

DEFICITS IN SOCIAL SKILLS AND FEEDING BEHAVIORS ASSOCIATED WITH
ADULTS DIAGNOSED WITH AUTISTIC DISORDER LIVING IN AN
INSTITUTIONALIZED SETTING

A Thesis

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Master of Arts

in

The Department of Psychology

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B.A., Princeton University, 2001
August 2007

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Abstract

Autistic disorder, a syndrome beginning in infancy and persisting into adulthood, has captured the attention of researchers and clinicians alike. Although this disorder has been studied since the mid-1940s, there is a lack of literature addressing certain adaptive skills in adults with autism. The aim of this study was to examine the differences in social and feeding skills between individuals with and without autistic disorder. Given the importance of acquiring these skills to facilitate proper adjustment and decrease potential health risks, better understanding of these behaviors in persons with autism is warranted. Participants comprised three separate groups: an autism group, a control group exhibiting psychopathology other than autism or pervasive developmental disorder not otherwise specified (PDD-NOS), and a control group consisting of individuals not diagnosed with an Axis I disorder. The author hypothesized that there would be significant differences between the three groups on the MESSIER and the STEP, two scales designed to measure social skills and feeding related problems in individuals with developmental disabilities. In particular, the autism group was expected to show fewer strengths and greater deficits in social and feeding skills in comparison to the other groups. Furthermore, the investigator hypothesized that associated items from the MESSIER and the STEP, determined by post hoc analyses, would differ across the autism, psychopathology, and control groups, such that the correlation between mean subscale scores would be significantly higher for the autism group than for the other two groups. Analyses of the mean subscale scores on the MESSIER and the STEP did not show any significant differences across the groups.

INTRODUCTION

Since its identification in 1943, the study of autism has fascinated researchers and clinicians alike. As a result, it has drawn the attention of various researchers who attempt to explain some of the core features of the disorder. Studies focusing on social skills and feeding behaviors in adults with autism, however, are quite limited despite their obvious importance. The goal of the present study will be to examine social skills, feeding skills, and mealtime behaviors of adults with mental retardation and autism in comparison to adults with mental retardation and other psychopathology. First, a brief synopsis of autism, social skills, and feeding and mealtime behaviors in individuals with mental retardation will be discussed.

Autistic Disorder

History and Diagnosis of Autistic Disorder

Poignantly calling attention to the general attitude toward childhood disorders during the early to mid-1940s, Wile (1943) notes, “Too frequently [the nervous child] is a result of a generic classification of misunderstood children, whose problems are not recognized save in terms of their failure to live up to the standards of their families or community...He may be a deviate in physiologic, psychologic, or social adaptation” (pp. 211-212). This was a time when psychodynamic theories dominated the field of psychotherapy. Children who deviated from the norm were considered nervous or anxious children resulting from inadequate parenting. Despite emerging biological and behavioral theories, the psychodynamic approach remained the dominant model for several decades. Unfortunately, this was true for a childhood disorder discovered by Dr. Leo Kanner in 1943, and it was this view that hindered research into the causes of this disorder until the 1970s.

In 1928, Dr. Leo Kanner began his study of autism at Johns Hopkins University. At that time Kanner applied for a Commonwealth Fellowship at the Henry Phipps Psychiatric Clinic, then headed by Professor Adolf Meyer. Only three years into his fellowship, Kanner was appointed to a permanent position as the chief director of the first child psychiatry division, when Meyer and Edward A. Park, Professor of Pediatrics, decided to begin a new wing of The Harriet Lane Home, a pediatric hospital. Prompted by his appointment, Kanner taught himself child psychiatry (Sanua, 1990). In 1935, he published the first child psychiatry book written in the English language, entitled *Child Psychiatry*. These endeavors prepared him for the work he would do in autism.

Kanner is most well known for his 1943 article entitled "Autistic disturbances of affective contact". This revolutionary article, printed in the journal *Nervous Child*, was the first to identify and describe this particular childhood disorder. In a study of 11 cases of children ranging in age from 2 ½ years to 11 years old, with eight children between the ages of 2 and 6 years old, Kanner (1943) found abnormal functioning in four general areas: 1) social interaction, 2) language, 3) intrusions, and 4) insistence upon sameness. He believed that the most basic, underlying cause of the disorder was an "inability to relate themselves in the ordinary way to people and situations from the beginning of life" (Kanner, 1943, p. 242) coupled with an "extreme autistic aloneness" that prevented these children from interacting with others. In each case, Kanner reported that the child took more interest in common objects than in people or family members. He also noted that these children suffered from several impairments in and related to language. Only 8 of the 11 children learned to speak according to normal developmental milestones or after some developmental delay. These children developed outstanding rote memory, mastering such things as Mendelssohn's violin concerto and the Twenty-third Psalm. But within these 8 speaking

children, the use of language as a communicative tool was no different from that of the three mute children. Other impairments in language included echolalia (both immediate and delayed), literalness, and pronomial reversal.

Next, Kanner found that these children reacted adversely to certain forms of intrusions upon them. Most of the parents reported that tube feeding was required in certain cases for some children who refused to eat. The children often responded negatively to intrusions such as loud noises and moving objects. Vacuum cleaners, swings, mechanical toys, syringes, and stethoscopes were among things that these children feared. Kanner theorized that the infringement upon the child's solitude led to the fear and repulsion exhibited towards the objects.

These children also suffered from an insistence upon sameness. They would not tolerate changes to their environment, so objects had to be placed in precise locations the child had selected. Daily activities, including some conversations, had to be performed with ritualistic exactness, otherwise the child would begin to tantrum. This behavior was carried on to such a degree that the ability for spontaneous activity was severely limited. Many of the children studied also suffered from motor stereotypies, and could spend hours engaged in repetitive actions such as finger waving.

Unfortunately, with the insight that Kanner brought to the psychological and medical community, along came confusion. The naming of the disorder, *infantile autism*, generated a great deal of controversy. *Autism* is derived from the Greek word "autos" meaning "self". Eugen Bleuler used this term to refer to the self-centered thinking, leading to a withdrawal from the real world into a fantasy world that is characteristic of schizophrenia. Based on the social aloofness that characterized the behavior observed in the children in his study, Kanner used the word autism to label this disorder. In his initial description of the disorder, Kanner maintained the

distinction between the later onset of childhood schizophrenia and the autistic behaviors in his group, "The children of our group have all shown their extreme aloneness from the very beginning of life..." (p. 248). He even provided physical evidence of this early occurrence by noting reports of failure among the children as infants to ready their bodies to be picked up, an anticipatory behavior that is found in normally developing infants.

Nonetheless, researchers continued to group infantile autism and other similar syndromes affecting children, into a general category of "childhood schizophrenia" (Rutter, 1972). In a follow-up study of the original 11 children studied, Kanner (1971) reconfirmed his belief in autism as a separate disorder from childhood schizophrenia, noting the 'innate disability to form the usual, biologically provided contact with people' (p. 141). However, it was not until 1971, when an article was published by Michael Rutter, that the distinction between infantile autism and childhood schizophrenia was recognized. Rutter (1972) described five major differences between the two disorders. First, he stated that while autism entails an inability to cultivate social relationships, schizophrenia is a retreat to a world of fantasy that is focused upon the self. The impairment in autism was derived from a developmental deficit, while in schizophrenia it resulted from an aberration from normal development. Second, Rutter (1972) noted that the progression of autism and schizophrenia was markedly different. The former sustained a generally steady path in symptomatology, while remission and relapse characterized the latter. Third, Rutter (1972) noted that mental retardation was common in autism, but not in schizophrenia. Fourth, Rutter (1972) stated that the rate of the disorders among men and women differ greatly. Lastly, epilepsy was found to occur more frequently in autism and occurred in a different region of the brain when compared to childhood schizophrenia (Rutter, 1972).

Controversy surrounded Kanner's findings that children with autism were of average to above average intelligence (Mesibov, Adams, & Schopler, 2000; Volkmar, Klin, & Cohen, 1997). Based on the outstanding vocabularies and memorization skills, Kanner (1943) concluded that autistic children have "good cognitive potentialities." Since then, however, researchers have concluded that most children with autism are indeed mentally retarded, and many do not develop useful expressive language (Mesibov et al., 2000; Volkmar et al., 1997). Kanner also suggested that autism was unrelated to other medical conditions, a supposition that has since been proven false (see Volkmar et al., 1997).

The observations of Kanner on birth order and social class status also drew much attention from the scientific community. Kanner found three of those studied to be only children, and six were firstborn children. Since then, researchers have both confirmed and discredited these original findings, but ultimately researchers are uncertain of the role that birth order plays in autism (Mesibov et al., 2000). As far as social class, Kanner suggested, based on his findings, that children with autism come from families of high intelligence and socioeconomic status. All of the fathers were professionals who had attended either medical school, law school, or graduate school, and nine of the mothers were college graduates (Kanner, 1943). More recent research shows that the rate of autism across social class disappears when controlling for certain biases (i.e., parents of higher socioeconomic status are more likely to seek treatment for abnormal behavior in their children) (Wing, 1980).

