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Comparing social skills in children diagnosed with Autism Spectrum Disorders according to the DSM-IV-TR and the proposed DSM-5

Jennifer Susan Beighley
Louisiana State University and Agricultural and Mechanical College, jbeigh1@lsu.edu

COMPARING SOCIAL SKILLS IN CHILDREN
DIAGNOSED WITH AUTISM SPECTRUM DISORDERS
ACCORDING TO THE DSM-IV-TR AND THE PROPOSED DSM-5

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Jennifer S. Beighley
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ABSTRACT

Autism Spectrum Disorder (ASD) is currently defined using criteria from the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR)*. With the fifth edition of the *DSM (DSM-5)* forthcoming, one change the American Psychiatric Association has proposed is an increase in the number of overall symptoms necessary to meet criteria for ASD. Because social skills is well established as a core symptom of autism, the present study explores differences in social functioning using the *Matson Evaluation of Social Skills in Youngsters-II* (*MESSY-II)* in three groups of children ages 3-16 years including those diagnosed with ASD using the current criteria who will no longer meet criteria according to the proposed *DSM-5*, those who will still meet criteria for ASD using the proposed *DSM-5*, and a control group of typically developing children. In the present study ($n = 205$), significant differences were found between the control group and the two *DSM* groups combined. On the two factors of the *MESSY-II* representing inappropriate social skills, there were no significant differences in social functioning between those diagnosed with the proposed *DSM-5* and those who met criteria under the *DSM-IV-TR* but will no longer meet criteria with the proposed *DSM-5*. Concerning the factor of the *MESSY-II* rating socially appropriate behavior, significantly more impairments were found in the *DSM-5* group compared with those diagnosed with ASD according to the *DSM-IV* only*,* though both groups evinced severe impairments. The implications of these findings are important; though individuals who may no longer meet criteria were found to engage in slightly more appropriate social behavior, they functioned in the severely impaired range in terms of social skills. Further, children diagnosed with the different criteria demonstrated the same amount of inappropriate social behavior. Thus, individuals projected to no longer meet criteria for ASD appear to have clinically significant social impairments requiring intervention.

CHAPTER 1. INTRODUCTION

Controversy exists regarding whether or not Autism Spectrum Disorder (ASD) is comprised of different categories of separable disorders (Matson, Nebel-Schwalm, & Matson, 2007; Mayes & Calhoun, 2004). Some postulate that ASD is dimensional, with no clear categories of individual disorders (Eisenmajer et al., 1996; Allen et al., 2001), whereas others maintain there are different disorders under the umbrella of ASD including autistic disorder and Asperger's disorder (Buitelaar et al., 1999; Koyama et al., 2007; Walker et al., 2004). This controversy is no longer simply an esoteric debate, as diagnostic criteria for ASD in the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM*) are scheduled to change with the publication of the next edition. Another contentious change proposed in the new edition is in regard to the core features of ASD. Though the current edition includes three core features when describing ASD, the subsequent edition is set to reduce this number to two, with quantitatively more symptoms required overall to qualify for a diagnosis on the autism spectrum, in large part due to the exclusion of the pervasive developmental disorder not otherwise specified (PDD-NOS) diagnosis as well as the elimination of specific criteria for Asperger's disorder.

Text revisions to the *DSM's* fourth edition (*DSM-IV-TR*), published by the American Psychiatric Association (APA) in 2000, are currently used by psychologists and psychiatrists all over the world to diagnose mental disorders. The *DSM-IV-TR* takes a categorical approach to diagnostics and separates ASD into five distinct disorders inclusive of autistic disorder, Asperger's disorder, PDD-NOS, childhood disintegrative disorder (CDD), and Rett's disorder. It should be noted that the nomenclature for ASD in the *DSM-IV-TR* is Pervasive Developmental Disorder (PDD). For reasons of clarity, as well as to represent the current conceptualization of the disorder, the term ASD will be used rather than PDD throughout this manuscript. The *DSM-*

IV-TR describes three core features of ASD including impairments in social interaction; language and communication impairments; and the presence of restricted, repetitive behavior. The other commonly used set of diagnostic criteria comes from the *International Classification of Diseases, Tenth Edition* (*ICD-10;* World Health Organization [WHO], 1992). Due to considerations of the scope of this manuscript, *ICD-10* criteria will not be elaborated upon here.

The proposed fifth edition of the *DSM* (*DSM-5*) has a projected publication date of May 2013 (APA, 2012). The *DSM-5* endeavors to apply a more dimensional ideology to diagnostics. As such, ASD will not be separated into different disorders. Autistic disorder, Asperger's disorder, PDD-NOS, and CDD will no longer be differentiated, and it is proposed that they will be subsumed under the label of ASD. Rett's Disorder will no longer be considered in the category of ASD. The *DSM-5* proposes only two core features of ASD. The first, social/communication impairments, is the merging of the first two core features as listed in the *DSM-IV-TR* (i.e., impairments in social interaction and language/communication impairments). The second includes the presence of fixated interests and repetitive behaviors.

With these changes likely to occur, the clinical understanding of ASD will have to evolve. Drastically changing the diagnostic criteria will delineate a different population despite the fact that theoretically the population will not change. Recently, several researchers have suggested that with these changes, between 23% and 46% of children currently meeting criteria for an ASD will no longer meet criteria under the proposed changes (Gibbs, Aldridge, Chandler, Witzlsperger, &Smith, 2012; Mattila et al., 2011; McParland, Reichow, & Volkmar, 2012; Worley & Matson, 2012). With so many children potentially not being captured diagnostically, it is important to describe functional deficits in those no longer meeting criteria.

Social skills have long been a core, defining feature of ASD since the first identification of the disorder (Kanner, 1951; Wing, 1997). For this reason, social skills are an important facet to investigate with regards to the changing diagnostic criteria. The aim of the current study is to use a psychometrically sound measure for describing social skills in this population, the second edition of the *Matson Evaluation of Social Skills in Youngsters* (*MESSY-II; Matson, 2010*) to investigate differences in social functioning in the presently defined population with ASD and the population that will exist using the proposed criteria.

CHAPTER 2. HISTORY OF AUTISM SPECTRUM DISORDERS

The history and understanding of the disorder now known as ASD is a long and complicated one that continues to evolve to this day. Over the years, the words autism and autistic have been used to describe individuals with a variety of symptoms and disorders, leading to confusion and an unclear description of the disorder that lasted for decades. A contributing factor to the different descriptions of the disorder is the fact that there is much variation across individuals with autism in their overall development, features of the disorder, and severity of problems (Kanner, 1944; Matson & Minshawi, 2006). Even now, the understanding of the disorder and the qualifying characteristics for diagnosis are changing (APA, 2012).

The disorder that is now referred to as autism was first described as an affective disorder in 1943 by Leo Kanner, a physician practicing at the Children's Psychiatric Service of the Johns Hopkins Hospital in Baltimore, Maryland. In an article entitled "Autistic Disturbances of Affective Contact," Kanner provided a preliminary report on 11 children (8 male and 3 female) seen between the ages of 2 and 11 years of age (1943). He described the children, first seen in 1938, as having a condition that had not been described until that point. Kanner noted that the children all had similar characteristics, which he described as a new and rare syndrome, though he suspected that the syndrome was not as rare as it first appeared due to potential misdiagnoses. The qualities common in the 11 children included an inability to relate to people and situations, lack of social awareness (which he cautioned was not the same as the withdrawal or loss of skill seen in individuals with schizophrenia but rather a failure to develop social skills in the first place), lack of language to communicate, eating difficulty, fear of loud noises and moving objects, insistence on sameness, preoccupation with objects over people, and good cognitive potential.

In 1944 Kanner published again, this time describing the behavior of 20 children. He designated the principle problem evinced by all the children as a "disability to relate themselves in the ordinary way to people and situations from the beginning of life" (p. 211). Some behavior common to these children included an inability to adopt an anticipatory body position when an adult moved to pick them up, misuse of personal pronouns, echolalia or delayed echolalia, insistence on sameness, and preference for objects over people (Kanner, 1944). By 1951, Kanner had seen almost 100 such children, and he had begun referring to the disorder as early infantile autism (Kanner, 1951). Kanner continued to describe the behavior of these children and further refined the diagnostic features to include social withdrawal, obsessive insistence on sameness, preference for objects over people, intact intelligence, and language/communication impairments. Though initially Kanner described early infantile autism as occurring from birth, this qualifier was later expanded to include children who developed normally until 18-20 months of age at which time regression in skill occurred (Kanner & Eisenberg, 1956). Kanner and Eisenberg then described early infantile autism as a psychobiological disorder appearing in the first two years of life characterized by extreme aloneness and insistence on sameness (1956).

It should be noted that another researcher described autism at around the same time as Kanner. In 1944 Hans Asperger, a doctoral student in Austria, published a thesis entitled "Autistic Psychopathy in Childhood," translated into English in 1991 by Uta Frith. Because the work was originally completed in German, many in the field were not aware of his contributions at the time. In his thesis Asperger described four children having similar features as those described by Kanner. The children he described had noted deficits in social skills and used stereotypic movements. Interestingly, the name he also chose for them was "autism." One distinction between the two descriptions was that Asperger's autism was characterized by a

typical early development of language with resulting verbal communication of children resembling adult language. The social use of the language, however, was odd, being in large part one-sided and having preoccupations with certain topics (Klin, McPartland, & Volkmar, 2005)

The naming of the disorder "autism" by Kanner contributed greatly to the confusion over the disorder. Eugen Bleuler, director of the psychiatric clinic at the University of Zurich, had previously coined the term 'autism' in 1908 as an adjective to describe individuals with schizophrenia who exhibited behavior that was illogical and characterized by fantasy and who actively withdrew from reality (Bleuler, 1913). Though there are striking differences between the two disorders, there were frequent misdiagnoses and a collapse of autism into the understanding of schizophrenia (Rutter, 1978). The disorder that Bleuler described is in line with our current understanding of schizophrenia or psychosis. He used the word "autism" to describe a symptom of schizophrenia, that is, social withdrawal, as opposed to a naming of the disorder itself. Bleuler also coined the term "schizophrenia" in 1911 to refer to a group of related disorders. Bleuler rightly predicted that the umbrella term of schizophrenia would become more specific in subsequent years (Kanner, 1965).

Kanner and Asperger, on the other hand, used the term autism to refer to a syndrome in and of itself much different from that described by Bleuler. Kanner (1943) specified that the "autism," or extreme aloneness, exhibited by these children was distinct from the autistic thinking or withdrawal demonstrated by individuals with schizophrenia. Kanner's autism was described as unlike childhood schizophrenia, which has a much later onset and a different set of impairments overall. Mosse (1958) explained the overuse of the label schizophrenia and stressed that schizophrenia has an onset in adolescence and preadolescence. The children described by Kanner showed a lack of social interest from infancy, unlike those with schizophrenia who

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demonstrated typical development with a later onset of withdrawal. Some of the children seen by Kanner were previously misdiagnosed as feebleminded or schizophrenic, which Kanner postulated may have occurred commonly at that time and previously (1943). Other children were previously thought to have auditory problems (Kanner, 1944).

Though Kanner made a point to discuss the differences between the two disorders, he proposed that autism and childhood schizophrenia may be generically related (Kanner & Eisenberg, 1956). Eisenberg suggested that early infantile autism, though a distinct clinical diagnosis, was likely a subset of the larger group of schizophrenias (1956). On this point, others disagreed, stating that the differences in the disorders were so great that it was not likely for autism to be a subset of schizophrenia (Rutter, 1968). Another aspect of the confusion between the disorders concerned the definition of schizophrenia. At the time there was not a uniformly applied definition agreed on by those in the psychological community. Debate continued over whether schizophrenia was a single disease or a broad term describing related disorders (Kanner, 1965). Thus, it was not possible to disentangle the two diagnoses until the definition of schizophrenia was specified. Kanner had set up clear and specific diagnostic features of autism; however, he was speculative regarding the nature of the relationship autism held with "the schizophrenias." Though many researchers attempted to clarify the difference between the two disorders, the use of the term "autism" and the unclear definition of schizophrenia caused the debate to last for decades.

The course of autism as described by Kanner was distinct from that of schizophrenia in that the latter results in withdrawal, whereas he explained the course of autism to be typified by growth of adaptive skill and communication abilities over the years (1965). Further evidence

that infantile autism was different from childhood schizophrenia was the extremely rare event of delusions or hallucinations reported in those with autism (Eisenberg, 1965).

In the late 1960s and throughout the 70s, Michael Rutter from the Institute of Psychiatry in London, England contributed much to the understanding of autism. One of Rutter's largest contributions was to definitively argue for the separation of schizophrenia and autism (1968; 1978). Rutter wrote emphatically that the symptom of autism in schizophrenia as a withdrawal into fantasy is considerably different from the syndrome of infantile autism where the child fails to interact with the social world from the outset (Rutter, 1972). Rutter supported the complete distinction between autism and schizophrenia explaining some of the main differences to support the idea that they are not the same disorder (1968). He emphasized many differences including: gender differences (autism is more common in males than females, with a ratio of 4:1), family background (a high proportion of children with autism had parents of above average intelligence and high socioeconomic status), family history of schizophrenia (high in individuals with schizophrenia), below average Intellectual Quotient (IQ) which was more common in those with autism, range of IQ subscores (autistic individuals had higher visual-spatial compared to verbal scores), delusions and hallucinations (common in schizophrenia), and course (remission and relapse common in schizophrenia; Rutter, 1968). Rutter also noted that although those with schizophrenia have an active fantasy life, those with autism were described since Kanner as having limited imaginative abilities.

Only five years after Kanner started using the label of early infantile autism, many countries had accepted it as a clinical syndrome (Eisenberg, 1956). However, in part because of the nomenclature and in part because of similarities to the overused diagnosis of childhood schizophrenia, there continued to be a need to clarify the classification of the disorders. Kanner

postulated that the explosion of autism diagnoses included misdiagnoses of children with mental

deficiencies and odd behavior. Further confusion was brought about as a result of a general

climate at the time that focused on treatment over assessment. Because all the disorders of

childhood (including autism, schizophrenia, and feeblemindedness) were thought to be a result of

poor mother-infant bonding, there was considered no need to differentiate the type of problem.

Researchers lumped all of these disorders in childhood together as "atypical development"

(Rutter, 1968). Unfortunately, autism soon became thought of by lay people and clinicians alike

as a syndrome brought about by maternal emotional detachment (Kanner, 1965).

     Concerning etiology, Kanner (1943) suggested that the parents and families of the 11

children he first described, on the whole, were of high intelligence, had marked obsessiveness,

and were not overly affectionate or warm. Because the children demonstrated deficits from

birth, Kanner suggested that the disorder did not appear to be a result of upbringing, but was

inborn. Kanner and Eisenberg (1956) postulated that the parents may possess milder

manifestations of the same disorder, and thus early infantile autism was suggested to have a

genetic component. They further suggested that "emotional refrigeration" was a common

parental quality for many of the autistic children, and thus early infantile autism was suggested to

have a psychosocial component as well. However, Kanner and Eisenberg maintained that this

emotional coldness was only one factor in the development of autism, and that coldness, in and

of itself, was not causal. The nature-nurture argument as a dichotomy was rejected by Kanner

and Eisenberg (1956), and these researchers thought etiology to be multifaceted. Rimland

(1964) put forth the proposal that autism was a genetic disorder, though genetic evidence would

come much later. Rutter maintained that the cause was unknown but could have roots in

genetics, organic problems, or problems of maturation (Rutter & Bartak, 1971).

Others, including Bettelheim, ran with the concept of "emotional refrigeration" as projected by Kanner and Eisenberg. Bettelheim (1967) took a heavy stance on the nurture side, suggesting that "refrigerator mothers" caused the disorder. Throughout the 1950s and 1960s, researchers made various claims that autism had organic origins, was a result of differential reinforcement, was a problem of overactivity or underactivity of the reticular system, was related to faulty sensory perception, or was a result of brain damage (Rutter, 1968). These postulations were made all the more unclear because it is likely the different researchers were not all describing the same disorder. Rutter attempted to clarify the information available up until that time as it related to true cases of autism described by Kanner by clarifying that the population he discussed included only those cases with symptoms having onset at infancy. He described the early childhood of these individuals with the following description: aloofness, lacking interest in others, difficulty with social relationships, lacking eye contact, limited facial expressions, failing to express feelings, and lacking sympathy or empathy (Rutter, 1968). Rutter considered each of the theories concerning etiology and came to the conclusion that the genetic basis was not proven due to insufficient data. Parenting and/or parental characteristics as a cause for autism was shown to have no scientific basis and little agreement across researchers, and because symptoms often begin in early infancy, he purported that parenting was likely not a causal factor. Rutter further posited that the aloofness with which some parents interact with their child with autism may be a result of the detachment of the child rather than a problem inherent to the parents.

Concerning prognosis, Kanner suggested that autism, as opposed to schizophrenia, had a positive prognosis, with at least minimal gains in communication and behavior made by age 5-6 years in many cases with no psychiatric intervention (1943). Follow-up study with the children evaluated by Kanner showed that almost one-third of the individuals reached at least a fair social

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level. Prognostic indicators found by early researchers include the degree of aloneness, with individuals who relate more to the social environment doing better (Kanner & Eisenberg, 1956), and verbal ability, with individuals who communicate verbally at age 5 years having a better prognosis (Eisenberg, 1956). A variable that was highly linked to good outcomes at that time was the efforts of teachers, with children improving more if they had teachers willing to extend superior amounts of effort toward their learning (Eisenberg, 1956; Kanner & Eisenberg, 1956). Rutter noted that individuals with normal IQ also showed a greater chance of favorable outcomes (1968).

It should be noted that there is a clear distinction between mental retardation and autism. Kanner's early papers discuss a preservation of intelligence and a potential for learning (1943). However, other researchers found that over half of individuals diagnosed with autism had subnormal IQ scores (Rutter, 1968). Despite a potential relationship between low IQ scores and autism, it is clear that the two are not the same, as many (between a quarter and a third) individuals with autism do function in the normal range of intellectual ability (Rutter, 1968). In addition, individuals with autism were shown to have a larger range of subscores on IQ tests when compared with the general population (Rutter 1968).

After autism became accepted as a disorder separate from schizophrenia and feeblemindedness, and after much research was conducted to attempt to better understand the disorder, progress was then focused on better ways to diagnose and classify the disorder. Kanner was instrumental in putting forth the early diagnostic criteria for early infantile autism as mentioned above. Rutter concurred that there must be deficits in three areas: social withdrawal, speech and language problems, and ritualistic and compulsive behavior. He did not consider hand and body stereotypies to be diagnostic features, because he noted that they were frequent in

other populations as well (Rutter & Bartak, 1971). Rutter concluded that the core feature of autism was a deficit in language comprehension, considered a cognitive deficit, with a secondary consequence being the social and behavioral difficulties similar to those described by Kanner. Rutter later conceptualized the key features of autism as abnormal social relationships, delays in language development, and insistence on sameness, also similar to those proposed by Kanner (Rutter, 1978). Rutter demarcated the onset of autism to be prior to 30 months of age (1978).

World War II impacted diagnostics as psychological problems in veterans and citizens affected by the war came into prominence. Such disorders included mental illness, personality problems, combat fatigue, and stress reactions (Shorter, 1997). Because of the war, there was a need to classify and accurately diagnose individuals easily and reliably. Therefore, in 1952 the APA created a task force made up of medical professionals to write the first *DSM (DSM-I).* Unfortunately, autism was not described in this, nor the following version of the manual published in 1968.

A tri-axial classification system was proposed using an international study through the World Health Organization (WHO) for disorders occurring in childhood (ages 0-12 years), with the first axis consisting of the psychiatric syndrome, the second the level of intellectual functioning, and the third associated or causal factors (Rutter et al., 1969). By 1972 the suggested system consisted of four axes, with the associated or etiological factors split into biological and psychosocial, the third and fourth axes, respectively (Rutter, 1972). At that time, autism was still unspecified, lumped under the heading of "psychosis" (Lockyer & Rutter, 1970; Rutter, 1968; 1972). Diagnostic criteria for the first axis, clinical psychiatric syndrome of infantile autism, were offered by Rutter, which included three main areas: "failure of social development (of a specific type), a deviant and delayed language development, and various

ritualistic activities" (p. 327) and a qualifier that onset had to occur by the age of 2.5 years (1972).

Changes in Diagnostic Criteria pre *DSM-IV*

Despite the plethora of research in the field beginning in 1943, autism did not become an official diagnosis until 1980. Until that point, the *DSM-I* (APA, 1952) and the *DSM-II* (APA, 1968) had not included a diagnosis of autism; rather, individuals with symptoms as described above were categorized as having childhood schizophrenia, psychoses, being "atypical children," among others (APA, 1980). It was not until the *DSM-III* was published in 1980 that autism finally became included as a clinical psychiatric disorder of its own (APA). Rutter's definition was used in this edition to develop the criteria. The *DSM-III* was also notable as it was the first edition to use a multiaxial diagnostic approach and include specific criteria for each disorder.

The *DSM-III* included a category called Pervasive Developmental Disorder (PDD), which included five disorders. The new qualifier, pervasive, was used to clearly express the ubiquitous nature of the deficits present in these disorders. Infantile autism, residual infantile autism, childhood onset pervasive developmental disorder (COPDD), residual COPDD, and atypical autism were delineated (Volkmar & Klin, 2005). Three core features described the PDDs with impairments in interpersonal relationships, impairments in communication, and bizarre responses to the environment. Delusions and hallucinations could not be present. To meet criteria for infantile autism, symptom onset had to be prior to 30 months of age. Criteria for infantile autism consisted of the following: "pervasive lack of responsiveness to other people;" "gross deficits in language development;" "if speech is present, peculiar speech patterns such as immediate and delayed echolalia, metaphorical language, pronominal reversal;" and "bizarre responses to various aspects of the environment, e.g., resistance to change, peculiar

interest in or attachments to animate or inanimate objects" (APA, 1980, p. 89). If onset of

symptoms occurred between 30 months of age and 12 years, the diagnosis of COPDD was given.

Diagnostic criteria for COPDD included "impairment in social relationships," and three of the

following: "excessive anxiety," "constricted or inappropriate affect," "resistance to change in the

environment," "oddities of motor movement," "abnormalities of speech," "hyper or hypo-

sensitivity to sensory stimuli," and "self-mutilation" (APA, 1980, p. 91). The qualifier residual

referred to individuals that at one point in their lives did meet criteria, though later could not be

categorized with a PDD. Atypical PDD was used to describe children with problems in multiple

areas related to language and social skills, but did not currently meet (and never did meet) full

criteria for infantile autism or childhood onset pervasive developmental disorder.

Revisions to the third edition were published in 1987 in the *DSM-III-R* (APA). Though

only seven years separated the revisions, significant changes were made in the PDD area

(Volkmar & Klin, 2005). In this edition, PDD was moved to Axis II. In the revisions the name

Infantile Autism was changed to Autistic Disorder, a necessary change as criteria were

broadened so that individuals would still meet criteria as they aged. Accordingly, residual

diagnoses were no longer necessary. In addition, COPDD and atypical PDD were removed, and

pervasive developmental disorder-not otherwise specified was added. Sixteen diagnostic criteria

were laid out, eight of which had to be met to warrant a diagnosis of autistic disorder. The three

core features were maintained, with two of the impairments in the area of reciprocal social

interaction, one in communication and imaginative activity, and one in restricted repertoire of

activities and interests. The age of onset for the disorders was changed to 36 months of age.

Another change was the removal of the qualifier that those with PDD could not also exhibit

schizophrenia. It has been suggested that these diagnostic criteria resulted in false positives at a

rate of 40% (Rutter & Schopler, 1992). Though individuals identified through *DSM-III* criteria were in large part still identified by the *DSM-III-R*, significantly more individuals categorized as having a PDD were diagnosed specifically with autistic disorder. Further, researchers found that "the concept of the disorder has been specifically broadened to include children who, although socially impaired, are *not* pervasively unresponsive to other people" (Hertzig, Snow, New, & Shapiro, 1990, p. 126)

Prevalence

The issue of prevalence is very challenging to address due to many factors contributing to ambiguity and controversy including methodological differences in measuring rates of ASD, changes in diagnostic criteria, increased public awareness of ASD, earlier identification of the disorder, and increased availability of assessment and treatment services (Matson & Kozlowski, 2011). The *DSM-IV-TR* reports prevalence rates of autistic disorder as 5 in 10,000 (APA, 2000).

Description of an increase in ASDs is not a new phenomenon. In 1965 Kanner cautioned that rates of autism diagnoses were artificially increasing, with many diagnoses of autism being incorrect due to a misunderstanding of the disorder by many practitioners. As a result, many children with global developmental delays were labeled as autistic. Thus, increases in diagnoses of ASD have been described for over half a century, since autism was first named. Early data report a prevalence of 4-5 in 10,000 (Lotter, 1966). Recent increases have been reported since the 1980s when prevalence rates were reported at 30-60 in 10,000, leading to questions of a burgeoning autism "epidemic" (Inglese & Elder, 2009), though only about a quarter of those described exhibited symptoms of true autism. The Centers for Disease Control and Prevention (CDC) have attempted to collect accurate information regarding prevalence of ASD in the United States as well as across the world. The Autism and Developmental Disorders Monitoring

Network (ADDM) was founded to head up this daunting task. In 2010, ADDM released a prevalence rate of 1 in 110 children diagnosed with an ASD with no difference based on race, ethnicity, or socio-economic status (CDC, 2010); this number increased to 1 in 88 children in reports released in March of 2012 (CDC, 2012).

Prevalence of ASDs varies among the five diagnoses on the autism spectrum. Although the *DSM-IV-TR* provided prevalence data for autistic disorder, similar information was not supplied for the other ASDs due to insufficient epidemiological data (APA, 2000). Other studies report PDD-NOS to be the most common of the ASDs with rates ranging from 31.4 to 36.1 per 10,000 (Chakrabarti & Fombonne, 2001, 2005; Howlin, 2006). It is intuitive that PDD-NOS is the most frequently given diagnosis, as fewer diagnostic criteria need to be met overall compared to the other ASDs. Asperger's disorder was reported to occur at rates from 8.4 to 9.5 in 10,000 (Chakrabarti & Fombonne, 2001; 2005; Howlin, 2006). CDD and Rett's disorder, the least common of the ASDs, were found to occur at rates of approximately 0.6 in 10,000 each (Chakrabarti & Fombonne, 2001; 2005).

Many experts believe that the expanding criteria for defining autism explain much of the increases in prevalence seen across the world. Early work limited diagnoses to Kanner's original description; however, the conceptualization of ASD has broadened and currently includes five disorders with a heterogeneous depiction of individuals within each group. In addition, improved clinical understanding of autism and overuse of ASD diagnoses to qualify individuals for early intervention funding may also play a role in the increasing prevalence (Leonard et al., 2010). Diagnostic substitution has been put forth as an explanation and illustration of shifts in prevalence rates. Diagnostic substitution involves the replacement of one diagnosis with a more popular alternative (Leonard et al., 2010). Social stigma as well as availability of services may

be factors that can drive popular diagnoses. An example may be the shift from diagnoses of intellectual disability (ID) to ASD. Whereas previously, a child with symptoms of both ID and ASD would have been labeled with the primary diagnosis of ID (in the *DSM-IV-TR* this is called Mental Retardation [MR]), today it is more common for ASD to be the primary diagnosis. This is illustrated by the phenomenon that, though IQ tests are very often administered by school psychologists, diagnoses of MR were rarely given (Gresham & Witt, 1997). One study examining the relationship between changes in prevalence of ID and ASD showed a clear relationship between the two disorders. As rates of autism increased, a corresponding decrease was seen in rates of ID (Croen, Grether, Hoogstrate, & Selvin, 2002).

One aspect of prevalence that remains unchanged since autism was first described is the gender difference in diagnosed cases. Kanner and Eisenberg (1957) found gender ratios of interest because boys were more often diagnosed with the disorder at a ratio of 4:1. The gender difference remains well documented today (Charman, 2008, Rice et al., 2010).