The single most controversial issue in the study of autism has been the role of parents in the disorder. "In the whole group, there are very few really warmhearted fathers and mothers. For the most part, the parents, grandparents, and collaterals are persons strongly preoccupied with abstractions of scientific, literary or artistic nature, and limited in genuine interest in

people" (Kanner, 1943, p. 250). This statement, paired with Kanner's reports of emotional dysfunction, led many researchers and theorists to apply the psychodynamic approach to the study of autism. They felt that an inability on the part of the parents to provide emotional support to their child resulted in the social withdrawal of the child. Theorists seemingly ignored Kanner's statement in his initial report, "...whether or to what extent this fact has contributed to the condition of the children. The children's aloneness from the beginning of life makes it difficult to attribute the whole picture exclusively to the type of the early parental relations..." (p. 250).

Despite growing evidence from biologically-based research to support Kanner's doubts, theorists held on to the psychodynamic view for three main reasons (Mesibov et al., 2000). First, the presentation of autism was similar to other childhood disorders that were considered psychogenic. Second, the behaviors resembled those of concentration camp survivors, and thus were attributed to exceeding deprivation. Third, classified as an emotional disorder, autism was then regarded in a similar vein as other childhood disorders. Since childhood autism fell victim to the winds of the *Zeitgeist* during the 1940s through the 1970s, research into the true etiology of the disorder was left virtually untapped for several decades. By the time of his death on April 3, 1981, Dr. Leo Kanner wrote 10 books and approximately 300 articles, and some of these works were devoted to dispelling the myths surrounding the causes of autism.

Today, the true value of the original account of 11 children with autism given by Kanner is apparent. He was able to establish several facets of the disorder, that continue to be key characteristics of autism, 1) impaired social interaction, 2) impaired language, 3) sensory sensitivities, 4) insistence upon sameness and ritualistic behaviors, 5) stereotypy, and 6) impaired gait and gross motor functioning. Additionally, he noted autism to be a disorder that is

developmental in its pathology. Finally, Kanner established a differential diagnosis between autism and schizophrenia.

Diagnosis and Classification

Since the history and early controversies in autism have been addressed, it is necessary to examine current issues in the classification and diagnosis of the disorder. This situation will begin to clarify the way in which autism is presently perceived in both the scientific community and in our society in general. The most obvious benefit of having a classification system for autism is that it allows for better communication among clinicians, researchers, educators, and legal specialists (Volkmar & Cohen, 1988; Volkmar et al., 1997). Classification schemes establish set criteria from which clinicians and educators can uniformly and consistently diagnose and treat a given disorder. At the same time, it gives researchers a consistent package of symptoms when investigating a particular disorder. For legal specialists, classification systems provide a framework from which special benefits can be created (Volkmar et al., 1997). It is important, then, to establish criteria that are stringent enough to weed out those who do not have a given disorder, while at the same time creating criteria that are inclusive of those who may have lighter expressions of a disorder. As a result, two orientations are at the forefront of classification systems, the categorical approach and the dimensional approach.

In categorical approaches to classification schemes, diagnosis is based on an "either you have it or you do not" philosophy. Clinicians and researchers conduct field trials to determine prevalence, comorbidity, and characteristic symptoms to become integrated into the clinical picture of the disorder. The primary deficits reported by Kanner (1943) continue to be considered hallmarks of the disorder as evidenced by current classifications in the *International Classification of Diseases, 10th edition* (ICD-10) (World Health Organisation, 1993; WHO) and

the *Diagnostic and Statistical Manual of Mental Disorders, fourth edition-text revision* (DSM-IV-TR; American Psychiatric Association, 2000; APA). Furthermore, the ICD-10 and the original DSM-IV (APA, 1994) were created to be diagnostically similar (Volkmar et al., 1997), and these efforts are clearly seen in their definitions of autism.

In the ICD-10 (WHO, 1993), autism is labeled "childhood autism" and consists of three major criteria. First it states that, prior to the age of three, deficits in either receptive or expressive social communication, the development of normal social attachments and reciprocal social interaction, or functional/symbolic play must be present. The second major criterion requires that at least six symptoms must be present across its three subdivisions. One subdivision involves impairments to communication in one area such as 1) a delay in, or lack of development in spoken language, without compensatory gesturing; 2) problems in initiating or maintaining reciprocal language; 3) stereotyped, repetitive, or idiosyncratic use of language; or 4) lack of spontaneous social imitative and "make believe" play. The second subdivision involves two impairments to social interaction made evident by 1) failure to use facial and bodily expressions; 2) developmental deficits in peer relationships through common interests, activities, and emotions; 3) lack of "socioemotional reciprocity" through an inability to effectively respond to the emotions of others or to modify one's behavior to the social context; or 4) failure to seek or share common interest, pleasure, or achievements with others. The third subdivision involves restricted, repetitive, or stereotyped behavior, interests, and activities as shown by obsessions with an abnormal object of focus, compulsive maintenance of routines or rituals, stereotyped motor movements involving fingers or the whole body, or preoccupations with parts of or nonfunctional objects. Finally the last major criterion stipulates that the symptoms cannot be accounted for by other pervasive developmental disorders, disorders of receptive language,

reactive attachment disorder, disinhibited attachment disorder, mental retardation with an associated behavioral or emotional disorder, early onset schizophrenia, or Rett's Syndrome.

The DSM-IV, on the other hand, labeled this disorder originally recognized by Leo Kanner (1943) as "autistic disorder". This edition was created to remedy several problems caused by the DSM-III-R (APA, 1987) definition of the disorder. The DSM-III-R had (a) criteria that were too elaborate in an attempt to address the full spectrum of autism just like the ICD-10, (b) a limited operational definition due to the inclusion of examples in the criteria, and (c) a deletion of the criteria regarding the age of onset, which was a crucial aspect of Kanner's (1943) definition (Volkmar et al., 1997). Therefore, the DSM-IV created stricter criteria, by eliminating some examples and including age of onset as a required criterion for the diagnosis of autism. These changes reduced the number of overdiagnosed cases of autism (Volkmar et al., 1997). Another important revision allowed the DSM-IV to have a definition for autism that was useful to both researchers and clinicians, unlike the ICD-10 which has separate classifications for the two groups (Volkmar et al., 1997).

Similar to the ICD-10, the DSM-IV-TR establishes three major diagnostic criteria. The first requires that at least six symptoms across three subcriteria must be met. Two impairments in social interaction must be present, in activities such as facial expressions and body postures, peer relationships (appropriate to developmental level), joint attention, and social or emotional reciprocity. There must be at least one impairment in communication as evident in spoken language, initiating and maintaining conversation, stereotyped and repetitive or idiosyncratic use of language, or spontaneous make-believe or social imitative play (according to developmental level). And, there must be at least one aspect of restricted, repetitive and stereotyped behaviors, interests, and activities, shown by preoccupations with narrow interests of focus or intensity,

compulsions toward nonfunctional routines and rituals, stereotyped and repetitive motor mannerisms, and obsessions with parts of objects. The second major criterion requires a delay or deficit, with onset before 3 years of age, in either social interaction, language as used for social communication, or symbolic or imaginative play. Lastly, the third major criterion states that Rett's Disorder or Childhood Disintegrative Disorder can not better explain the child's behavior.

While categorical classification schemes take an "all or nothing" approach to diagnosis, dimensional classification schemes are far more permissive. The dimensional approach considers autism and autistic-like disorders as separate points along a spectrum of severity. In this way, pathological behavior is judged by its deviation from normalcy based on adaptational level, age, developmental level (both physical and mental), frequency, and number of behaviors, in addition to severity of symptomatic expression. This helps create the distinction between high and low functioning individuals with autism. These factors are then weighted and summed to determine the severity and threshold for diagnosing autism (Volkmar, 1998).

In order to classify a person with autism dimensionally, one would use several of an array of rating scales and questionnaires to arrive at a diagnosis. The *Childhood Autism Rating Scale* (CARS) (Schopler, Reichler, & Renner, 1988) is the most frequently used rating instrument, composed of 15 items of a 4-point scale, used after behavioral observation. Although the CARS may discriminate between autistic children with mental retardation and those without mental retardation, it tends to overdiagnose children with autism (Lord, 1997). The *Autism Diagnostic Observation Schedule* (ADOS) (Lord et al., 1989) designed for children ages 6 to 18 years, and the *Pre-Linguistic Autism Diagnostic Observation Schedule* (PL-ADOS) (DiLavore, Lord, & Rutter, 1995) designed for children under 6 years old, are also observational measures used by trained clinicians to assess social and communicative behaviors. Both the ADOS and the PL-

ADOS have good interrater reliability for individual items and excellent reliability for total items, and internal consistency for both instruments are reported to be good (Lord, 1997). Clinicians can also use instruments designed to interview caregivers such as the *Autism Diagnostic Interview-Revised* (ADI-R) (Lord, Rutter, & Le Couteur, 1994) which has 93 items and takes approximately 90 to 150 minutes to conduct. Interview-based behavior rating scales also include the *Gilliam Autism Rating Scale* (Gilliam, 1995) and the *Autism Behavior Checklist* (ABC) (Krug, Arick, & Almond, 1993). The ABC, created to assess body and object use, language, sensory behaviors, relating, and social interaction, is a particularly useful instrument because it can be used to plot changes in autistic and autism-related behaviors (Lord, 1997). Interrater reliability is high for the ABC and discriminant validity can be high when based upon discriminant data from within a group. The *Vineland Adaptive Behavior Scales* (VABS) (Sparrow, Balla, & Cicchetti, 1984) although not designed specifically for autism, has become useful in assessing deficits in daily adaptive functioning (Shriver, Allen, & Mathews, 1999).

In summary, Kanner's (1943) original findings continue to play an important role in the classification and diagnosis of autism. Both the DSM-IV-TR and the ICD-10 capture the essence of and extend Kanner's original descriptions and are diagnostic tools beneficial to both researchers and clinicians. The categorical approach establishes a concrete label as far as having autism or not, while the dimensional approach provides a clearer picture about the variability and severity of the disorder.

Prevalence and Associated Disorders

Although autistic disorder is a pervasive and extremely debilitating syndrome, it is not common. A meta-analysis done on 21 epidemiology studies found a median prevalence of 10.0 in 10,000 cases (Fombonne, 2005), an increase from previous studies (see Fombonne, 1998).

Another study suggests that the prevalence of autism can be as high as one in 1,000 (Bryson, 1997). In his 1971 follow-up study, Kanner noted that the Johns Hopkins Hospital reported a sex ratio of four boys to one girl diagnosed with the disorder. Consistent with these findings, Fombonne (1998) concluded a sex ratio of 3.68, males to females.

There are many medical conditions associated with autism. Children with autism frequently display hyperactivity, sensory sensitivities, short attention, aggressiveness, self-injurious behaviors, tantrums, impulsivity, aberrant mood or affect, and a lack of fear to dangers (APA, 1994). Also, problems in sleep have been found across all IQ's in autism (Richdale, 1999). Baron-Cohen and Wheelwright (1999) concluded that obsessions in autism tend to focus around folk physics (basic knowledge of how the physical world of objects works) and people with autistic disorder are impaired in folk psychology (basic knowledge of how the social world works). Depression has been implicated in higher functioning individuals who realize the gravity of their impairment (APA, 1994). An epidemiological study found that in autism about 40% of people with autism have severe or profound mental retardation, 30% have mild or moderate mental retardation, and the rest have normal to above normal intelligence (Fombonne, 2005). Fombonne (1998) also found the following rates in associated conditions: 16.7% epilepsy, 2.75% cerebral palsy, 2% fragile X, 1.1% tuberous sclerosis (100 times higher than expected), 0.3% neurofibromatosis, 1.1% Down's Syndrome, 0.9% congenital rubella, 3.1% hearing impairments, and 1.3% for visual impairments. There was no association between autism and socioeconomic status (Fombonne, 1998). In summary, autism is a rare disorder affecting disproportionately more males than females, and is associated with many conditions both medical and psychological.

Etiology

Many general findings can be gleaned from the cognitively based theories of autism. First, the executive dysfunction hypothesis posits a correlation between the ability to plan and carry out complex behavior and social skills such as joint attention, reciprocal social interaction, imitation, and pantomime skills (Pennington et al., 1997). Second, the information processing approach suggests that the impairment in autism is the result of general cognitive deficit in the ability to process complex features of an object or event, so that the specific areas of impairment differentiate autism from other similar disorders, such as Tourette Syndrome and Attention Deficit Hyperactivity Disorder (Ozonoff, 1997; Minshew, Goldstein, Muenz, & Payton, 1992; Minshew, Goldstein, & Siegel, 1997). Third, the theory of mind hypothesis suggests that autism appears to involve an inability to appreciate the mental states of oneself and others. This negatively impacts communication (especially nonverbal communication) and social interaction skills (Baron-Cohen, O'Riordan, Stone, Jones, & Plaisted, 1999; Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001; Ziatas, Durkin, & Pratt, 1998). Fourth, research also suggests that individuals with autism tend to selectively focus on one aspect of a visual field to the exclusion of other aspects. These individuals show deficits in disengaging attention as well as slowed orienting, such that impairment is at the performance and not the competence level (Bara, Bucciarelli, & Colle 2001; Casey, Gordon, Mannheim, & Rumsey, 1993; Prior & Ozonoff, 1998; Townsend, Harris, & Courchesne, 1996).

Many general findings can be concluded from biological studies on the etiology of autism. Researchers in genetics suggest that abnormalities, such as deletions and mutations, on several genes are linked to autistic disorder (DeLong, 1999; Rodier, 2000; Rutter, 2000; Rutter, 1997). Twin and family studies reveal the high degree of heritability of autism with a 60% to

90% concordance among monozygotic twins (Rapin, 1999; Rutter, 2000), less than 10% concordance among dizygotic twins (Rapin, 1999; Rutter, 2000), and a 3% to 8% concordance for siblings (Rodier, 2000). Research in face processing has shown that individuals with autism are impaired in the recognition of faces, especially when the faces are expressing emotions (Gauthier, Behrmann, & Tarr, 1999; Gauthier, 2001; Nelson, 2001). Furthermore, this area of study implicates dysfunction of the amygdala (Abell et al, 1999; Adolph, Sears, Pivens, 2001; Baron-Cohen et al., 2000) and the fusiform gyrus and the inferior temporal gyri (Schultz et al., 2000) in autism. In addition, biological research in the study of autism has revealed that the cerebellum plays a role in both motor and cognitive functions, such as shifting attention (Allen, Buxton, Wong, & Courchesne, 1997; Courchesne et al., 1994; Harris, Courchesne, Townsend, Carper, & Lord, 1999; Minshew, Sweeney, & Bauman, 1997; Townsend et al., 1999) so abnormalities in this area of the brain has been implicated.

Key Features

Temple Grandin, a woman with high intellectual functioning and autism, described her own experiences. “When I encounter a new social situation I have to scan my ‘video tape’ library of experiences and find a similar situation for comparison. I then make a logical decision based on previous experiences” (Grandin, 1995, p.153). Although she is representative of approximately one-fourth of the population of autistic individuals, her account is a window into the mind of a person with autism. Autism is characterized by deficits or excesses in several areas, including 1) cognition, 2) language, 3) restricted range of interests, 4) feeding problems, and 5) social skills.

Cognitive Impairment. Although not a part of the official DSM-IV-TR diagnosis of Autistic Disorder, one main focus of research on the symptoms of autism is that of cognition.

Most studies show that a higher score is reported on the Performance IQ than on the Verbal IQ on the Wechsler Intelligence Scales (for review see Lincoln, Allen, & Kilman, 1995). Further analysis shows that the Verbal Comprehension score is lower than the Perceptual Organization score, supporting the finding that individuals with autism show weaknesses in verbal comprehension and strengths in visual motor and perception abilities (Lincoln et al., 1995). Support for this trend suggests that high-functioning people with autism perform well on the Block Design subtest of the Performance Subscale but score very poorly on the Picture Arrangement subtest (Siegel et al., 1996). Autistic persons also show hyperlexia, i.e. skills for word recognition are significantly better than would be otherwise predicted by social skill deficits and educational or intellectual functioning (Prior & Ozonoff, 1998). Despite discrepancies between mechanical and conceptual abilities in reading (i.e. strengths in phonological processing and weaknesses in comprehension and interpretation), high-functioning autistic individuals perform as well, if not, better than matched controls in arithmetic calculation and applied mathematics (for review see Prior & Ozonoff, 1998).

Another aspect of cognition that has been examined in individuals with autism is that of memory. In his original study Kanner (1943) found that children with autism have excellent rote memory. Since then, researchers have further investigated the role of memory in autism. Lincoln and colleagues (1995) reported five major conclusions regarding memory and autism. First, immediate recall of stimuli presented visually and orally was preserved although an earlier study found significant differences (Ameli, Courchesne, Lincoln, Kaufman, & Grillon, 1988). Second, short-term and serial-memory was in tact. Third, cued recall and associative learning were normal, supported by findings from recent research (Mottron, Morasse, & Belleville, 2001). Fourth, Lincoln and colleagues (1995) concluded that recall and recognition following filled-

retention intervals were impaired. Finally, they found that individuals with autism show deficits in remembering recent events, although these findings are challenged (Hermelin & Frith, 1991; Mottron et al., 2001; Prior & Ozonoff, 1998). Furthermore, deficits in working memory, the maintenance of information in an activated state to guide cognitive processing, was found to be impaired when compared to control groups (for review see Prior & Ozonoff, 1998).