With diagnostic criteria again changing with the publication of the *DSM-5*, additional shifts in prevalence are to be expected. It is as yet unclear how the new criteria will affect prevalence data. It is put forth that the change will "increase sensitivity across severity levels from mild to more severe, while maintaining specificity with just two domains" (APA, 2012). However, with the elimination of the PDD-NOS category and the increase in number of symptoms needed to meet criteria for an ASD, it is possible to have a change in the opposite direction. In a study of epidemiology in Finland by Mattila and colleagues, only 46% of those identified as having an ASD using *DSM-IV* criteria were captured when using the proposed *DSM-5* criteria, showing a decrease in sensitivity (2011). Though further research into prevalence is clearly warranted, efforts need to be made to control for above factors and

standardize the procedures for estimating prevalence. Otherwise, researchers will continue to

have difficulty providing accurate data and interpreting results of their work (Matson &

Kozlowski, 2011).

DSM-IV-TR

Text revisions of the fourth edition of the *DSM (DSM-IV-TR)* were published in 2000 and

maintain the multiaxial approach of the third edition (adding a fifth axis for a rating of global

adaptive functioning) as well as the inclusion of a category of PDDs. The *DSM-IV-TR* is the

edition currently in use by the psychological and psychiatric communities. The PDDs are

commonly referred to as Autism Spectrum Disorders (ASDs) and contain five distinct diagnoses.

It should be noted that the criteria that follow were initially put forth in the *DSM-IV* published in

1994 (APA). The PDDs include autistic disorder, Asperger's disorder, PDD-NOS, CDD, and

Rett's disorder.

ASD - Core Features

Core features of ASDs in the *DSM-IV-TR* include impairments in three areas: social

interaction, language/communication, and repetitive behavior/restricted interests (APA, 2000).

This triad of impairments is consistent with Kanner's early work (1943), and has long been

accepted as characteristic of the ASDs (Rutter, 1968).

Social interaction. Many consider deficits in social interaction to be the primary feature

of ASD (Kanner, 1943; Rutter, 1968; Wing & Gould 1979). Impairments in socialization are

apparent early in life. Babies and young children may resist physical contact and cuddles, and

they may appear to lack an attachment to their parents. Oftentimes, infants are reported to

demonstrate a lack of responsiveness to caregivers, which can cause parents to worry that their

child is deaf (Eveloff, 1960). Infants may not enjoy being held or may prefer to be alone. Other

early examples of deficits include lower rates of eye contact, limited social smiling, and a lack of joint attention and social orienting (Dawson et al., 2004). Joint attention refers to shared attentional focus by two or more individuals. Examples include when an infant and caregiver direct their attention to each other simultaneously (dyadic) or when an infant and caregiver both direct their attention to an object (triadic; Osório, Martins, Meins, Martins, & Soares, 2011). Later on, in childhood, individuals with ASD may fail to establish relationships with their peers. Children with autism share attention less, seek help less, have less mutual eye contact, and are more avoidant in play (Walters, Barrett, & Feinstein, 1990). Parallel play, cooperative play, and make-believe play may be missing or lacking in quality (Rutter & Bartak, 1971). Social demands increase with age in general, so deficits may become more apparent over time for the child with ASD. Difficulty with friendships and dating relationships may result from an inability to understand the perspectives of others as well as nonverbal cues such as body language.

In those with ASD, social and emotional reciprocity may be lacking (Dawson & Murias, 2009). An individual with autism may have difficulty using appropriate eye contact, facial expressions, and gestures when interacting with others. In addition, there may be deficits in the interpretation of the facial expressions and gestures used by others. Children with autism often do not point at objects of interest in their environments as often as typically developing children (Suzuki, 2011).

Communication. Failure to meet developmental milestones in the area of language is often an early indicator to parents and other care providers of a developmental delay (Kozlowski, Matson, Horovitz, Worley, & Neal, 2011). In young children with ASD, there may be early impairments in nonverbal and/or verbal communication. Deficits in children with ASD almost always consist of delay in the development of verbal language with a corresponding lack of the

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use of nonverbal language (Charman, 2008). Nonverbal communication is often used by typically developing children and includes the use of gestures, body language, and facial expression to communicate to others. Some examples of this include waving hello, using a finger to "shush" a person when a baby is sleeping, and crossing arms over a person's chest when angry. Charman (2008) also noted that in some cases (15-30%) children with ASD exhibit a loss of previously acquired skill, often in the area of communication around the ages of 14-36 months of age.

In addition, those with ASD may have impairments in expressive and/or receptive language. Expressive language is the use of verbal and nonverbal behavior to communicate to others. Individuals with ASD often have difficulty with conversation skills in areas such as initiating, maintaining, and ending a conversation (Bertoglio & Hendren, 2009). Receptive language is the understanding of the verbal and nonverbal behavior of others. Rutter (1978) explained that someone with autism may only understand simple instructions when combined with gestural directions.

There is a wide range of possible deficits in the area of language/communication. At the extreme end, some children fail to develop any speech at all. Approximately 25-50% of children with ASD never develop language skills (Dawson & Murias, 2009; Rutter 1978). Less severe symptoms might include difficulties such as pronoun reversals, immediate or delayed echolalia, and difficulty interpreting the meaning of figurative language such as idioms and jokes (Bertoglio & Hendren, 2009; Eveloff, 1960). Echolalia may take the form of immediate repetition of sounds or words heard by others or on television. In other cases, sounds, words, or phrases may be used seemingly out of context and may be used in an attempt to self soothe or to communicate. Other common language impairments include articulation difficulties, problems

with volume, pitch, rhythm, rate, or intonation during speech. These symptoms can further exacerbate communication challenges.

Restricted, repetitive, and stereotyped patterns of behavior. Individuals with ASD also share common features in terms of their behavior. In young children, restricted behavior may involve a limited repertoire of play activities and a preoccupation with a specific object. These interests are remarkable in their intensity as well as unusual nature. Rutter (1978) explained this as a having strict rules of play without the use of imagination. As an example, during play, a child may line up all of his or her toys rather than play with them appropriately. Pretend play is also largely absent. Further, it is not uncommon for children with ASD to be fascinated by spinning objects such as fans. Children with ASD may become fixated on a part of an object, such as the wheels of a toy car (Mauk, Reber, & Batshaw, 1997). Rather than play with the car in a typical fashion, the toy may be held up and the child may flick the wheel repeatedly. The child may rigidly refuse to play with all but his or her favorite toy. In many individuals, restricted areas of interest may develop that are unusual for typically developing children of the same age (Van Krevelen, 1971). Kanner (1943) gave an example of this in his original paper describing autism in which one of his participants had a fixation on toilets.

Individuals with ASD may have a strict insistence on sameness or a need to adhere to stringent, non-functional routines or schedules. Often, when the routine is disrupted, an individual with ASD may react with strong opposition. Tantrum behavior, aggression to self and others, and other apparent distress or emotional behavior may be exhibited. For example, a child may insist that the same book be read every night before bedtime (Eveloff, 1960). This insistence on sameness was described by Kanner (1951) who noted interruption of the routine to

cause emotional rage. A child with autism may become distressed when his or her mother gets a haircut, when the furniture is rearranged, or when a new route to school is taken.

Repetitive behavior may also be apparent in the form of repetitive movements such as stereotypies. Stereotypic motor movement can include repetitive hand flapping, toe walking, body rocking, and finger flicking. Young children are more likely to engage in simple repetitive movements such as hand flapping, whereas older children and adults may have more complex routines and rituals similar to those seen by individuals with Obsessive Compulsive Disorder (Loveland & Tunali-Kotoski, 2005).

Current Diagnostic Criteria

Autistic disorder. To meet criteria for autistic disorder, the *DSM-IV-TR* lists significant deficits in all three core areas – social interaction, communication, and restrictive/repetitive behavior (RRB) with onset before the age of 3 years (APA, 2000). Six endorsements must be made, with at least two endorsements in the area of the social interaction (impairments in the use of nonverbal social behaviors, lack of developmentally appropriate peer relationships, deficits in the spontaneous sharing of enjoyment with others, and difficulty with reciprocating in social or emotional situations), at least one endorsement in the area of communication (limited or no use of verbal language, deficits in initiating or maintaining conversation, use of stereotyped or repetitive speech, impairments in pretend or imitative play), and at least one endorsement in the area of restrictive and repetitive behavior (abnormal preoccupation with restricted or stereotyped interests, insistence on maintenance of routines or rituals, motor movements that are repetitive or stereotyped, and an indefatigable fascination with specific parts of objects). A diagnosis of autistic disorder is only appropriate if symptoms are not better explained by Rett's disorder or CDD.

Asperger's disorder. To meet criteria for Asperger's disorder, an individual must show impairment in two of the three core domains, namely, social interaction and RRB. The subdomains are the same as those indicated for autistic disorder. As in the case of autistic disorder, individuals must show two out of the four impairments in the area of social interaction and one out of the four impairments listed in the area of RRB. In addition to the three endorsements needed, the impairments must cause clinically significant difficulties in at least one main area of functioning (i.e., social or occupational). There can be no significant delay in meeting developmental milestones in the area of language, cognitive skills, or adaptive skills (with the exception of social interaction). According to the *DSM-IV-TR,* a diagnosis of Asperger's disorder cannot be made if criteria for a different PDD or schizophrenia are met.

Pervasive developmental disorder not otherwise specified (PDD-NOS). In order to meet criteria for PDD-NOS, there must be a severe deficit in the development of social skills that is associated with deficits in communication or RRB with full criteria for other PDDs not met (APA, 2000). However, PDD-NOS is more often diagnosed using exclusionary symptoms rather than inclusionary ones (Matson & Boisjoli, 2007). A diagnosis of PDD-NOS is often made when full criteria for autistic disorder are not met or if the full criteria are not met until after the age of 3 years (Buitelaar, Van der Gaag, Klin, & Volkmar,1999). PDD-NOS is considered a catch-all category containing individuals who exhibit less autism symptomatology than those with autistic disorder or Asperger's disorder or atypical presentations (Walker et al., 2004).

Childhood disintegrative disorder (CDD). For this diagnosis the *DSM-IV-TR* requires a period of typical development occurs for at least the first two years of life in the areas of communication, social interaction, and adaptive skills/behavior (APA, 2000). Following this period and before the age of 10 years, regression must occur in two of the following five areas:

(1) language, (2) social skills or adaptive behavior, (3) toileting skills, (4) play, and (5) motor skills. There must also be difficulties in functioning in two of the three diagnostic areas for PDD. Further, criteria are not met for another of the PDDs. Due to the infrequency of this diagnosis, few research studies have considered the comparison of symptomatology with the other PDDs.

Rett's disorder. The *DSM-IV-TR* states that individuals with the disorder must experience normal pre- and perinatal development, including normal head circumference at birth, and seemingly typical psychomotor development for the first five months of life (APA, 2000). Following this course, all of the following criteria must be met, (1) slowing down of head growth from 5-48 months of age, (2) loss of manual dexterity between 5 and 30 months of age and the later development of stereotyped manual manipulation in the form of hand-wringing or hand washing, (3) early regression in social skills relating to engagement with others, (4) deficits in coordinated movement relating to walking or trunk use, and (5) severe deficits in language and psychomotor function.

First described by Andreas Rett, a pediatric physician born in Austria (Freilinger et al., 2010), Rett's disorder is a neurodevelopmental disorder that is a common cause of mental retardation in females. The etiology of Rett's disorder is the deletion or mutation of an X-linked gene that encodes a protein called methyl-CpG-binding protein 2. Rett's disorder almost exclusively affects females, as males almost invariably are miscarried. Severity of symptoms is variable, however life expectancy is reduced.

CHAPTER 3. SOCIAL SKILLS

Background

"Social skills are defined as interpersonal behaviors that help the individual in society" (Matson, 1988, p. 1). Though the operational definition of social skills varies across researchers, social skills as a construct have been studied for years (Gresham, 1981a; 1981b; Van Hasselt, Hersen, Whitehill, & Bellack, 1979), with significant attention being invested in the past 30 years. In addition to enabling an individual to interact with others effectively, social skills also include the avoidance of socially inappropriate behaviors (Gresham & Elliott, 1984). Although terminology may differ among researchers, there is agreement that social skills are behaviors rather than thoughts; therefore, they are measurable and observable.

Some examples of social skills include self-care (grooming), verbal and nonverbal conversation skills, assertiveness skills, social problem solving skills, employment related interpersonal skills, friendship, and dating skills (Wilkins & Matson, 2007). Social skills impact the development and maintenance of relationships with other individuals including family, friends, teachers, coworkers, and acquaintances. In addition, social skills allow individuals to engage in leisure activities as well as enable individuals to access opportunities in the community (Ladd, 1984).

Assessment and treatment relating to social skills is important for individuals with a variety of different diagnoses including ASD, schizophrenia, mood disorders such as major depressive disorder, attention-deficit hyperactivity disorder, intellectual disabilities, social anxiety disorder, and others (APA, 2000; Bellini & Peters, 2008; Matson, Dempsey, & LoVullo, 2009). Individuals with social impairments have been shown to have poor academic achievement (McClelland, Morrison, & Holmes, 2000), rejection by peers (Crawford &

Manassis, 2011), behavior problems (Akhtar & Bradley, 1990), and psychopathology such as anxiety and depression (Segrin, 1990).

Children with ASD demonstrate a range of impairments that fall under the umbrella of social skills. Between the ages of 9 and 12 months of age, review of home videos show differences between those with ASD and typically developing children on social behaviors including joint attention and failing to orient (Matson, Wilkins, & González, 2007). Other social skills deficits in very young children include lack of imitation, lack of eye contact, limited social smiling, aversion to social touch, unusual physical posturing, and inappropriate play with objects (Watson, Baranek, & DiLavore, 2003). In addition, infants with autism are impaired in empathy tasks involving the use of social gaze compared with developmentally delayed and typically developing infants (Charman et al., 1997).

Older children with ASD may prefer to spend their time alone, may not respond appropriately to strangers, may not show an interest in interacting with those close to them such as parents, and often will not initiate social interaction unless driven by a nonsocial goal (Carter, Davis, Klin, & Volkmar, 2005). Higher functioning children with ASD may be interested in social interactions, but often have an odd style and an inability to comprehend or predict the emotional states, intentions, and motivations of others (Klin, Jones, Schultz, & Volkmar, 2003).

Theory of mind is a related concept that has been used to shed light on the deficits evinced by those with an ASD. Theory of mind is the ability to understand the attitudes, beliefs thoughts, intentions, feelings, and mental states of others (Baron-Cohen, 1991). Individuals with ASD may have deficits in this area and may not be able to "put themselves into another person's place." There may be difficulty in understanding another person's perspectives which can lead to problems in social interactions (Volkmar & Pauls, 2003). Although some research supports

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the theory of mind deficit in autism, other research shows that some high functioning children are able to complete tasks that require theory of mind skills even though they still exhibit social deficits (Volkmar & Pauls, 2003). The term "high functioning" is an informal description frequently used to describe those individuals diagnosed with autism who have mild mental retardation or average to above average intelligence, as opposed to low functioning autism which describes the roughly 75% of individuals with autism having more severe mental retardation (Cohen & Remillard, 2006).

Social subtypes have been described in the ASD population by Lorna Wing and her colleagues (Wing & Gould, 1979). Their work describes three types of social impairments seen in those with autism. The three subtypes are aloof, passive, and active-but-odd (Volkmar, Cohen, Bregman, Hooks, & Stevenson, 1989). Borden and Ollendick (1994) established validity for the aloof and active-but-odd groups and partial support for the passive group (which falls between the other groups on functioning).

Wing and Gould (1979) also contributed to the understanding of autism by outlining a new conceptualization of the triad of impairments as seen in those with ASD. These researchers described the three fundamental difficulties encountered by those with ASD as impairment of (1) social interaction (e.g., impaired use of non-verbal gestures and facial expressions to indicate interest and enjoyment in being around other people), (2) social communication (e.g., problems with verbal and nonverbal conversation, idea sharing, and understanding of the communication from others), and (3) social imagination (e.g., challenges in predicting outcomes in one's own life as well as the lives of others). Wing and her colleagues believed impairrments in social imagination to be the most disabling of the deficits seen in the ASDs, though it does not emerge in typical development until age 3 years (Wing, Gould, & Gillberg 2011).

Other theoretical models for deficits in social skills in those with ASD have been put forth. One that has received some support emphasizes difficulties with executive function, broadly resulting in problems with forward planning, problem solving, and set shifting (Carter, et al., 2005). Some behaviors that may result from lack of ability in this area are perseveration, attention problems, and difficulty with the application of knowledge in context of the social world. Though this may be helpful in understanding ASD, executive function problems are not unique to this population, so would not contribute to a diagnostic understanding of this disorder.

Assessment

The methodology for the assessment of social skills has changed significantly over the years. Matson and Wilkins described a variety of the methods used (2007; 2009), focusing on 48 assessment scales developed specifically to measure social skills. Role play scenarios were originally utilized to assess social skills with children beginning in the 1970's (Matson & Wilkins, 2007). Although role play tests were the first to utilize observable behaviors in social skill assessment (Matson & Wilkins, 2009), these tests have not proven to have high validity (Bellack, 1983; Bellack, Hersen, & Turner, 1978; Van Hasselt et al., 1979). As a result, there was a move to social skills tests or rating scales, which are currently the most common method used to assess social skills. Rating scales often use a Likert or forced-choice method of assigning scores to a variety of social behaviors. Rating scales can be given as a self-report test, parent-report, or teacher-report depending on age, functioning level, and context. Previously, such tests were imbedded within broad assessments of adaptive skills or problem behaviors with a subset of items related to social skills (Matson & Wilkins, 2009). Though these tests provided useful information, they were designed as measures of overall functioning, and thus did not provide detailed or overly descriptive information regarding social ability.

One example of a rating scale specifically developed to assess social skills is the *Matson Evaluation of Social Skills in Youngsters* (*MESSY*). The *MESSY* was introduced in 1983 by Johnny Matson, Anthony Rotatori, and William Helsel, who were working with the Department of Learning at Northern Illinois University (Matson, Rotatori, & Helsel, 1983). Two forms of the *MESSY* were created including a self-report form and a teacher report form.

To develop the *MESSY*, two raters with relevant experience and expertise in working with children with deficits in social skills reviewed standardized measures including the *Child Behavior Profile* (Ackenback, 1978; Achenbach & Edelbrock, 1979), *Behavior Problem Checklist* (Quay, 1977; Quay & Peterson, 1975), and *Connor's Hyperactivity Scale* (Connors, 1969). All of the above scales included a social skills component. Ninety-three items were initially included for the *MESSY* (Matson, 1988). This version of the *MESSY* was given as a self-report as well as a teacher-report to 744 typically developing children between the ages of 4-18 years of age and their teacher counterparts on two occasions, two weeks apart. The self-report version of the scale was reduced to 62 items after Pearson correlations on test-retest reliability were run; $r = 0.50$ was chosen for the criterion correlation coefficient for exclusion of items. For the teacher-report, the scale was reduced to 64 items after similar procedures were used with $r = 0.55$ as the criterion correlation coefficient for exclusion of items. The scale consisted of two factors: Appropriate Social Skills and Inappropriate Assertiveness (Matson, Rotatory, & Helsel, 1983). Each of the 64 items on the *MESSY-II* is a brief behavioral description such as "becomes angry easily," "asks questions when talking with others," and "stays with others too long." The rater assigned a score for each item regarding how often the skill is demonstrated (1 = not at all, 2 = a little, 3 = some, 4 = much of the time, 5 = very much). The measure was administered during a 10-25 minute informant-based interview, at the beginning of which standardized

instructions are read aloud (Matson, 2010). To administer the measure, general instructions were

given during an individual interview. The rater was chosen as someone who knew the child well

and was cautioned not to give what is considered a good answer, rather to report how often the

behavior actually occurs (Matson, 1990). The *MESSY* was created to be a measure that would

specifically measure social skills, both adaptive and maladaptive, in children and adolescents

(Matson, Macklin, & Helsel, 1985).

Assessment of social skills was deemed important in order to identify deficits and

excesses relating to social behavior that could be used for diagnostic purposes as well as for

treatment (Matson, Rotatori, & Helsel, 1983). Assessment of social functioning across a variety

of ages is also extremely important, especially because early treatment has been identified as

important for autism intervention. In addition to identifying deficits, assessment can help point

toward appropriate treatment approaches for individual children. Ongoing assessment is

important to monitor progress with treatment and allow for re-evaluation and re-

conceptualization of goals.

Problems in describing differences in social functioning among the ASDs

It is challenging to describe the differences in social functioning between the different

ASDs because the vast majority of research centers on describing autistic disorder (Matson &

LoVullo, 2009). Differences between the disorders tend to concentrate on autistic disorder and

Asperger's disorder even though the most frequently given diagnosis remains PDD-NOS

(Mayes, Volkmar, Hooks, & Ciccheti, 1993). Further, because symptom severity varies greatly

among individuals diagnosed with any of the ASDs and because there is symptom overlap

among the disorders, teasing apart group differences is challenging. Also contributing to the

difficulty in addressing differences among the ASDs, and related to the previously described matters, is the issue of stability of diagnoses within the spectrum over time.

Woolfenden, Sarkozy, Ridlye, and Williams (2012) reviewed the literature concerning diagnostic stability in ASD and found that overall, diagnoses of autistic disorder are found to be stable (88-89%). They qualified that diagnoses of autistic disorder made in the preschool years had lower stability (53%) than those made later, with 12-15% not meeting criteria for autistic disorder in follow-up studies. This was especially true in those with cognitive impairment. Their meta-analysis showed mixed results with Asperger's disorder and PDD-NOS. In these disorders, 14-61% had unchanged diagnoses at follow-up. Sixty-one percent of children diagnosed before the age of 3 years did not meet criteria for an ASD at follow up. Eighty-one percent of children diagnosed with PDD-NOS or Asperger's disorder after the age of 5 years met criteria for autistic disorder at follow-up.

Attwood (1998) suggests that, depending on the child's age at the time of assessment, a child or adolescent could meet criteria for different ASDs. Changing diagnoses is one rationale for the collapsing of the separate disorders into one category in the upcoming *DSM-5*. Lord and colleagues (2006) also investigated the stability of autistic disorder and PDD-NOS diagnoses from ages 2 through 9 years. They found that only 14 of the 46 toddlers diagnosed with PDD-NOS retained the diagnosis with 27 meeting criteria for autistic disorder, and 5 not meeting criteria for an ASD. Thus, 27 out of 46 children could not be identified with autistic disorder at age 2, though went on to exhibit full symptomatology. Of the 84 diagnosed with autistic disorder at age 2, 71 retained the diagnosis, 12 were diagnosed with PDD-NOS, and 1 no longer met criteria for an ASD. In total, 95% showed stability of diagnosis from age 2 to 9 years (Lord, 2006). Worley, Matson, Mahan, Kozlowski, and Neal (2011) also looked at diagnostic stability

among toddlers after a time period of 4 to 13 months. Results from their study showed that while 32.5% of diagnoses changed from early PDD-NOS diagnoses, all of the toddlers were still diagnosed with an ASD at follow-up.

Group differences in social skills among the ASDs

Symptom criteria in the social domain are identical for Asperger's disorder and autistic disorder. Thus, looking at diagnostic inventories does not lead to a complete qualitative explanation of differences between the two disorders. In addition, some researchers have reported no difference in current social abilities between those with Asperger's disorder and those with high functioning autistic disorder; however, they noted that past history of social deficits were reported to be more severe in those diagnosed with autistic disorder (Onozoff, South, & Miller, 2000). Others have described differences in social functioning between those with Asperger's disorder and those with autistic disorder. Szatmari and colleagues (2000) found fewer social impairments overall in preschoolers with Asperger's disorder compared with autistic disorder. Also, some researchers have found less social phobia in Asperger's disorder when compared to PDD-NOS or autistic disorder (Klin et al., 2005) which may relate to Wing's conceptualization of social subtyping.

Those with autistic disorder versus PDD-NOS had more symptoms of social withdrawal and immature social skills when groups were controlled for differences in intellectual ability (Pearson et al., 2006). Mayes, Volkmar, Hooks, and Cicchetti (1993) found that those diagnosed with PDD-NOS fell between those diagnosed with autistic disorder and those diagnosed with a language disorder in several areas of functioning. They looked at the following areas of functioning: social problems, communication problems, deviant responses to the environment, affective symptoms, movement problems, and thought problems, all of which can impact social

functioning. They found that the most robust predictor in discriminating PDD-NOS from autism was related to abnormal comfort seeking. The most robust predictor in discriminating PDD-NOS from language disorders was related to inability to make friendships. Interestingly, abnormal comfort seeking and inability to make friendships are both social behaviors, thus supporting the primary role social deficits take in ASD. They also found that the degree of socialization and relatedness was the most important factor when comparing those with PDD-NOS and autistic disorder, with individuals with PDD-NOS exhibiting less severe difficulties in this area.

Njardvik, Matson, and Cherry (1999) looked at social skills in adults with profound mental retardation diagnosed with autistic disorder, PDD-NOS, and no comorbid ASD. Social skills were assessed using the *Vineland Adaptive Behavior Scales (VABS)* and the *Matson Evaluation of Social Skills in the Severely Retarded (MESSIER)*. Diagnoses were made using the *Childhood Autism Rating Scale (CARS)*. They found that individuals with MR and comorbid PDD-NOS had better positive nonverbal social skills than those with MR and comorbid autistic disorder. Those not diagnosed with an ASD had better positive nonverbal social skills than the other two groups.

In a recent study by Kozlowski, Matson, and Belva (2012), children with Asperger's disorder, PDD-NOS, and autistic disorder were compared on social functioning. Three factor scores on the MESSY-II were investigated for 57 children between the ages of 4 and 16 years diagnosed with ASD without comorbid ID. Of the three factors (Hostile, Adaptive/Appropriate, and Inappropriately Assertive/Overconfident), two showed significant differences among the groups. Specifically, children with Asperger's disorder scored better on the Adaptive/

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Appropriate skills but had more impairments regarding Hostility. No other significant

differences were found on factor scores among the three groups studied.

CHAPTER 4. PROPOSED DSM-5

The new addition of the *DSM* will eliminate the category of PDDs. Rather, ASD will be listed as one of several neurodevelopmental disorders. There will no longer be separate diagnostic categories for different disorders; rather, the same criteria will need to be met for anyone diagnosed on the spectrum. According to the APA (2012), proposed changes were made based on literature review, consultation by experts in the field, and workgroups.

Autism Spectrum Disorder - Core Features

Social/Communication Deficits

Though previous diagnostic definitions, including those proposed by Kanner and Rutter, maintained that there were three core features of autism, the proposed changes in the *DSM-5* combine social and language delays into one category (APA, 2012). The APA offers an explanation of the rationale. They contend that impairments in the areas of language/communication are unable to be separated from those in the area of social skills. For that reason, the two features should be considered as one. Further, it is suggested that language delays are not a diagnostic feature of ASD as they are not seen in all individuals with the disorder, and are also seen in individuals with other diagnoses.

Fixated Interests and Repetitive Behaviors

The description of fixated interests and repetitive behaviors is very similar to that in the *DSM-IV-TR*. The only notable addition is the inclusion of behaviors related to the sensory system including hyper- or hypo- sensitivity to stimuli such as temperature, pain, sound, texture, smell, light, or spinning objects (APA, 2012).