Possibly the most fascinating aspect of cognition in persons with autism is the presence of splinter skills, more commonly known as “idiot savant” abilities. Some individuals with autism are capable of amazing cognitive feats, such as complex mathematical calculation, counting, calendar calculation, and rote memory (Prior & Ozonoff, 1998). Other areas of special ability include music, art, mechanical ability, geographical knowledge (for maps, routes, etc.), and multiple skills (Prior & Ozonoff, 1998). However, it is possible that these abilities are based upon strategies governed by rules. Also, these special skills appear to be related to the circumscribed interests of autistic persons, but these talents bear little positive influence upon other cognitive and social skills (Prior & Ozonoff, 1998).

Language. Most noticeably, individuals with autistic disorder suffer from pronounced impairments in language and communication. Most autistic children never develop speech, while the rest suffer from a delay in the acquisition of spoken language (APA, 2000; Frith, 1989). The pragmatic skills, the use of language to communicate, of children with autism is also impaired because most fail to use language to communicate (Lord & Paul, 1997). This includes an inability to respond to, initiate, and sustain conversations derived from an inability to appreciate the emotions of others, an inability to recognize social norms, and cognitive impairments to control what is said (Frith, 1989). Children with autism engage in idiosyncratic use of words and metaphorical phrases (APA, 2000; Frith, 1989). They commonly use neologisms, new words

created by the child. Autistic children frequently do the same thing with metaphorical phrases, not taking into account the effort the listener would have to undertake in order to understand the meaning of the phrase (Frith, 1989). At the same time, children with autism will use pendant speech, which is overly formal, very literal and concrete speech. As a result, language is limited in vocabulary, except in the technical terms for an area of interest (Frith, 1989). Echolalia, the parrot-like repetition of a word or phrase, is also common in autism. (Hermelin & Frith, 1991). A highly visible form of language impairment is the reversal of pronouns. Some children with autism will refer to themselves in the second person and refer to others in the first person (e.g. “you want a drink” when they mean to say, “I want a drink”). Finally, children with autism display difficulties in the prosody, or melody of language (Frith, 1989; Lord & Paul, 1997). Speech can be monotonous, staccato, sing-songy, high in pitch or volume, harsh or hoarse, or otherwise deviant in intonation. All of these abnormalities in language and communication are characteristics of autism.

Restricted Range of Interests and Sensory Abnormalities. Other primary features of autism include restricted and repetitive behaviors (APA, 2000). Individuals with autism will often show obsessive interests in particular topics, most commonly baseball statistics, buses or train schedules, transportation or aspects of transportation (Folstein, 1999). Not only do these function as conversation pieces (albeit unsuccessfully due to the extreme preoccupation), but they also serve as pacifiers in times of distress. When unable to navigate the nuances of social interaction or when placed into a new situation, reciting such statistical knowledge alleviates their tension through negative reinforcement (Attwood, 1998).

Individuals with autism also suffer from an insistence upon sameness and ritualistic behaviors. Rooms, possessions, and activities often have to be situated and performed in the

exact same way, time and time again. If an object is out of place, or if the routine is not followed to the letter, tantrums, self-injurious behaviors, or reversions to circumscribed interests can ensue. Hence, these rituals and special interests continually reduce anxiety caused by an otherwise chaotic or novel situation (Attwood, 1998). Furthermore, a person with autism could become engaged in various stereotyped movements of the limbs or body such as clapping, finger flicking, rocking, or swaying for hours if left alone to do so. These are characteristics that Kanner noticed in his original study (1943) and continue to be fundamental aspects of autism.

Along with restricted focuses of interest, another area of abnormal functioning characteristic of autism are deficits in sensory and motor abilities "...[I]ntrusive methods may cause a child with severe sensory impairment to withdraw due to sensory overload" (Grandin, 1995, p. 153). Although it is not a part of the official diagnosis, children with autism frequently suffer from sensory hypo- or hypersensitivities and are therefore often averse to human touch as well as the feel of certain fabrics (Folstein, 1999). As a result, they will shy away from other people, and will often refuse to wear certain types of clothing, or wear clothing on particular body parts. Other tactile sensitivities include running water or sand through one's fingers and aversions to certain types of food (Prior & Ozonoff, 1998; Folstein, 1999). As a result, autistic children will often be diagnosed with feeding disorders due to the refusal to eat certain types of food due to its texture or taste. Some individuals are hypersensitive to certain noises such as vacuum cleaners and coffee grinders, and some are able to hear vehicles such as trains in the distance and airplanes overhead long before anyone else (Folstein, 1999). Low functioning individuals with autism will often stare endlessly at lights, moving fans, their own fingers flicking in front of lights, or particular objects (Prior & Ozonoff, 1998). In addition to the motor deficits already mentioned, children with autism are often clumsy in both fine and gross motor

coordination (Folstein, 1999) and have an abnormal gait, including toe-walking. Furthermore, there is usually some type of delay in motor milestones. The degree and severity of sensory and motor abnormalities vary both across and within children with high and low functioning autism.

Social Skills. Arguably the most debilitating features of autistic disorder are the impairments in social interaction. Wing and Gould (1979) focused on a “triad of impairment” in imagination, communication, and socialization as the fundamental features in autism. Set up in this fashion, the social deficits in autism can be analyzed across levels of functioning and across one’s lifetime. During infancy and childhood, autistic children will be only minimally engaged in activities with others, often preferring to play by themselves (Volkmar, Carter, Grossman, & Klin, 1997). In older children, attachments can form with parents and they may engage in conversation with others. In higher-functioning children, they may try to initiate and maintain conversation, often unsuccessfully because of 1) failure to establish a common topic or basis for the interaction, 2) failure to observe social norms or consider the feelings of the other person, and 3) a dependence upon a circumscribed interest for conversation, rarely engaging in spontaneous conversational topics (Volkmar et al., 1997). Although individuals with autism are able to develop coping strategies as they mature to adulthood, the majority of their social impairments persist throughout their life span. Impairments in social interaction affect several areas, such as nonverbal behavior, joint attention, attachment and affective development, and imitative play.

An area of social impairments in children with autistic disorder is the use of multiple nonverbal behaviors (APA, 2000). One representation of this deficit is in the lack of eye contact between the child and the caregiver. Eye contact, coupled with facial expressions, provides the basis for the sharing of affective states (for review see Volkmar, 1997). Volkmar and colleagues (1997) further noted that the amount of eye contact between the autistic child and the caregiver

varies with the demands of the situation and the level of functioning and development of the child so that higher functioning and developmentally mature children are capable of longer amounts of gaze. A study that investigated the understanding and use of gestures by autistic children showed deficits in nonverbal behavior (Attwood, Frith, & Hermelin, 1998). They found that while autistic children used instrumental gestures to the same extent as comparison groups, there were deficits in the understanding and use of expressive gestures (those conveying emotion).

Besides nonverbal behaviors, individuals with autism also show impairments in joint attention. Joint attention is considered the specific social interaction in which two people can share a common visual focus without the aid of verbalizations. This activity is either nonexistent or, when present, unusual in children with autism (Mundy, Sigman, & Kasari, 1994). Mundy and colleagues (1994) found that children who are impaired developmentally show a greater deficit in joint attention. The authors concluded that children with autism are able to engage in protoimperative pointing (use of nonverbal behavior to get help in obtaining an object) but lack protodeclarative pointing (use of nonverbal behavior to gain the attention of another toward a common focus; for review see Volkmar et al., 1997). So Kanner's (1943) original finding that "people are included in the child's world to the extent to which they satisfy his needs..." (p. 249) is supported by recent research.

"We must, then, assume that these children have come into the world with innate inability for the usual, biologically provided affective contact with people, just as other children come into the world with innate physical or intellectual handicaps" (Kanner, 1943, p. 250). Attachment and affective development are also aspects of social interaction that are impaired in children with autistic disorder. Using such tests as the "Strange Situation" autistic children are found to display

secure attachments to their mother, but that these attachments are somewhat odd compared to comparison groups (for review see Volkmar et al., 1997). Children are often difficult to hold (Kanner, 1943) and older children less frequently engage in peer interactions (Attwood et al., 1988). Children with autism also have difficulties in recognizing the emotions of others, an idea that provides the basis for the “theory of mind” hypothesis of autism. Affective development is also impaired due to deficits in expressing and producing emotional responses (Volkmar et al., 1997). Given these problems in attachment and affective development coupled with disabilities in joint attention, it is no wonder that social interaction in autism is impaired.

A final area of difficulty in the realm of social interaction is in imitation and play of children with autism. There is still debate over the origins of this problem, but research shows that children with autism have difficulty imitating body movements and engaging in symbolic play (for review see Volkmar et al., 1999). With an impoverished ability for making objects represent other objects (e.g. a banana as a telephone or a chair as a car), interacting with peers through play becomes a difficult and awkward task.

An important issue to keep in mind when considering issues in the presentation of autism is the high degree of variability in expression. An individual with autistic disorder can be high functioning and display very few of the symptoms, so few that the person can be well integrated into society, just having an odd social style. At the other end of the autistic spectrum, a low functioning individual can suffer from many of the characteristic behaviors of autism, requiring life-long treatment and unable to live independently. Autism is a disorder with core symptoms of impairment to social interaction, communication, and language, with unusual intellectual capabilities and restricted, stereotyped behaviors and interests of varying intensities.

Social Skills

Deficits in social interactions are a key feature of autistic disorder and are common in the population of individuals with mental retardation. As a result, these deficits can and often do persist throughout one's lifetime. Furthermore, it has been remarked that "even the highest functioning individuals show deviance that is readily apparent to lay persons" (Volkmar, 1987, p. 47). Abnormalities in social functioning characteristic of these individuals have important implications for opportunities for normalization, placement in the least restrictive setting (Matson, Taras, Sevin, Love, & Fridley, 1990), and adjustment and success in community settings (Langone, Clees, Oxford, Malone, & Ross, 1995). Adults with autistic disorder have been noted to lack identifiable friends, have flat affect (Rumsey, Rapaport, & Sceery, 1985), and have deficits of social behavior that would impede the development of social skills. A study conducted by Hall and colleagues (2005), found that individuals with mental retardation were less likely to hold jobs, become married, have children, own homes, and engage in adult education, when compared to adults with normal intellectual functioning. People with autistic disorder and mental retardation, therefore, can benefit from social skills training.

A large number of people with autistic disorder reside in residential facilities. Research suggests that in follow-up studies, a large percentage of participants lived at residential facilities (Kanner, 1971). More recent research suggests that as many as 95% of adults with autism reside in state-run facilities (Hitzing, 1987). The fact that large numbers of adults with autism reside in institutionalized settings and compounded by the fact they are not able to gain experience of social interactions that are afforded individuals living in communities, highlights the need for social skills training in this population.

The training of social skills in adults with autistic disorder ought to be of great importance. Institutions, developmental centers, group homes, and day programs should allow individuals to interact with one's environment to the best of one's abilities. This can be accomplished by "the acquisition, maintenance, or generalization of behaviors that allow the individual to gain wider access to preferred materials, activities, or social interaction" (Van Houten et al., 1988, p. 382). Assessments allow for diagnosis, treatment prescription, and evaluation of treatment effect (Matson & Hammer, 1996). The assessment of skills will determine the particular strengths and weaknesses, which will in turn guide the development of a treatment or training plan, and thereby set the stage for the evaluation of the effectiveness of the treatment plan itself. In this way, the assessment and treatment of social skills in people with autistic disorder can maximize the potential benefit for the individual.

Assessment – Direct Observation

Direct observation is a useful method for the assessment of social skills. Due to the presentation of social skills as observable behaviors such as eye contact, posture, and voice volume (Bellack, 1979), it easily lends itself to direct observation (Laud, 2004). In vivo, or naturalistic, observation is conducted in the natural environment of the participant and raters score specific, operationally defined behaviors. Analogue observation also involves raters scoring operationally defined behaviors, however it does not occur in a natural setting. Role-play tests can be used, in which participants are presented with a scenario to which they must respond. This method allows for an inexpensive way to measure low-frequency behaviors (Bielecki & Swender, 2004).

Assessment – Checklists

For people with mental retardation, it is not always possible to conduct some observational methods, due to poor communication skills. As a result, checklists are often a better method when conducting assessments of social skills in people with severe and profound mental retardation (Browder & West, 1991). These measures are inexpensive, and efficient ways of gathering a range of information on individuals (Bielecki & Swender, 2004), particularly appealing for those clinicians and researchers working in residential or institutionalized settings.

Matson Evaluation of Social Skills for Individuals with sEvere Retardation (MESSIER; Matson, 1995). This tool is an informant-based measure designed to assess in individuals with severe and profound mental retardation strengths and weaknesses in social skills. These social skills are divided into 6 clinically derived factors of both positive and negative verbal, nonverbal, and general social skills. There are 85 items on the MESSIER and each item is scored on a 0-3 scale as well as a “not applicable” choice. The internal consistency of the MESSIER is high, with a Cronbach’s alpha of 0.94. It has good inter-rater reliability of $r = 0.73$ and high test-retest reliability of $r = 0.86$ (Matson, LeBlanc, & Weinheimer, 1999).

Vineland Adaptive Behavior Scales (VABS). The VABS Interview Survey Form (Sparrow, Galla, & Cicchetti, 1984) is an informant-based measure designed to provide a general picture of the adaptive functioning of a person. It consists of 225 items across the Communication, Daily Living Skills, and Socialization Domains, with an additional 27 items in the Maladaptive Behavior Domain. Each item is rated on a 0-2 scale, with additional choices for “don’t know” and “no opportunity” with regards to observing a given behavior. The VABS has good psychometric properties with test-retest reliability coefficients mostly in the 0.80s and

0.90s, and inter-rater reliability coefficients in the 0.70s, with the exception of a moderate coefficient of 0.62 for the Socialization Domain.

AAMR Adaptive Behavior Scale-Residential and Community, Second Edition (ABS-RC:2). The ABS-RC:2 (Nihira, Leland, & Lambert, 1983) is a 356-item informant-based measure designed to assess adaptive behavior. It was developed for use with people with disabilities in residential and community settings up to the age of 79 years old. This rating scale consists of two parts 1) Individual Responsibility and Daily Living and 2) Social Behaviors. The first part is composed of 10 domains including: independent functioning, physical development, economic activity, language development, numbers and time, domestic activity, prevocational-vocational activity, self-direction, responsibility, and socialization. The second part consists of 8 domains including: social behavior, conformity, trustworthiness, stereotyped and hyperactive behavior, sexual behavior, self-abusive behavior, social engagement, and disturbing interpersonal behavior. The ABS-RC:2 has good psychometric properties with internal consistency Cronbach's alpha coefficient ranging from 0.80 to 0.99, test-retest correlation coefficients ranging from 0.81 to 0.99, and interrater reliability correlation coefficients ranging from 0.83 to 0.99.

As previously mentioned, in addition to the deficits in social skills, it is common for individuals with autism to also have sensory sensitivities, often with food. Such sensitivities can result in selectivity and refusal of certain foods. This, in turn, sets the stage for the development of problematic feeding and mealtime behaviors (Babbitt et al., 1994).

Feeding and Mealtime Behaviors

In addition to the characteristic problems of social skills, individuals with autistic disorder often have deficits in feeding behaviors. Eating a few select foods extends naturally

from the sensory abnormalities and restricted interests of people with autism. The DSM-IV-TR (APA, 2000) also notes pica, the eating of non-food substances, as being associated with autism. Deficits with feeding skills have serious and important implications for individuals with autism. For example malnutrition, weight loss, lead poisoning, intestinal obstruction or perforation, failure to make expected weight, lethargy, and death are all possible results of problematic feeding behaviors in this population (APA, 2000; Gravestock, 2000a; Johnston, 1993). Often times medical intervention such as nasogastric or gastrostomy tubes are needed to obviate such deleterious consequences. Although these are possible ways of avoiding the grave consequences of prolonged feeding problems, these medical procedures are invasive, restrictive, and labor intensive.

Types and Prevalence of Feeding and Mealtime Behaviors

There are several different types of feeding deficits that can affect people with mental retardation. These include: pica, rumination, feeding disorder of infancy or early childhood, food selectivity, and feeding skill problems.

Pica derives its name from the Latin word for *magpie*, a bird that is known to eat various objects to satisfy hunger. It can be defined as the ingestion or mouthing of nonfood objects, such as string, cloth, paper, cigarette butts, cigarette ashes, dirt, leaves, twigs, feces, urine, paint, or coffee grounds (Bugle & Rubin, 1993; Danford & Huber, 1982). The DSM-IV-TR list four major criteria for receiving a diagnosis of pica disorder: 1) persistent eating of nonnutritive substances for at least 1 month, 2) this behavior is inappropriate to developmental level, 3) this behavior is not part of a culturally sanctioned practice, and 4) when the behavior occurs in the presence of another mental disorder such as mental retardation or pervasive developmental disorder, it must be severe enough to warrant a separate diagnosis. One study found pica to occur

in 25.8% of a sample of 991 individuals diagnosed with mental retardation (Danford & Huber, 1982). Danford and Huber (1982) also found that lower intellectual functioning was also associated with higher incidences of nonfood pica. Several studies found associations between autistic disorder and a diagnosis of pica (Gravestock, 2000a; Matson & Bamburg, 1999). In another study, 60% of a sample of participants with autism had pica, in comparison to only 4% of a sample of participants diagnosed with Down's syndrome (Kinnell, 1985).