Proposed Diagnostic Criteria

The proposed *DSM-5* includes a single disorder called ASD. It is listed under the

heading of neurodevelopmental disorders which contain the following subheadings: intellectual

development disorders (previously called mental retardation), communication disorders, autism

spectrum disorder, attention deficit/hyperactivity disorder, learning disorders, and motor

disorders. Unlike the *DSM-IV-TR*, the proposed *DSM-5* does not include multiple diagnoses

within ASD, though multiple categorical diagnoses are included for all other

neurodevelopmental disorders (APA, 2012). There will, therefore, be only one set of diagnostic

criteria for ASD using a dimensional approach. It is proposed that the subcategories including

autistic disorder, Asperger's disorder, CDD, and PDD-NOS be subsumed under the label of

ASD. Because of clear etiological differences, Rett's disorder will no longer be included in this

area. To meet criteria for ASD, there must be significant and persistent impairments in the two

core areas as described above. In the area of social/communication deficits, impairments must

be present in all three of the following areas: (1) social-emotional reciprocity, (2) nonverbal

behavior used for social communication, and (3) developmentally appropriate relationships with

others (not including caregivers). In addition, there must be a presence of fixated interests and

repetitive behavior including at least two of the following: (1) repetitive speech, motor

movements, or use of objects; (2) insistence on sameness through routines or rituals; (3)

abnormal restricted interests or preoccupation with specific objects; and (4) disproportionate

reactions to sensory stimuli. In addition to deficits in these two areas, the third specification is

that symptoms must be present in early childhood, though no age is specified. It is noted that it

is possible for symptoms not to become apparent until such time that social demands surpass

abilities. The fourth, and final, criterion is that the severity of symptoms must impact everyday functioning.

Rationale

Rationale for the inclusion of only one diagnosis of ASD, rather than the five included in the *DSM-IV-TR*, is provided by the APA (2012). Reliable and valid diagnosis of the ASDs has been shown when distinguishing the ASDs from other disorders outside of those considered a PDD (Lord, et al., 2006). However, these same researchers, among others have noted that differential diagnosis within the four PDDs (removing Rett's disorder because it has clear etiological differences) has not been found to be reliable over time or among raters. Much of the variation among diagnoses seems to be attributable to symptom severity, degree of language impairment, or intellectual functioning rather than based on diagnostic features. Further complications arise in differential diagnosis when accurate developmental histories are unavailable, as the *DSM-IV-TR* criteria for the different ASDs hinge on early development. This is especially salient for Asperger's disorder and CDD.

It was felt by those making the proposed changes that a specific individual's diagnosis would be better explained by adding qualifiers to the diagnosis of ASD including the severity of symptoms, verbal ability, and IQ. In addition, current understanding of pathology and presentation of the disorder indicate that the four ASDs can appropriately be combined into one diagnostic category. The APA (2012) describes the use of previous distinctions of autistic disorder, Asperger's disorder, PDD-NOS, and CDD were akin to attempting to "cleave meatloaf at the joints." In other words, a dimensional rather than categorical approach is needed.

Wing, Gould, and Gillberg (2011) have suggested that the new criteria may cause confusion because criteria are not behaviorally defined, which may preclude all but experts in the

field from using the criteria accurately. Another problem is that with the current stress on early diagnosis (between the ages of 18 months and 3 years), children meeting *DSM-IV-TR* criteria for PDD-NOS and Asperger's disorder may not meet the more stringent criteria of the proposed *DSM-5*. Thus, these children may need rule-out diagnoses with additional evaluation necessary between the ages of 5-10 years (Matson, Beighley, & Turygin, 2011). Unfortunately, the potential increased difficulty in early diagnosis may affect the availability of early intervention services.

Severity Ratings

Descriptions of severity levels are proposed to aid in the specification of ASD, given that there is so much variability across symptomatology (APA, 2012). Individuals assigned a severity of Level 1 are those "requiring support." Specifically, there is a noticeable deficit in the area of social/communication, with difficulty initiating interactions as well as responding to others, potentially combined with an apparent disinterest in social relationships. Level 1 severity also indicates the presence of RRB that cause problems in functioning and the interruption of RRB causes resistance. Those described as Level 2 are individuals "requiring substantial support." These individuals show clear impairments in social communication skills even when supports are available. In addition to the difficulties mentioned in Level 1, there may be an abnormal response to the social advances of others. Level 2 indicates a frequency and intensity of RRB that is readily apparent to the general public and interferes with functioning across settings. Redirection is challenging when immersed in RRB and interruption of RRB leads to frustration or upset. Those qualified as Level 3 are those "requiring very substantial support." In the area of social/communication, impairments are severe and lead to problems with functioning. There is a very limited response to social cues and advances of others with little effort to initiate

social contact. RRB are very frequent and impede functioning across all aspects of life. Redirection from RRB is very difficult, and interruption of these behaviors and routines causes considerable amounts of upset.

CHAPTER 5. PURPOSE

The timeline the APA is using for the development of the *DSM-5* sets the date of

publication of the new version of the manual in May of 2013 (APA, 2012). Therefore, it is

important to use reliable and valid measures for those with ASD to see if there will be expected

differences in functional skills in the core areas of ASD when using the new criteria for

diagnosis. Because the proposed changes of the *DSM* combine language impairments with social

deficits, it is proposed that the specificity of the diagnosis will increase with the narrowing of

diagnostic criteria (APA, 2012). In addition, individuals with severe impairments in the area of

social/communication may not have two endorsements in fixated/repetitive behavior, the second

core area. Previously, only one symptom was required to be present in this area. Combined with

the stipulation that three out of three criteria will be needed in the area of social/communication

to qualify for a diagnosis, there will likely be fewer individuals meeting criteria for an ASD

diagnosis. Recently several researchers using a variety of methodologies have suggested that

with these changes, between 23% and 46% of children currently meeting criteria for an ASD will

no longer meet criteria under the proposed changes (Gibbs, Aldridge, Chandler, Witzlsperger,

&Smith, 2012; Mattila et al., 2011; McParland, Reichow, & Volkmar, 2012: Worley & Matson,

2012).

The aim of the present study is to determine if there is a difference in social skills

between children and adolescents who are diagnosed with ASD using *DSM-IV-TR* criteria and

those who are diagnosed with ASD using *DSM-5* criteria. Typically developing children serve

as a control group to determine if differences among groups are indicative of clinical

impairment. Results of this study inform future assessment and diagnosis of children with

symptoms of ASD. Further, because a formal diagnosis of ASD is often needed for a child to

qualify for services at school or to justify insurance or health care reimbursement, implications

of this study include treatment access and treatment planning for children and adolescents with

ASD symptoms as well.

The current investigation is important, as potentially many children and adolescents who

currently meet criteria for an ASD will likely no longer meet diagnostic criteria according to the

proposed *DSM-5*. This is especially likely for those currently meeting criteria for PDD-NOS and

Asperger's disorder (McParland, Reichow, & Volkmar, 2012). When redefining the parameters

for the diagnosis, it is important to consider the ramifications of the proposed changes. Children

and adolescents with significant social impairments will not meet new criteria if they do not

exhibit each of the three deficits in the social/communication area. Because ASD is such a

heterogeneous disorder, many individuals with significant deficits in this area may not meet the

strict criteria. Further, if individuals do not exhibit two symptoms in the repetitive

behavior/fixated interest domain, they may no longer qualify for a diagnosis of ASD, despite

potentially having significant symptoms that fall under the area of RRB. Even with the inclusion

of the sensory impairment criterion, many children previously diagnosed with ASD due to

impairments in the areas of social skills and language may be left out according to the proposed

DSM-5. Such children will not qualify for services from providers requiring a diagnosis of ASD.

It is prudent to begin looking at how many children, proportionally, this will apply to. In

addition, it is important to investigate the degree of impairment in those who may no longer meet

criteria for an ASD on one of the core features, social skills.

Because children and adolescents with symptoms of ASD will have to meet more

stringent requirements to qualify for a diagnosis of ASD using the *DSM-5* criteria, the specificity

of the diagnosis is predicted to increase, though sensitivity is expected to be unaffected (APA,

2012). Thus, false positives are expected to decrease and true positives are expected to remain

identified. However, with estimates of between 23-46% of individuals with ASD likely to no

longer meet criteria (Gibbs, Aldridge, Chandler, Witzlsperger, &Smith, 2012; Mattila et al.,

2011; McParland, Reichow, & Volkmar, 2012: Worley & Matson, 2012), it is concerning that,

rather than simply eliminating false positives, true positives will also be lost with the proposed

revisions. Though some researchers have suggested that similar sensitivity will remain (Frazier

et al., 2012), other researcher predict a considerable drop in sensitivity to .76 in order to

eliminate false positives (Gibbs, et al, 2012).   Individuals with quantitatively fewer symptoms

will no longer be described as having ASD, though severity of symptoms may remain in those no

longer identified (Worley & Matson, 2012). The question is, will these individuals who no

longer meet criteria still have clinically significant impairments in the area of social functioning?

The characteristics of those with ASD in the future may include only those individuals

manifesting *quantitatively* more diagnostic symptoms rather than those who demonstrate

significant functional impairments in the core domains. Specifically, in the area of social skills,

one additional symptom will be required for classification of an ASD. As a result, those children

and adolescents diagnosed according to the *DSM-5* may actually be more impaired, and may

have more inappropriate social behaviors and fewer adaptive social skills.

Another possibility, however, is that children and adolescents meeting criteria for ASD

according to the *DSM-5* may be *quantitatively* more impaired, according to number of criteria

met, though may evince similar *qualitative* impairments in everyday life. Because so many

individuals are likely to be excluded and because symptom severity is likely to be similar when

looking at overall symptomatology (Worley & Matson, 2012), in the current study it was

hypothesized that, though those in the *DSM-5* group may score higher on the Hostile and

Inappropriately Assertive subscales and lower on the Adaptive/Appropriate subscale of the

MESSY-II than those children and adolescent in the *DSM-IV-TR* only group, this difference

would be insignificant and will have a negligible effect size. Further, it was hypothesized that

the control group would score significantly higher on the Adaptive/Appropriate subscale and

significantly lower on the Hostile and Inappropriately Assertive subscales of the *MESSY-II* when

compared to those diagnosed with ASD using either the *DSM-IV-TR* or the *DSM-5*, as the control

group serves to provide a non-clinical comparison group. Finally, it is hypothesized that scores

on the Adaptive/Appropriate subscale of the *MESSY-II* will best distinguish group assignment

among the three groups, because a dearth of appropriate social skills is diagnostic of ASD

according to *DSM* criteria and corresponds with the current conceptualization of the definition of

ASD, whereas inappropriate social skills may be seen in non-ASD as well as typically

developing children who may have academic problems, behavior problems, or difficulties with

mood regulation or anxiety (Akhtar & Bradley, 1990; McClelland, Morrison, & Holmes, 2000;

Segrin, 1990).

CHAPTER 6. METHOD

Participants

The sample investigated included 205 children and adolescents between the ages of 3 and 16 years old; the participants were the parents or primary caregivers who completed the *MESSY-II* and the *DSM-IV/ICD-10 Checklist* (see Measures section). The sample consisted of children and adolescents from throughout the United States, and participants were recruited from a variety of different settings and referral sources including outpatient clinics, schools, and community organizations. In addition to those participants recruited from the above mentioned settings, many participants were seen as clients at the Psychological Services Center (PSC) at Louisiana State University. Initially, a total of 285 individuals from a large dataset who received both measures of interest and were within the identified age range were considered for inclusion in the study. Scores for each of these individuals were examined and excluded if adequate information was not included in the database (e.g., incomplete measures) or if, in the case of the control group, the children/adolescents exhibited disorders with overlapping symptoms with ASD (e.g., social anxiety and other developmental disorders. The final sample consisted of 205 children and adolescents (see Table 1 for demographic information). The sample was divided into three groups: those diagnosed with ASD using criteria proposed by the *DSM-5* ($n = 73$), those who qualified for a diagnosis of an ASD (excluding Rett's disorder) based on *DSM-IV-TR* criteria but not based on proposed *DSM-5* criteria ($n = 53$), and a control group consisting of children and adolescents who did not meet criteria for an ASD using either *DSM-IV-TR* criteria or *DSM-5* criteria ($n = 79$). The *DSM-IV-TR/ICD-10 Checklist* (see Measures section) was used to assign diagnoses according to *DSM* criteria for all groups.

Table 1

Demographic Information of Participants

	Control	DSM-IV-TR	DSM-5	Total Sample
	n = 79	*n* = 53	*n* = 73	*N* = 205
Age in years				
Mean (SD)	7.9 (3.2)	7.6 (3.3)	8.4 (3.6)	8.01 (3.4)
Range	3 – 16	3 – 15	3 – 16	3 – 16
Gender				
Male	38 (48.1%)	42 (79.2%)	58 (79.5%)	138 (67.3%)
Female	41 (51.9%)	11 (20.8%)	15 (20.5%)	67 (32.7%
Ethnicity				
Caucasian	67 (84.8%)	41 (77.4%)	63 (86.3%)	171 (83.4%)
African American	7 (8.9%)	8 (15.1%)	2 (2.7%)	17 (8.3%)
Hispanic	3 (3.8%)	2 (3.8%)	2 (2.7%)	7 (3.4%)
Other/Unknown	2 (2.5%)	2 (3.8%)	6 (8.2%)	10 (4.9%)
IQ				
Mean (SD)	105.4 (15.0)	81.5 (21.3)	86.4 (19.0)	89.1(21.2)
n - subset	13	22	17	52

Of the 205 children and adolescents included in the sample, 95 were clients at the PSC. There were 98 participants recruited from other sources and for 12 participants, information was unavailable as to where they lived. The 98 non-PSC participants often submitted the measures electronically and responders reported living in 14 different states all across the United States.

The *DSM-5* group consisted of children and adolescents having five items endorsed on the checklist, with three specific endorsements in socialization and two of four endorsements in restricted interests and repetitive behavior. Criteria were consistent with the proposed diagnostic criteria suggested for the *DSM-5* (APA, 2012). The *DSM-IV-TR/ICD-10 Checklist* was useful because the measure includes all three of the social/communication and interaction criteria for the *DSM-5*. In addition, the *DSM-IV-TR/ICD-10 Checklist* contains three of the four criteria in the area of restricted, repetitive patterns of behavior, of which two must be met. The one criterion not included in the *DSM-IV-TR/ICD-10 Checklist* in this area is the criterion related to

hyper- or hypo- reactivity to sensory input or unusual interest in sensory aspects of the environment. Because information regarding this criterion was unavailable using the existing database, participants were not able to be identified in the case that they met only one of the criteria listed in this area, but all three in the social/communication area. To take a conservative approach to this potential limitation, any participants meeting all criteria in the social/communication area and only one of the criteria in the behavior area were removed from the study. Only one participant out of the sample of 205 fell into this category.