Rumination can be defined as the chronic regurgitation of the contents of the stomach into the mouth and, usually, the chewing and reswallowing of rumitus in a repeated cycle after each bout of eating (Johnston, 1993; Rast, Johnston, Drum, & Conrin, 1981). The DSM-IV-TR requires that 1) this behavior persist for 1 month following normal functioning, 2) it is not due to an associated gastrointestinal or other related medical condition, 3) it does not occur exclusively with Anorexia Nervosa or Bulimia Nervosa, and 4) when it occurs exclusively with mental retardation or pervasive developmental disorder, it must be severe enough to merit a separate diagnosis. Individuals may facilitate rumination by manually stimulating the gag reflex, placing the upper body lower than the lower body, using centrifugal force by throwing the body forward, or by engaging in more subtle movements of the head and neck (Johnston, 1993). The prevalence of rumination in individuals with mental retardation is estimated at 5% - 10% of those living in residential settings, with a higher prevalence among those with more severe forms of mental retardation (Gravestock, 2000a). Gender differences have also been observed whereby boys are found to outnumber girls by 3 or more to 1 (APA, 2000; Johnston, 1993). Furthermore, Gravestock (2000a) found associations between rumination and autistic disorder, as well as social withdrawal.

A third feeding disorder described by the DSM-IV-TR is feeding disorder of infancy or early childhood. This disorder, also known as failure to thrive, is characterized by persistent failure to eat adequately, manifested by failure to gain weight or by significant weight loss (APA, 2000). The DSM-IV-TR criteria further state that: 1) this behavior exists for at least 1 month, 2) the behavior is not due to an associated gastrointestinal or other related condition, 3) it is not better accounted for by another mental disorder, and 4) onset of the behavior occurs before the age of 6.

Beyond the DSM-IV-TR exists several other types of abnormalities to feeding and mealtime behaviors that are problematic in individuals with mental retardation. Food selectivity and food refusal refers to eating a limited variety of foods of one's own volition (Riordan, Iwata, Wohl, & Finney, 1980). This selectivity can be of both food type as well as food texture (Munk & Repp, 1994). Food selectivity and refusal has been estimated to occur in anywhere from 19% to 43% of people with mental retardation (Gravestock, 2000a). Often problematic are the acquisition and maintenance of feeding skills of individuals with mental retardation (Riordan et al., 1980). Deficiencies can be observed in such skills as basic utensil use, neatness, table manners, and oral motor skills (Cooper et al., 1995; Sisson & Dixon, 1986). Several studies have noted associations between pervasive developmental disorders, feeding problems, restricted range of interests in food, and food refusal (Ahearn, Castine, Nault, & Green, 2001; Schreck, Williams, & Smith, 2004)

Assessment

Once the presence of feeding or other mealtime behavior problems are suspected, it is necessary to conduct an evaluation. Although there is not currently a codified method for conducting such an evaluation, certain steps can be taken to ensure a thorough investigation. A

structured examination of feeding problems can include screening of behavior, an interdisciplinary assessment, and an observational assessment (Kuhn & Matson, 2004).

The first step in conducting an evaluation of feeding and mealtime behavior skill deficits is to screen for such problems. Targeting psychopathology in individuals with severe and profound mental retardation, the *Diagnostic Assessment for the Severely Handicapped-II* (DASH-II; Matson, 1995) includes 6 items that deal with food stealing, vomiting, choking, pica, eating too quickly, and not eating enough. Additionally, the *Screening Tool of Feeding Problems* (STEP; Matson & Kuhn, 2001) is a 23-item rating scale designed to assess feeding and mealtime problems in people with mental retardation. The STEP has 5 subscales addressing risk of aspiration, feeding skills, selectivity, food refusal, and nutrition related behavior problems. Once the person has been screened for feeding problems, the next step is an interdisciplinary assessment of the problem.

The interdisciplinary assessment is composed of three parts, a medical evaluation, a nutritional evaluation, and an occupational therapy evaluation (Kuhn & Matson, 2004; O'Brien, Repp, Williams, & Christophersen, 1991). A medical work-up would help rule out the presence of an organic cause, such as gastroesophageal reflux disease (GERD), that could respond to medical treatment and therefore remove potentially aversive stimuli that surround feeding (e.g., avoiding foods high in acidity can exacerbate GERD). Other medical procedures such as a Barium Swallow Study, gastrointestinal tract endoscopy, gastric emptying scan, and esophageal manometry can clarify other potential structural or functional problems with the digestive tract, such as esophageal reflux and esophagitis, that can be targeted by medical interventions. Next, a nutritional evaluation can elucidate any problems with caloric intake, weight (O'Brien et al., 1991), food allergies, or inability to digest or metabolize food that may contribute to

problematic feeding and mealtime behaviors (Kuhn & Matson, 2004). Furthermore, an evaluation conducted by an occupational therapist can reveal potential problems with oral motor skills (e.g., sucking, swallowing, chewing, and tongue control), hand-eye coordination, tactile sensitivity, gross reflexive movements, and oral pharyngeal reflexes (Kuhn & Matson, 2004; O'Brien et al., 1991), all important aspects of self-feeding.

An equally integral component of the assessment of feeding problems in individuals with mental retardation is to conduct observational assessments of the behavior. Data can be collected, once operational definitions for the target behaviors have been established, to determine: 1) frequency measures (e.g., number of refusals, number of acceptances, number of food presentations, etc.); 2) duration measures (e.g., length of time in seat); 3) occurrence measures (e.g., presence of rumination); and 4) permanent products (e.g., quantity of food consumed, quantity of food remaining, etc.) (Kuhn & Matson, 2004; O'Brien et al., 1991). Specifically, these data can be used to determine the function of the problem behaviors. Functional assessment, through the use of interviews, mealtime observations, and manipulation of consequences contingent upon target problem behaviors, has been used to determine behavioral functions of spitting and whining during meals (Sprague, Flannery, & Szidon, 1998). Analogue functional analysis has been used to determine the function of mealtime problem behaviors such as throwing food and spitting out food (Girolami & Scotti, 2001).

PURPOSE

Currently, there is little research that investigates social skills and feeding behaviors in adults with autistic disorder. Previous research has highlighted the possible connection between social skill deficits and pica in individuals with mental retardation (Matson & Bamburg, 1999). Since people with autism continue to face problems with social interaction, have associated problems with feeding, and are often institutionalized, researchers should continue to investigate social and feeding skill development in this population. In particular, researchers should examine the relationship between social and feeding problems among individuals with autism and mental retardation when compared to other persons with mental retardation.

Since potentially life threatening problems such as food refusal, pica, rumination, and food selectivity are also associated with autism spectrum disorders (Gravestock, 2000a; Gravestock, 2000b; Matson & Bamburg, 1999; Munk & Repp, 1994), more research is needed to clarify the relationship between feeding problems and social skill deficits of people with autism. Previously researchers have suggested that the absence of positive social skills was more pronounced in individuals with mental retardation exhibiting rumination when compared to those who did not exhibit rumination (Kuhn, Matson, Mayville, & Matson, 2001). Therefore, the purpose of this study was to examine the differences in social and feeding skills between individuals with and without autistic disorder.

Researchers suggest that the treatment of social skills can result in parallel reductions in other problem behaviors (Koegel, Koegel, Hurley, & Frea, 1992; Koegel, Koegel, & McNeerney, 2001). For example, Kuhn and colleagues (2001) hypothesized that problem behavior, such as rumination, could emerge to compensate for deficient social skills and that the use of social skills training could potentially reduce such problem behavior. Therefore, the current study was

designed to be a necessary first step in establishing social skills as pivotal behaviors in the treatment of deficits in feeding behaviors in individuals with autism. Such a relationship would highlight the importance of social skills training designed to promote the development of positive adaptive and interpersonal skills while decreasing the negative effects of pervasive social and feeding skill deficits.

METHOD

Participants

The participants in this study were from Pinecrest Developmental Center (PDC), a state-run facility that provides 24-hour supervision to approximately 560 residents. Approval for the study was obtained from the Institutional Review Board (IRB). The residents at PDC function at various levels of mental retardation and differ in age, race, and gender. This study included both male ($n = 27$) and female ($n = 18$) residents. The average age of the participants was 49 years old, ranging from 27 to 65 years of age. Most of the participants were diagnosed with profound MR ($n = 42$), although a few were diagnosed with MR, severity unspecified ($n = 3$). Three participants were verbal while the majority was nonverbal ($n = 42$). Furthermore, the participants were either Caucasian ($n = 36$) or African American ($n = 9$). Table 1 includes a complete listing of the demographic variables for all 45 participants of this study.

The participants in this study comprised three groups based upon diagnoses given by licensed psychologists using DSM-IV-TR criteria: individuals with autistic disorder (AD), individuals with psychopathology other than autistic disorder (psychopathology), and individuals with no psychopathology (control). The psychopathology group served as a comparison to delineate differences specific to autism and not to severe psychopathology or developmental disabilities in general. The control group was used to adjust for potential effects of intellectual functioning. Participants who were on a gastrostomy tube (g-tube) at the time of data collection were excluded from the study, since the g-tube does not allow the participants to control their intake of food. Also, the researcher attempted to match the participants across groups for age (within 10 years), gender, race, level of MR, verbal ability, and presence of psychotropic

medication. Table 2 includes a complete listing of the demographic variables for the three groups in this study.

Table 1

Demographic Characteristics of Participants (N = 45)

Characteristic	n	%
Age at time of survey (years)		
0 – 21	0	0.00
22 – 45	12	26.67
46 – 65	32	71.11
66+	1	2.22
Gender		
Male	27	60.0
Female	18	40.0
Race		
African-American	9	20.0
Caucasian	36	80.0
Level of Mental Retardation		
Profound	42	93.3
Severity Unspecified	3	6.67
Verbal Ability		
Verbal	3	6.67
Non-verbal	42	93.33

Table 2

Demographic Characteristics of Groups

Characteristics	Groups					
	Autism (n = 15)		Control (n = 15)		Psychopathology (n = 15)	
	n	%	n	%	n	%
Age						
0 – 21	0	0.00	0	0.00	0	0.00
22 – 45	5	11.11	3	6.67	4	8.89
46 – 65	9	20.00	12	26.67	11	24.44
66+	1	2.22	0	0.00	0	0.00
Gender						
Male	9	20.00	9	20.00	9	20.00
Female	6	13.33	6	13.33	6	13.33
Race						
African-American	13	28.89	12	26.67	11	24.44
Caucasian	2	4.44	3	6.67	4	8.89
Level of MR						
Profound	14	31.11	14	31.11	14	31.11
Severity Unspecified	1	2.22	1	2.22	1	2.22
Verbal Ability						
Verbal	1	2.22	1	2.22	1	2.22
Non-verbal	14	31.11	14	31.11	14	31.11

Results of the chi-square analysis suggested that the groups did not differ significantly on the variables of age, gender, race, level of MR, or verbal ability. There was, however, a

significant difference between the groups on the presence of psychotropic medication, according to results of the chi-square analysis, $\chi^2(1) = 10.49$, $p = 0.005$. Table 3 presents the complete listing of psychotropic medication use across the groups.

Table 3

Psychotropic Medication Usage of Groups

Medication Class	Frequency		
	Autism (n = 15)	Control (n = 15)	Psychopathology (n = 15)
Antidepressant			
Paxil	0	0	1
Strattera	0	0	1
Antipsychotic			
Thorazine	1	0	0
Seroquel	0	0	1
Mood Stabilizer			
Neurontin	0	0	1
Depakote	0	0	2

Measures

MESSIER

The MESSIER is an 85-item informant-based measure that assesses social skills of individuals with severe or profound mental retardation. In particular, this instrument addresses both strengths and deficits in social skills. These social skills are divided into six clinically derived factors: 1) positive verbal, 2) positive nonverbal, 3) general positive, 4) negative verbal,

5) negative nonverbal, and 6) general negative. A total score can also be derived that allows the individual to be diagnosed with severe or profound intellectual deficits whereas other instruments designed to assess social or adaptive skills are not able to give such a delineation (Matson, Dixon, Matson, & Logan, 2005). The MESSIER is scored on a 0-3 scale as well as a “*not applicable*” choice”. The behavior is rated according to whether it occurs “*never*” (i.e. “0”), “*rarely*” (i.e., “1”), “*some*” (i.e., “2”), or “*often*” (i.e., “3”). The internal consistency of the MESSIER has a Cronbach’s alpha coefficient of 0.94, suggesting high internal consistency. The MESSIER has high test-retest reliability ($r = 0.86$) and good inter-rater reliability ($r = 0.73$) (Matson, LeBlanc, & Weinheimer, 1999).

STEP

The STEP is a 23-item instrument designed to screen for a number of feeding and mealtime behavior problems exhibited by people with mental retardation. This informant-based measure has five subscales: 1) Aspiration Risk, 2) Selectivity, 3) Feeding Skills, 4) Refusal Related Behavior Problems, and 5) Nutrition Related Behavior Problems. Behaviors on the STEP are measured for both frequency and severity on a scale from 0 – 2. Frequency addresses how often the behavior has occurred during the last month and is rated “0 = *not at all, not a problem*”, “1 = *between 1 and 10 times*”, and “2 = *more than 10 times*”. Severity pertains to the degree to which the behavior has been problematic for the individual and for others during the last month, and is rated “0 = *caused no harm/problems*”, “1 = *caused minimal harm or problems*”, or “2 = *caused serious injury or problems*”. The STEP has acceptable psychometric properties with cross-rater reliability of $r = 0.71$ and a test-retest reliability coefficient of $r = 0.71$. Criterion validity for the rumination and pica subscales against the DSM-IV diagnoses for pica and rumination has been established (Kuhn & Matson, 2002).

Procedure

The investigator was trained on the administration of the MESSIER and the STEP according to the procedures listed in the respective manuals for each measure. Data was collected for the MESSIER and the STEP by interviewing direct care staff working at PDC. Informants were those who were familiar with and those who had worked with the participant in question for at least six months. Additionally, all measures pertaining to a participant were administered to the same informant in order to decrease the chances of inter-rater error between measures. Data was collected for all groups within a two and one-half month period. Data collection and storage were conducted in accordance with accepted procedures to secure patient confidentiality. Participants were yoked in groups of three, one for each experimental condition. The MESSIER and STEP data were collected for each yoked triplet within the same week.

Experimental Design

Analysis of Social Skills and Feeding Behaviors. Analyses of social skills and feeding behaviors were made, as measured by the MESSIER and the STEP, respectively. A multivariate analysis of variance (MANOVA) was conducted, first comparing the mean scores of the six subscales of the MESSIER across groups to demonstrate the existence of any significant differences, while protecting against inflation of alpha error (Tabachnick & Fidell, 2001). In the event that a significant difference was found, one-way analyses of variances (ANOVAs) and post hoc analyses were to be conducted to determine which subscale contributed the most to this difference. This procedure was repeated for the STEP.

Analysis of Associated Social Skills and Feeding Behaviors. Finally, if the previously mentioned MANOVAs yielded significant results, then the association between social skills and feeding behaviors in the AD group, relative to the other two groups, were to be examined. The

restricted log maximum likelihood estimation procedure was to be used with each mean subscale score found significant during the analyses conducted in the previous section (i.e., during the analysis of social skills and feeding behaviors). The null hypothesis (that there would be no significant differences between the groups) was to be compared against the alternative hypothesis (that there would be significant differences between the groups) in the correlation of the significant MESSIER and STEP mean subscale scores across the three groups. Post hoc pairwise comparisons were to be conducted to determine where the specific significant differences between the groups occur on the correlated mean subscale scores of the MESSIER and STEP.

Hypotheses

Based on existing literature, several predictions were made regarding the outcome of this study. The author hypothesized that there would be significant differences between individuals with and without autism on the MESSIER and the STEP. The autism group was expected to show more deficits and fewer strengths in social skills, as exhibited by higher mean scores on the negative skills and lower mean scores on the positive social skills subscales of the MESSIER when compared to the psychopathology and control groups. On the subscales of the STEP, the autism group was expected to show higher mean scores suggesting greater deficits in feeding and mealtime behaviors in comparison to the other two groups. Additionally, the author hypothesized that the correlation between mean subscale scores from the MESSIER and the STEP would differ across the three groups. Specifically, the correlation between particular mean subscale scores of the MESSIER and STEP was expected to be significantly higher for the autism group than for the other two groups, suggesting that there is a stronger association between social and feeding skill deficits in individuals with autism than in individuals with or without other psychopathology.