The *DSM-IV-TR* only group consisted of those children and adolescents who met criteria for an ASD according to the *DSM-IV-TR* but did not meet criteria for an ASD according to the *DSM-5*. Rationale for this is that, by default, all those who met diagnostic criteria according to the *DSM-5* also met criteria according to the *DSM-IV-TR*. To have mutually exclusive groups, only those children who did not meet *DSM-5* criteria were assessed for inclusion in the *DSM-IV-TR* only group. The *DSM-IV-TR* only group consisted of children and adolescents not meeting criteria using the *DSM-5* and also having at least three items endorsed on the checklist, with a minimum of two endorsements in the area of social interaction and one in either communication or repetitive, stereotyped, restricted patterns of behavior (González, 2008; Matson, González, Wilkins, & Rivet, 2008). Previous researchers established this cutoff to include children and adolescents with PDD-NOS, autistic disorder, and Asperger's Disorder (González, 2008; Matson et al., 2008).

The control group consisted of children and adolescents who did not meet criteria for either a *DSM-IV-TR* or *DSM-5* diagnosis of ASD. A control group was included to be able to compare those meeting criteria for an ASD under either set of criteria with typically developing children. If those children no longer meeting criteria for ASD according to the *DSM-5* are truly

false positives, it would make sense that they would more closely resemble typically developing children on measures of core ASD symptomatology. For the control group, participants were removed if they were diagnosed with a disorder that has overlapping symptoms with ASD. Disorders qualifying for exclusion included attention-deficit/hyperactivity disorder, language disorders, social phobia, intellectual disability, and developmental delays other than ASD.

Measures

DSM-IV-TR/ICD-10 Checklist

The *DSM-IV-TR/ICD-10 Checklist* contains 19 items including the criteria from the *DSM-IV-TR* which were detailed earlier in this manuscript, as well as additional criteria from the *ICD-10* (WHO, 1992). Some of the items taken from the *ICD-10* include: "rarely seeking or using others for comfort in times of stress or comforting others when they are stressed;" "lack of emotional response to other verbal or nonverbal communication;" "lack of variation in speech;" "impaired use of gestures to aid spoken communication;" "specific attachments to unusual objects;" and "distress over changes in small, nonfunctional details in the environment." Because some of the language used in the written criteria is not accessible to a layperson, examples from the texts are included for most of the items. One item also addressed symptom onset and asked if delays in at least one of the core areas were seen before age 3 years. The *DSM-IV-TR/ICD-10 Checklist* is psychometrically sound, with good reliability. Inter-rater reliability and test-retest reliability were robust ($r = .90$ and $.97$, respectively). Internal consistency was excellent with an alpha value of .95 (González, 2008; Matson, González, et al., 2008) as Cicchetti (1994) asserts that excellent internal consistency exists when alpha is above .80.

MESSY-II

The *MESSY-II* is the second edition of the *MESSY* and contains the same 64 items used in

the teacher-report version of the original scale (Matson, 2010). The *MESSY-II* was revised to be

a parent/teacher rating form. Psychometric properties of the scale were revisited using a

population of 885 typically developing children and was normed using an expanded age range

with children ages 2-16 years and different cutoffs for three separate age cohorts (ages 2-5, 6-9,

and 10-16; Matson et al., 2010). The researchers reported strong internal consistency for all age

ranges (alpha ranged from .84 to .93), with the highest reliability found for those over the age of

5 years. Convergent and divergent validity were found to be good to strong for all age groups.

Cutoff scores were provided for the *MESSY-II* for children diagnosed with ASD and for typically

developing children (Matson, Kozlowski, Neal, Worley, & Fodstad, 2011).

Using exploratory factor analysis, a three factor structure was proposed including two

factors relating to inappropriate social skills and one relating to appropriate social skills. The

three factors are Hostile, Inappropriately Assertive/Overconfident, and Adaptive/Appropriate

(Matson, Neal, Worley, Kozlowski, & Fodstad, 2012). Factor I, Hostile, includes items such as

"gets in fights a lot," "makes fun of others," and "feels angry or jealous when someone else does

well." Factor II, Adaptive/Appropriate, includes items such as "sticks up for friends," "smiles at

people he/she knows," and "helps a friend who is hurt." Factor III, Inappropriately

Assertive/Overconfident, contains items such as "always wants to be first," "speaks too loudly,"

and "gets upset when he/she has to wait for things." Each factor can be summed to create a total

score for each factor. The functional levels are separated into no/minimal impairments,

moderate impairments, and severe impairments. High scores are indicative of impairment for the

two inappropriate social skills factors, and low scores indicate impairment on the Adaptive/Appropriate factor.

Because the *MESSY-II* is a parent or teacher report format, the scale can be used for all types of children and adolescents who are typically developing, nonverbal, verbal, intellectually disabled, or psychotic. The *MESSY-II* was specifically created to identify children with challenges in the area of social skills, to assess social skills for Individualized Education Programs through the school system, to evaluate effectiveness of interventions, to measure social skills in children with ASD, to be used together with educational strategies to teach social skills, and for research purposes (Matson, 2010). Because social skills are a basic and necessary component of all interactions, there are many populations for which such an assessment tool is needed. In addition, with behavioral treatment deemed a best practice for intervention, measurement protocols consistent with this view are imperative.

Procedure

Participants were recruited through advocacy groups, support groups, schools, and through an outpatient clinic. Primary caregivers served as informants for the study. Informed consent was obtained from the informants and a battery of measures was completed by the caregivers. The battery included the *MESSY-II*, *DSM-IV-TR/ICD-10 Checklist*, and other measures related to symptoms of ASD, adaptive behavior skills, and challenging behavior. In some cases, standardized tests of intellectual ability were also given.

All forms were completed either in the homes of the children/adolescents or at an outpatient clinic. When forms were completed in the home, measures were sent by mail and doctoral-level graduate students called the home to answer any questions and provide

clarification. When forms were completed at a clinic, doctoral-level graduate students were available in person to answer questions and provide clarification for directions.

At the top of each measure, directions were written out for the caregiver. When completing the *DSM-IV-TR/ICD-10 Checklist*, the primary caregiver of the child was instructed to record their answer to each item with "yes" or "no" depending on if the child exhibited each symptom listed. For the *MESSY-II*, the rater was instructed to state how often each social behavior was demonstrated by the child (Matson, 2010). Ratings are as follows: 1 (not at all), 2 (a little), 3 (some), 4 (much of the time), 5 (very much; Matson, 1988). The current study was approved by the Louisiana State University Institutional Review Board.

Statistical Analyses

An a priori power analysis was conducted using G*Power 3 (Faul, Erdfelder, Lang, & Buchner, 2007) to determine the sample size necessary to achieve adequate power. According to Field (2005), a power of .80 is satisfactory to detect a difference where one exists. To determine the minimum number of participants for the following analyses, alpha was set to .05, power was set to .80, and the effect size was set at .20. The power analyses for the MANCOVA, ANOVAs, and planned contrasts recommended that a total sample size of 159 would be needed to detect a small effect size if one exists. The total sample of 205 exceeded the recommended size for adequate power.

Next, descriptive statistics were run in order to determine the percentage of those who met criteria for ASD according to the *DSM-IV-TR* but not according to the *DSM-5* to estimate the potential differences in number of cases meeting clinically significant criteria between the two editions of the *DSM*. Previous researchers in our lab and in other labs have estimated this

difference to be significant, so this portion of the study is a replication using a different subset of the same database used by Worley and Matson (2012).

A priori analyses were conducted to investigate potential differences among demographic variables in the three groups including gender, ethnicity, and age (see Table 1). Results of the chi-square analysis indicated that there were no differences in ethnicity among the three groups. The chi-square analysis also revealed no differences in gender between the two clinical groups, though there was a significant difference in gender when the control group was included in the analysis, $\chi^2 = 21.58$, $p < .001$. It has been established that ASD is diagnosed approximately four times more frequently in males than females (Fombonne, 2005; Kanner, 1971). The proportion of males to females in the clinical groups was in line with the recognized gender split in diagnoses of ASD and, as expected, the control group was had roughly equal numbers of males and females. Nonetheless, gender was added as a covariate in the analyses. An analysis of variance (ANOVA) was conducted to examine differences in age among the three groups in order to see if statistically significant differences existed between any of the groups. According to Levene's test, the assumption of homogeneity of variance was upheld for the age variable. Results of the ANOVA indicated no significant age differences among the three groups. IQ was also investigated; however, standardized IQ test results were not available in the database for a significant number of participants. For the 52 participants with available IQ scores, ANOVA revealed a significant difference among the three groups, $F(2, 49) = 6.58$, $p < .01$; however, Bonferroni corrected *post hoc* comparisons indicated that the difference resulted from significant differences between the control group and both of the clinical groups ($p < .05$), though there was not a significant difference between the two *DSM* groups ($p = 1.0$). Due to the limited number of available IQ scores in the current sample as well as the lack of significant difference between the

clinical groups, IQ was not included as a covariate in this study, though future studies should look at this variable in more depth.

Next, group scores for each of the three factors of the *MESSY-II* were assessed for homogeneity of variance as well as normality to ensure that assumptions for the statistical analyses were upheld. For two of the three factor scores, homogeneity of variance was violated. The violations of homogeneity of variance were not considered to be of significant import, as roughly equal sample sizes were studied using the three levels of the independent variable, diagnostic group (Field, 2005). Leech and colleagues (2008) suggest that no one group should have more than 1.5 times more participants than any other group when considering the impact of homogeneity of variance, a characteristic of the current study. Nonetheless, to be conservative, when homogeneity of variance was violated according to Levene's test, the more robust Welch procedure was used for those factors when conducting ANOVAs.

In order to test the assumption of normality of the distributions, the Kolmogorov-Smirnov test was used. The sample did violate normality in all except for two cases (i.e., the *DSM-IV-TR* only and the *DSM-5* groups on the Adaptive/Appropriate factor). However, the statistics used are robust to small deviations from normality, especially when sample sizes are large and roughly equal as in the case of the current study (Field, 2005). Visual examination of histograms indicated that distributions approached normality though they did evince some skew (most often positive skew). For these reasons, the parametric statistics were considered to be adequate in the present study.

The main purpose of the current experiment was to determine the difference (if any) between the current edition of the *DSM* and the proposed revisions in terms of social skill functioning. As such, a pair of two orthogonal planned contrasts of interest was conducted as the

primary analysis. To be safe and to examine if overall group differences exist, first a multivariate analysis of covariance (MANCOVA) was conducted to compare scores on the three dependent variables (i.e., Hostile, Adaptive/Appropriate, and Inappropriately Assertive factor scores of the *MESSY-II*) with diagnostic group used as the independent variable (i.e., group membership) and gender as a covariate. Group membership was mutually exclusive and included a group of children and adolescents who met ASD criteria according to the proposed *DSM-5*, a group meeting criteria for ASD according to the *DSM-IV-TR* only (and, thus, will no longer meet criteria according to the *DSM-5*), and a control group not meeting criteria for an ASD using either of the sets of criteria. Because results of the MANCOVA were significant, indicating differences among the groups, a series of three univariate ANOVAs were run to describe the differences among the groups on the different factor scores individually. The two pairs of planned contrasts included, first, a comparison of the control group with the ASD groups combined (i.e., the *DSM-IV-TR* only group plus the *DSM-5* group), and subsequently, a comparison of the *DSM-IV-TR* only group and the *DSM-5* group with test results reported along with calculations of effect sizes.

Finally, a regression analysis was completed with the three factor scores of the *MESSY-II* used as predictor variables. Diagnostic group served as the outcome variable in order to investigate which aspect of social skills best distinguishes group membership.

First, descriptive statistics were computed to look at number of participants meeting

criteria for ASD according to the two versions of the *DSM* studied. Whereas 126 individuals met

criteria under the *DSM-IV-TR*, only 73 in the current sample will retain the diagnosis using the

proposed *DSM-5* criteria. With 53 individuals no longer meeting criteria, as suggested by this

study, 42.0% of those meeting criteria according to the *DSM-IV-TR* criteria (i.e., those

individuals in the *DSM-IV-TR* only group plus those in the *DSM-5* group) will no longer meet

criteria under the proposed *DSM-5* criteria. Descriptive statistics were also calculated to report

means and standard deviations of each of the three factors of the MESSY-II for each of the

groups (see Table 2 and Figure 1).

Table 2

**Means and standard deviations of factor scores on the MESSY-II for all three levels of the
independent variable**

	Control M (SD)	*DSM-IV-TR* only M (SD)	*DSM-5* M (SD)
	n = 79	*n = 53*	*n = 73*
Factor 1			
Hostile	40.9 (12.7)	46.5 (20.8)	46.7 (20.0)
Factor II			
Adaptive/ Appropriate	74.7 (10.5)	48.0 (14.4)	40.5 (10.8)
Factor III			
Inappropriately Assertive	25.7 (7.8)	29.0 (10.0)	29.9 (9.4)

Though the planned contrasts were the results of interest, as stated in the proposed

analyses section, a MANCOVA was first conducted on the total sample with diagnostic group

serving as the independent variable and the three factor scores on the *MESSY-II* serving as the

dependent variables. Because Box's test was significant, suggesting that the assumption of

equality of covariance matrices was violated, but sample sizes were not vastly different among

groups, the more robust Pillai's Trace statistic was reported rather than Wilks' Λ. After

controlling for gender, Pillai's Trace was significant, Pillai's Trace = .69, $F(3, 200) = 100.8$, $p <$

.01, partial $\eta^2 = .60$, suggesting that there were significant differences among the groups. The

covariate, gender, was not significant, Pillai's Trace = .030, $F(3, 200) = 2.06$, $p = .107$, and so

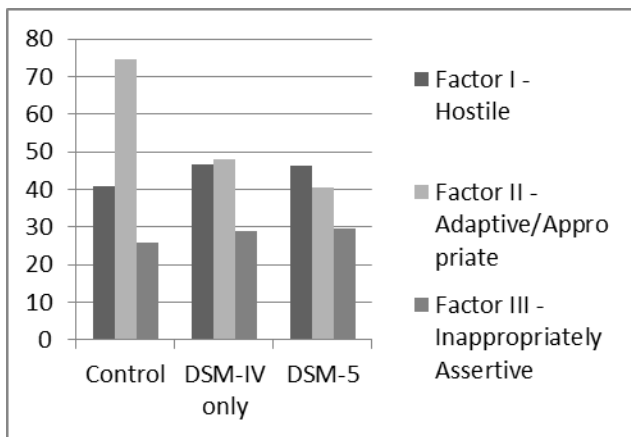gender was not added as a covariate in subsequent analyses.

Figure 1. Bar graph representing means for each of the dependent variables according to diagnostic group.

ANOVAs were used as a follow-up for the significant main effect found by the

MANCOVA for each of the three factors on the *MESSY-II*. Each factor score is discussed

separately. Factor I, Hostile, did not meet the assumptions for the ANOVA due to violations of

homogeneity of variance. Therefore, the more robust Welch test was reported, which indicated a

main effect for diagnostic group, $F_W(2,111) = 3.13$, $p < .05$. Factor II, Adaptive/Appropriate,

also violated homogeneity of variance, so the more robust Welch test was again reported

indicating a main effect for diagnostic group, $F_W(2, 118) = 207.8$ $p < .01$. For Factor III,

Inappropriately Assertive, homogeneity of variance was not violated, so the standard ANOVA

was conducted and a main effect of diagnostic group for Factor III was found, $F(2,202) = 4.56$, p

$< .05$, partial $\eta^2 = .636$. A pair of orthogonal planned contrasts was then conducted, first investigating potential differences between the control group and the combined *DSM* groups and also investigating potential differences between the two *DSM* groups (excluding the control group). When Levene's test was significant, equal variances were not assumed, and results were reported accordingly.

For the planned contrasts comparing the control group with the combined *DSM* groups, significant differences were found for all three of the factors (see Table 3). For clarity and consistency, the factors relating to inappropriate social skills (Factors I and II) will be explained first when planned contrasts are reported. Regarding Factor I, Hostile, the planned contrasts indicated significant differences between the control group and the combined *DSM* groups, $t(186.24) = -2.47, p < .05, d = 0.32$. Similarly, for Factor III, Inappropriately Assertive, significant differences were found, $t(202) = -2.89., p < .01, d = 0.42$. For the factor describing appropriate skills, Factor II, Adaptive/Appropriate, planned contrasts indicated significant differences between the control group and the combined *DSM* groups, $t(168.48) = 18.30, p < .01, d = 2.57$.

Table 3

Means and standard deviations of factor scores on the MESSY-II with the two DSM groups collapsed

	Control	*DSM* groups
	n = 79	n = 126
Factor 1*		
Hostile	40.9 (12.7)	46.6 (20.3)
Factor II**		
Adaptive/ Appropriate	74.7 (10.5)	43.6 (13.0)
Factor III**		
Inappropriately Assertive	25.7 (7.8)	29.5 (9.6)

*Significant at the .05 level
**Significant at the .01 level

Regarding planned contrasts between the two *DSM* groups, mixed results were found (see

Table 4). There were no significant differences between the two groups related to inappropriate

social skills (Factors I and III). Investigation of Factor I, Hostile, yielded no significant

differences between the *DSM-IV* only group and the *DSM-5* group, $t(109.67) = 0.59$, $p = .95$, $d = $

0.01. For Factor III, Inappropriately Assertive, similar to Factor I, significant differences were

not found between the *DSM-IV* only group and the *DSM-5* group, $t(202) = 0.57$, $p = .57$, $d = $

0.09. The only significant difference found for the planned contrasts involving the two *DSM*

groups were related to the appropriate social functioning, Factor II, Adaptive/Appropriate, where

the difference between the *DSM-IV* only group and the *DSM-5* group was significant, $t(91.72) = $

-3.21, $p < .01$, $d = 0.60$.

Table 4

Means and standard deviations of factor scores on the MESSY-II with the two DSM groups collapsed

	DSM-IV only M (SD)	*DSM-5* M (SD)
	n = 53	*n* = 73
Factor 1		
Hostile	46.5 (20.8)	46.7 (20.0)
Factor II**		
Adaptive/ Appropriate	48.0 (14.4)	40.5 (10.8)
Factor III		
Inappropriately Assertive	29.0 (10.0)	29.9 (9.4)

*Significant at the .05 level
**Significant at the .01 level

The total sample was further scrutinized to determine if the same pattern of results was

upheld for those clients seen at the PSC and for responders completing measures via mail or

electronically (see Table 5). No differences were expected between these two subgroups, as

measures were all parent report and participants were independent in providing information.

However, because the subgroups did have different types of interactions and access to clinicians

to answer any questions about the items, planned contrasts were repeated for the participants

filling out questionnaires at the PSC separately from those who were recruited from elsewhere.

Table 5

Contingency table for PSC and non-PSC subgroups, representing the orthogonal planned contrasts for each of the Factor scores.

	PSC group				Non-PSC group			
	Control	Both DSM groups	DSM-IV-TR only	DSM-5	Control	Both DSM groups	DSM-IV-TR only	DSM-5
n	41	54	26	28	34	64	24	40
Factor I								
M	44.4	42.5	42.2	42.8	36.7 **	48.1	50.0	46.9
(SD)	(15.1)	(15.2)	(13.1)	(17.2)	(7.5)	(21.0)	(23.7)	(19.4)
Factor II								
M	73.0 **	44.0	50.2**	38.3	77.1 **	43.8	47.8 *	41.5
(SD)	(12.0)	(15.4)	(17.1)	(11.0)	(8.4)	(10.5)	(10.4)	(10.0)
Factor III								
M	26.9	27.2	27.0	27.5	24.1 **	30.8	31.6	30.2
(SD)	(7.9)	(9.1)	(9.2)	(9.2)	(7.7)	(9.0)	(9.6)	(8.8)

*Significant at the .05 level
**Significant at the .01 level

For the non-PSC subgroup the same pattern of differences as reported above were found.

Included in the analyses, there were 34 control participants, 24 in the *DSM-IV-TR* only group,

and 40 in the *DSM-5* group. Regarding the first planned contrast, significant differences were

found between the control group and combined *DSM* groups for all factors as in the previous

reported analyses using the entire sample. For Factor I, Hostile, $t(56.8) = -3.83$, $p < .01$, $d =$

0.67, for Factor III, Inappropriately Assertive, $t(95) = -3.67$, $p < .01$, $d = 0.78$, and for Factor II,

Adaptive/Appropriate, $t(95) = 15.79$, $p < .01$, $d = -3.39$. The second planned contrast, comparing

the *DSM-IV-TR* only group with the *DSM-5* group, significant differences were only found

between the control group and combined *DSM* groups for Factor II, Adaptive/Appropriate t(95) = -2.55, $p < .05$, $d = -0.62$. These results parallel the results for the entire sample.

For the PSC subgroup, there were 41 control participants, 26 in the *DSM-IV-TR* only group, and 28 participants in the *DSM-5* group. The first planned contrast yielded clinically significant differences between the control group and the combined *DSM* groups only for Factor II, $t(82.1) = 10.57$, $p < .01$, $d = -2.07$. Unlike the non-PSC subgroup and the analysis of the total sample, significant differences were not found for Factors I and III using the PSC subgroup. The second planned contrast comparing the *DSM-IV-TR* and the *DSM-5* groups revealed the same pattern of results as for the non-PSC subgroup as well as the total sample with significant differences found for Factor II, Adaptive/Appropriate only, $t(42.15) = -3.03$, $p < .01$, $d = -0.83$.

Finally, a logistic regression was completed to investigate which factors, if any, of the *MESSY-II* best predict diagnostic group membership for the three groups. Within this model, factor scores on the *MESSY-II* were found to account for a significant portion of the variance in diagnostic group, $R^2 = 0.612$, $F(3, 201) = 105.57$, $p < .01$. When all three factors were added to the model, Factor II, Adaptive/Appropriate, was found to best predict group membership and Factor III, Inappropriately Assertive also was also a significant predictor of group membership (see Table 6). Because the control group is so different from the clinical groups, the logistic regression was conducted a second time, excluding the control group. In that case, the *MESSY-II* was still found to predict group membership, $R^2 = 0.102$, $F(3, 120) = 4.529$, $p < .01$; however the only significant factor in the model that excluded the control group was Factor II, Adaptive/Appropriate (see Table 7).

Table 6

OLS regression estimates for factors that predict diagnostic group membership with all three groups included

	b	*t*	ß	*SE*
Factor I – Hostile	-0.001	-0.41	-0.02	0.003
Factor II – Adaptive/Appropriate	-0.034	-17.21**	-0.76	0.002
Factor III – Inappropriately Assertive	0.016	2.61*	0.17	0.006

N	205
R^2	0.612

*significant at the .05 level
**significant at the .01

Table 7

OLS regression estimates for factors that predict diagnostic group membership for the DSM-IV-TR and DSM-5 groups only

	b	*t*	ß	*SE*
Factor I – Hostile	-0.002	-0.647	-0.010	0.004
Factor II – Adaptive/Appropriate	-0.012	-3.620**	-0.326	0.003
Factor III – Inappropriately Assertive	0.100	1.354	0.194	2.744

N	126
R^2	0.102

*significant at the .05 level
**significant at the .01

CHAPTER 8. DISCUSSION

In the present study, the finding that approximately 40% of children and adolescents may no longer meet criteria for an ASD under the proposed *DSM-5* is consistent with previous recent research (Gibbs, Aldridge, Chandler, Witzlsperger, & Smith, 2012; Mattila et al., 2011; McParland, Reichow, & Volkmar, 2012; Worley & Matson, 2012). The finding that so many children may no longer meet criteria for ASD under the proposed criteria is of critical importance and is the reason the results of the present study are so important. Many questions are raised. Do these 40% represent false positives? Were they misdiagnosed? Do they truly have subclinical symptoms? Do they need services? Will they qualify for a different diagnosis according to the proposed *DSM-5*? When considering service provision and appropriate treatment, these questions take on ethical concerns. Service provision is expensive; however, previous researchers have suggested that the provision of evidence based interventions, especially Early Intensive Behavior Intervention or Applied Behavior Analysis, is more cost effective in the long run (Peters-Scheffer, Didden, Korzilius, & Matson, 2012). Currently, children and adolescents qualify for services in the community, in schools, and through insurance, often contingent upon being diagnosed with an ASD. If these children are not identified, or are diagnosed with an unrelated non-autism spectrum disorder such as social communication disorder, it is of concern that they may not be able to access needed services.

The current study diagnosed according to the *DSM-5* using the most educated guess at the present time. The lack of information related to sensory concerns did not impact the study in any way because that information was not needed to assign groups for all except one potential participant. However, it is important to note that the *DSM-5* has not been published, and in a

year or so, we will formally know more regarding exactly what the changes will be and how the changes will play out.

As hypothesized, the control group had better adaptive/appropriate social skills and fewer inappropriate social skills when compared to the *DSM* groups combined. The first orthogonal planned comparison investigated the significance of the above differences using planned contrasts by comparing the control group with the two *DSM* clinical groups combined. The differences between the control group and the clinical groups were significant for all three factors. Children and adolescents diagnosed with an ASD using either set of criteria, therefore, may have functional impairments compared to typically developing children.   For the two factors representing inappropriate social functioning, small effect sizes were found. For the factor tapping into appropriate social functioning, a large effect size was found. The results described here support the first hypothesis proposed in the study, that the control group would be significantly different from the *DSM* groups in terms of qualitative social functioning.

The hypothesis regarding differences between the two *DSM* groups was in large part supported, though not in its entirety. The second orthogonal comparison was more specific, and the focus was on possible differences between those who may no longer meet criteria for an ASD with the proposed revisions to the *DSM* (the *DSM-IV* only group) and those that will continue to meet diagnostic criteria for an ASD with the proposed revisions to the *DSM* (the *DSM-5* group). For the two factors of the *MESSY-II* describing inappropriate behavior (Hostile and Inappropriately Assertive), as hypothesized, no differences emerged between the groups and effect sizes were negligible. Therefore, individuals who have quantitatively fewer symptoms per *DSM* criteria still manifest the same degree of inappropriate social behavior in terms of increased

hostility as well as increased difficulties with inappropriate assertiveness. It follows that these individuals need the benefit of services to address the concerning, inappropriate behaviors.

For the factor of the *MESSY-II* addressing prosocial behavior, the Adaptive/Appropriate factor, the a priori hypothesis that there would be a negligible effect size between the two *DSM* groups was not supported. However, the *DSM-5* group was more impaired on this factor compared to the *DSM-IV* only group. A significant difference was found on the Adaptive/Appropriate factor, a medium effect size was reported. The individuals who will no longer meet criteria may in fact have significantly more adaptive social skills. Nonetheless, whereas the effect size was medium, the individuals no longer meet criteria according to the proposed *DSM-5* (the *DSM-IV-TR* only group). These children were still found to be in the severely impaired range as suggested by the cutoff scores on the MESSY-II. Those who may no longer qualify for services may be those who have more functional and adaptive skills (e.g., higher IQ, PDD-NOS or Asperger's disorder rather than autistic disorder), replicating previous studies. These children still evince debilitating amounts of inappropriate social behavior and severe deficits in the area of functional and adaptive skills. Unaddressed, such problems may lead to reduced opportunities for children and adolescents who cannot access appropriate treatment. The cost for society in caring for this subset of the population in the long term may be great. Despite qualitatively fewer deficits in those who will no longer meet criteria, it is important to highlight that in this study, individuals diagnosed using either set of criteria were functionally impaired socially, suggesting that, as a whole, the *DSM-IV* only group are not simply false positives. When investigating the factor scores of the *MESSY-II*, it is helpful to keep in mind the established cutoffs for the measure. For the Adaptive/Appropriate factor, which best describes social deficits or impairment in the use of appropriate social skills, the

means for both the *DSM-IV* only group as well as the *DSM-5* group were in the severe impairment range, whereas the mean for the control group was in the range indicating no/minimal impairments.

Differences found between the subgroups identified as PSC and nonPSC participants, may be due to the fact that the controls included in the PSC subgroup were typically developing children who were experiencing enough difficulty in some area to warrant a referral to the clinic. The control group for those recruited in other settings likely did not have presenting problems as they were recruited from a wide range of settings. Nonetheless, the main finding regarding the Adaptive/Appropriate factor was consistent for all groups, and it is important to include a wide range of typically developing control participants, as this represents naturally occurring variation in the population. Therefore, it is prudent to keep these findings in mind as the overall sample is considered.