RESULTS

Analysis of Social Skills

Table 4

Mean Scores, Standard Deviations, Multivariate Analysis of Variance, and Univariate Analysis of Variance for Social and Feeding/Mealtime Skills Measures

Dependent Measure	Diagnostic Groups						ANOVA	
	Autism (n = 15)		Control (n = 15)		Psychopathology (n = 15)		F(2, 42)	p
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>		
MESSIER ^a								
Positive Verbal	0.93	0.71	2.53	0.71	1.93	0.71	1.29	0.29
Positive Nonverbal	8.40	0.94	8.67	0.94	9.73	0.94	0.57	0.57
General Positive	10.6	1.58	12.6	1.58	13.3	1.58	0.80	0.46
Negative Verbal	1.47	0.38	1.73	0.38	2.00	0.38	0.49	0.61
Negative Nonverbal	7.20	0.73	5.80	0.73	6.73	0.73	0.95	0.40
General Negative	5.13	0.83	4.40	0.83	5.73	0.83	0.65	0.53
Dependent Measure	Diagnostic Groups						ANOVA	
	Autism (n = 15)		Control (n = 15)		Psychopathology (n = 15)		F(2, 42)	p
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>		
STEP ^b								
Aspiration Risk	0.00	0.20	0.60	0.20	0.07	0.20	2.78	0.07
Selectivity	1.13	0.38	0.80	0.38	1.07	0.38	0.21	0.81
Feeding Skills	3.40	0.75	4.67	0.75	3.67	0.75	0.80	0.46
Refusal Related	0.67	0.34	0.87	0.34	1.33	0.34	1.02	0.37
Nutrition Related	1.47	0.44	1.73	0.44	1.87	0.44	0.21	0.81

^a MANOVA F(12,74)=0.68, p=0.76

^b MANOVA F(10,76)=0.847, p=0.85

The mean scores from the six subscales of the MESSIER across the three groups (AD, psychopathology, control) were analyzed using a MANOVA. The differences on the Positive

Verbal, Positive Nonverbal, General Positive, Negative Verbal, Negative Nonverbal, and General Negative subscales were found to be non-significant, $F(12,74)=0.68$, $p=0.76$. Results for this analysis are displayed in Table 4.

Analysis of Feeding Behaviors

Scores derived from the subscales of the STEP were analyzed using a MANOVA across the three groups. The differences across the mean scores of the Aspiration Risk, Selectivity, Feeding Skills, Refusal Related Behavior Problems, and Nutrition Related Behavior Problems subscales were also non-significant, $F(10,76)=0.847$ $p=0.85$. Results are depicted in Table 4.

DISCUSSION

The purpose of this study was to investigate differences in social and feeding skills between individuals with and without autistic disorder. The participants consisted of three groups of individuals with MR: a group diagnosed only with autistic disorder, a group diagnosed with some form of psychopathology other than autistic disorder, and a group without any additional diagnoses. The MESSIER was used to measure social skills while the STEP was employed to measure feeding skills. These measures were administered to direct-care staff who were most familiar with the participants.

The results from the MANOVA conducted with the six subscales of the MESSIER did not reach significance. This suggests that there were no differences between groups on social skills. Furthermore, the lack of significant differences between the groups on the five subscales of the STEP suggests that the groups have similar feeding problems. Since the groups were not found to differ on these measures of social and feeding skills, the restricted log maximum likelihood estimation procedure could not be conducted.

Several other analyses were conducted in an attempt to elucidate relationships between the groups. Each of these analyses involved conducting a MANOVA on the subscales of the MESSIER and the STEP. The data were prepared for the additional analyses by recoding for presence versus absence of endorsement and for high versus low endorsements, in addition to item analyses. None of these additional analyses, however, yielded significant differences across groups on measures of social and feeding skills.

Limitations and Future Directions

Previous research investigating differences in social skills and feeding problems in individuals with MR have found significant results. One study assessed individuals divided into

three groups: an autism group, a PDD-NOS group, and a MR group (Njardvik, Matson, & Cherry, 1999). The researchers found significant differences between the autism group and the other two groups on the Positive Nonverbal subscale of the MESSIER and between the autism group and the MR group on the General Positive subscale of the MESSIER. Another study, also involving three groups of participants including a psychotic disorder group, an autistic disorder/PDD-NOS group, and a group whose behavior problems were of primary concern and not an Axis I diagnosis (Matson, Mayville, Lott, Bielecki, & Logan, 2003), yielded significant differences. These researchers found that the autistic/PDD-NOS group had significantly lower scores on the Negative Nonverbal subscale of the MESSIER, when compared to the psychotic and behavior problems groups. The psychotic group and the behavior problems group did not differ. Researchers from a third study, with participants divided among three diagnostic groups of clinically depressed, PDD-NOS, no disorder on Axis I, found significant differences on the Nutrition Related Behavior Problem subscale of the STEP between individuals diagnosed with MR and some other form of psychopathology when compared to individuals with MR without other psychopathology (Mayville, Matson, Laud, Cooper, & Kuhn, 2005).

In light of these findings, confounding factors can contribute to the lack of significant differences between the groups in this study. An important difference between the studies cited and this study relates to the grouping of participants. In the studies cited above, the groups were composed of individuals with homogenous diagnoses. That is, each group, be it autism, mood disorders, etc., was a homogeneous mix of the defining disorder. In the present study, although participants in the AD group were homogeneous, the other participants were more heterogeneous. Although the control group did not have any Axis I diagnoses, it is possible that members of this group did have some degree of problem behaviors that prevented this group

from being a true control. This same theory applies to the psychopathology group used in this project. The psychopathology group was a heterogeneous gathering of Axis I diagnoses including stereotypic movement disorders, mood disorder, pica, attention-deficit and disruptive behavior disorders, anxiety disorders, and psychotic disorders. The within-group differences of the psychopathology group could have nullified any significant differences between it, the AD group, and the control group. Therefore it is possible that despite attempts to create well-matched participants, the groups in this study involved two control groups whose within-group characteristics were fundamentally different.

Another possible explanation for the lack of significant findings pertains to the use of indirect assessment. Researchers have found that accuracy can be compromised when the informants are not competent enough, properly trained, or lack motivation to respond (Lalli, Browder, Mace, and Brown, 1993; Sturmey, 1996). Although precautions were taken to make sure that direct care staff who were most familiar were interviewed, the possibility remains that the staff member interviewed did not work with the participant during every work shift. Also, considering the demands of the home, the possibility also exists that the staff members had to divide their work shifts among one or more patients, and therefore may not have consistently observed the behaviors targeted by this study. Future research investigating social skill and feeding behavior deficits in this population should incorporate multiple checks on staff motivation and staff familiarity with residents. Given the good reliability of the MESSIER & STEP, other factors could contribute.

Factors relating to the feeding environment itself may account for the lack of differences across the groups. Although none of the participants were on g-tubes, several of the participants across all three groups required special diets. These special diets most typically consisted of

pureed or chopped meals, to help reduce the risk of aspiration. This in itself could introduce two confounds. First, since individuals with AD typically show sensitivities to texture, being restricted to an all-pureed or all-chopped food diet inherently eliminates many differences among various types of food textures. Second, this special diet, in an attempt to prevent serious medical harm, lowers the risk of aspiration for those participants who are the most susceptible and would therefore be more likely to have high rates of aspiration if this were not in place. Another potential confound pertains to the feeding environment of the participants. Considering that these participants are living in an institutionalized residential setting, choices in meals are limited. Meals are predetermined by staff and so the residents typically have little choice in what they are to eat. This could thereby limit the full expression of feeding and mealtime behavior problems because there are not as many foods to be refused as would be in the community. In the future, researchers should compare the feeding and mealtime behaviors across groups in a more naturalized setting, such as in the community.

Several possible explanations for the lack of significant findings have been presented. Factors such as lack of homogenous groups, flaws with indirect assessment arising from lack of staff motivation, level of staff familiarity and regularity of directly working with residents, and restricted diets have been discussed. Also, research has been discussed that, despite the presence of some of these confounds, significant differences between the groups were revealed. Therefore, it is likely that the lack of significant findings is not due to solely one reason, but more attributable to several confounding factors. Studies in the future that are designed to investigate deficits in social skills and feeding problems in individuals with MR and autism should try to control for the confounds discussed here.

Conclusion

Despite the lack of significant differences across the groups in this study, the relationship between deficits in social skills and feeding and mealtime behaviors warrants further research. Kuhn et al. (2001) found that the absence of positive social skills was more pronounced in individuals with mental retardation exhibiting rumination when compared to those who did not exhibit rumination. Other researchers have found that autism spectrum disorders were linked to several feeding and mealtime behavior problems including food refusal, pica, rumination, and food selectivity (Gravestock, 2000a; Gravestock, 2000b; Matson & Bamburg, 1999; Munk & Repp, 1994). Once the relationship between social skills and feeding skills deficits has been clearly identified, research should then investigate treatment packages targeting the training of pivotal social skills to potentially reduce problem behavior (Kuhn et al., 2001). Taken together these findings highlight the importance of examining this research question in more detail. This study was an attempt at making a necessary first step in establishing social skills as pivotal behaviors in the treatment of deficits in feeding behaviors in individuals with autism spectrum disorders.

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VITA

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