The final result of the study was that differences in Adaptive/Appropriate behavior best predicted diagnostic group membership both when the control group was included and also when it was excluded from regression analysis. Consistent with the a priori hypothesis, Factor II is expected to best delineate the control group from the ASD groups. In addition, it appears that the Adaptive/Appropriate factor also best predicts which individuals will likely no longer meet the proposed *DSM-5* criteria. Further, the Inappropriately Assertive, but not the Hostile factor was also found to predict group membership (though to a lesser extent) when all three groups were considered.

It is important to recognize that the current study is a research investigation. As such, only one measure was used to create the diagnostic groups. When diagnosing for clinical purposes, a parent's completion of a measure does not suffice, and multi-methods, multiple

informants, and observation by a clinician are critical for a thorough assessment (Huerta & Lord, 2012). Although the use of a parent report measure was used as the sole means to diagnose, because the dependent variable was also assessed using parent report, expected biases in response styles (i.e., overreporting or underreporting) were expected to have cancelled each other out.

In theory, the true population of those with ASD cannot change even when diagnostic criteria are modified; however, when criteria are changed, the parameters or the boundaries are altered by shifting what is considered *enough* deficits to be judged a "disorder." By nature of the new, stricter criteria, children in the *DSM-IV-TR* only group will have quantitatively fewer symptoms. Accordingly, recent research suggests that symptomatology differs between these two clinical groups (Worley & Matson, 2012). The groups are referred to as clinical groups, because, according to this study, children soon to be excluded from the category of ASD do have clinically significant qualitative social difficulties, whether these be described as not enough of the desired social behavior or too much of the undesired social behavior.

Of the neurodevelopmental disorders, ASD is one of only two categories in the proposed *DSM-5* without a Not Elsewhere Classified (NEC) specifier or a Not Otherwise Specified (NOS) category. Intellectual Developmental Disorders, Attention Deficit/Hyperactivity Disorder (ADHD), Specific Learning Disorder, and Motor Disorders all include such a category. With such large amounts of heterogeneity in symptom presentation in the ASD population, it is surprising that those with "subthreshold" or "atypical" presentations will not be given a captured by the new definition of the spectrum, though atypical and subthreshold diagnoses will remain for so many other neurodevelopmental disorders including ADHD and ID. Numerous researchers have shown that higher functioning individuals with ASD (e.g., those with more

advanced language skill, better joint attention, the ability to imitate, intact play skills, and socialization) respond the best to treatment (i.e., Applied Behavior Analysis; Bono; Sallows & Graupner; Sigman & McGovern). To restrict access to service for individuals most likely to benefit from treatment seems counterintuitive. Further, it is well accepted that early intervention is most effective. More restrictive criteria would likely make early identification more difficult, especially in the cases where there is not a total lack of social ability. Changes that may prevent individuals who have the most potential to make significant improvements could have dramatic ramifications. The current study supports the idea that, as a group, the 40% of children and adolescents who will no longer meet criteria are not simply false positives. Rather, the *DSM-IV-TR* only group consists of individuals with much to gain if provided with timely, accurate diagnoses and adequate intervention.

As a construct, on a theoretical level, have we been so wrong about categorizing 40% of individuals with ASD? If so, it would be prudent to ensure that services will still be available for those who will not meet the proposed *DSM-5* criteria prior to making such drastic changes to the criteria. Granted, the proposed changes would serve to halt the epidemic status of ASD diagnoses and would, at least in the short term, reduce the financial burden on insurance companies, the education system, and government agencies.

Further studies are needed to investigate the 40% who will no longer meet diagnostic criteria. Do they simply have social and communication deficits, making an appropriate diagnosis that of the newly proposed social communication disorder? In the present study, the majority of the sample in the *DSM-IV-TR* only group was noted to have at least one endorsement in the area of restricted and repetitive behavior. Of the 53 children and adolescents in the *DSM-IV-TR* only group, only 7 did not have any endorsements in the area of RRB, suggesting that a

diagnosis on the autism spectrum would be more appropriate for the vast majority of those no longer meeting criteria than a diagnosis of social communication disorder, which does not include symptoms of RRB. For those 7 with significant social deficits but no RRB, perhaps social communication disorder would be more appropriate. In the current study, the main reason children and adolescents did not meet criteria was not due to the absence of RRB. Of the 53 children, 43 did not meet the new criteria because the three specific endorsements in the area of social/communication required to meet *DSM-5* criteria were not met. As found in the present study, even though individuals no longer meeting criteria scored better on Factor II, they were still in the severely impaired range. Severe impairments in the area of adaptive/appropriate social skills combined with RRB seem to fall well within the definition of autism since the time of Kanner. It is possible that a NEC or atypical ASD diagnosis would be more appropriate to describe these children and adolescents rather than the social communication disorder diagnosis. If an NEC or NOS category is not included, results of the current study would support making the criteria less strict. Proposed changes to the criteria have been offered (Matson, Hattier, & Williams, 2012).

Another question raised by this study that warrants future research is whether or not hypo- or hyper-reactivity to sensory stimuli is a core diagnostic feature of ASD. Out of the 205 participants included in the study, criterion regarding reactivity to sensory stimuli provided necessary information for only one participant. More research is needed to show definitively that there would be utility to add hypo- or hyper-reactivity as a diagnostic symptom. Though many individuals with ASD do demonstrate this quality, it may be a manifestation of their attentional differences (also not a core or diagnostic feature).

Unfortunately, though the current study answers many questions about the nature of the functioning differences among the groups studied, even more questions remain. There may be a drastic reduction in those identified as having ASD, not because of a cure or because of a reduction in the number of people suffering from ASD, but because the definition of autism will change by way of changing criteria. With such high estimates of decreasing prevalence with the proposed criteria, even if clinical judgment and comprehensive assessment does identify more than the current study suggests, there will likely still be a sizeable and significant number of people currently on the spectrum no longer meeting criteria for an ASD diagnosis and therefore no longer qualifying for services. Likewise, many very young toddlers and children may not be identified to allow for early intervention.

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APPENDIX A. DIAGNOSING FOR DSM-5 GROUP

Item wording taken from DSM-IV/ICD-10 Checklist
1. Social/Communication (all three must be present)
    a. Impairment in the use of multiple nonverbal behavior, such as eye-to-eye gaze (e.g., eye contact), body posture, or gestures
    b. Failure to develop peer relationships appropriate to developmental level (e.g., little to no interest in forming friendships or lack of understanding of how to interact socially with others)
    c. Lack of social or emotional reciprocity (e.g., not actively participating in social play or games, preferring solitary activities)

2. Repetitive behavior (2 must be present)
    a. Stereotyped and repetitive motor mannerisms (e.g., hand or finger flapping or twisting, or other complex whole- body movements such as rocking, dipping, or swaying) -OR- *Stereotyped and repetitive use of language or idiosyncratic language (e.g., using words in a peculiar or odd way)
    b. Inflexible adherence to specific, nonfunctional routines or rituals
    c. Preoccupation with one or more stereotyped and restricted patterns of interest of abnormal intensity or focus (e.g., few interests)
    d. **

*Formerly, stereotyped use of language was a separate criterion found in the section on language impairments. Because the DSM-5 reorganizes some of the criteria, stereotypies involving language was included as a way for participants to meet this criteria.

**Sensory hypo- or hyper-sensitivity could not be assessed, as the DSM-IV-TR nor the ICD-10 included this symptom as a core deficit. However, only one participant met all three of the social/communication criteria and only one of the repetitive behavior criteria which we had data for. Therefore, though that participant did meet criteria according to the DSM-IV-TR criteria, it could not be determined if he would have met according to the DSM-5 group or the DSM-IV only group, and that one participant was excluded from the study.

APPENDIX B. ITEMS ON THE MESSY-II

1. Makes other people laugh
2. Threatens people or acts like a bully
3. Becomes angry easily
4. Is bossy
5. Gripes or complains often
6. Speaks when someone else is speaking
7. Takes/uses things that are not his/her without permission
8. Brags about self
9. Slaps or hits when angry
10. Helps a friend who is hurt
11. Gives other children dirty looks
12. Feel angry or jealous when someone else does well
13. Picks out other children's faults/mistakes
14. Always wants to be first
15. Breaks promises
16. Lies to get what he/she wants
17. Picks on people to make them angry
18. Walks up to people and starts a conversation
19. Says thank you and is happy if something is done for him/her
20. Is afraid to speak to people
21. Hurts others' feelings on purpose
22. Is a sore loser
23. Makes fun of others
24. Blames others for own problems
25. Sticks up for friends
26. Looks at people he/she knows
27. Thinks he/she knows it all
28. Smiles at people he/she knows
29. Is stubborn
30. Acts as if he/she is better than others
31. Shows feelings
32. Thinks people are picking on him/her when they are not
33. Thinks good things are going to happen
34. Works well on a team
35. Makes sounds that bother others
36. Brags too much when he/she wins
37. Takes care of others' property as if it was his/her own
38. Speaks too loudly
39. Calls people by their names
40. Asks if he/she can be of help
41. Feels good if he/she can help others
42. Defends self
43. Always thinks something bad is going to happen
44. Tries to be better than everyone else
45. Asks questions when talking with others
46. Feels lonely
47. Feels sorry when he/she hurts others
48. Gets upset when he/she has to wait for things
49. Likes to be the leader
50. Joins in games with other children
51. Plays by the rules of a game
52. Gets into fights a lot
53. Is jealous of other people
54. Does nice things for others who are nice to him/her
55. Tries to get others to do what he/she wants
56. Asks others how they are, what they have been doing, etc.
57. Stays with others too long
58. Explains things more than necessary
59. Is friendly to new people he/she meets
60. Hurts others to get what he/she wants
61. Talks a lot about problems or worries
62. Thinks that winning is everything
63. Hurts others' feelings when teasing them
64. Wants to get even with someone who hurt him/her

APPENDIX C. IRB APPROVAL

Project Report and Continuation Application

(Complete and return to IRB, 131 David Boyd Hall, Direct questions go to IRB Chairman Robert Mathews 578-8692.)

LSU

IRB#: 2609   Current Approval Expires On: 09/14/2012

Review Type: Expedited   Risk Factor: small

PI: Johnny Matson   Dept: Psychology   Phone: 225-578-8745

Student/Co-Investigator:

Project Title: Developing the Autism Spectrum Disorder

Number of Subjects Authorized: 2000

Institutional Review Board
Dr. Robert Mathews, Chair
131 David Boyd Hall
Baton Rouge, LA 70803
P: 225.578.8692
F: 225.578.5983
irb@lsu.edu
lsu.edu/irb

Please read the entire application. Missing information will delay approval!
IRB Security of Data Agreement: http://research.lsu.edu/files/item26774.pdf

I. PROJECT FUNDED BY: N/A   LSU Proposal #:

II. PROJECT STATUS: Check the appropriate blank(s) and complete the following:

- ◉ 1. Active, subject enrollment continuing; # subjects enrolled: 676
- ◯ 2. Active, subject enrollment complete; # subjects enrolled:
- ◯ 3. Active, subject enrollment complete; work with subjects continues.
- ◯ 4. Active, work with subjects complete; data analysis in progress.
- ◯ 5. Project start postponed; date:
- ◯ 7. Project cancelled: no human subjects used.
- ◯ 6. Project complete; end date:

III. PROTOCOL: (Check one).

- ◉ Protocol continues as previously approved
- ◯ Changes are requested*
  --List (on separate sheet) any changes to approved protocol.

IV. UNEXPECTED PROBLEMS: (did anything occur that increased risks to participants):
—State number of events since study inception: 0   since last report: 0
—If such events occured, describe them and how they affect risks to your study, in an attached report
—Have there been any previously unreported events? Yes/No: n

V. CONSENT FORM AND RISK/BENEFIT RATIO:
Do new knowledge or adverse events change the risk/benefit ratio? Yes/No: n
Is a corresponding change in the consent form needed? Yes/No: n

VI. ATTACH A BRIEF, FACTUAL SUMMARY of project progress/results to show continued participation of subjects is justified; or to provide a final report on project findings.

VII. ATTACH CURRENT CONSENT FORM (only if subject enrollment is continuing); and check the appropriate blank:
- ◉ 1. Form is unchanged since last approved
- ◯ 2. Approval of revision requested herewith: (Identify changes)

Signature of Principle Investigator: _P. Matson_   Date: _Sept. 4, 2012_

IRB Action: ✓ Continuation approved;   Approval Expires: _9, 9, 13_
_____ Disapproved
_____ File Closed
Signed _____   Date _9/10/12_

Print Form

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ASD STUDY Consent Form

1. **Study Title:** Developing the Autism Spectrum Disorder (ASD)

2. **Performance Sites:** Louisiana State University Psychological Services Center, preschools, grade schools, churches, hospitals or outpatient clinics, organizations, and internet websites.

3. **Contacts:** Johnny L. Matson, Ph.D.   (225) 578-8745   Mon-Fri

4. **Purpose of the Study:** Several diagnostic instruments exist that are designed to determine the presence of emotional difficulties and behavior problems in children and adults. Currently, there are no screening instruments that incorporate differential diagnosis of the developmental disorders. The purpose of this study is to develop assessment instruments designed to examine the social skills, challenging behaviors, and symptoms of emotional difficulties in children, as well as autistic traits in adults.

5. **Subjects: Inclusion Criteria:** Parents of children who are ≤ 18 years old receiving services at the Psychological Services Center; children who are receiving inpatient or outpatient medical/behavioral services, or currently attending preschools, grade schools, or church groups; children recruited via websites or organizations such as those for children with ASD or disabilities; and adults residing in the community. **Exclusion Criteria:** Parents, legal guardians, or informants unable or unwilling to provide informed consent or parental consent. **Maximum number of subjects:** 2000

6. **Study Procedures:** Assessment instruments designed to examine the social skills, challenging behaviors, and symptoms of emotional difficulties in individuals will be administered to the sample of 2000 adult participants (i.e., parents of child participants). Participants will receive information about the study and given an opportunity to volunteer through informational mail-outs at their child's school, church, or clinic, etc. or information given to them when calling about services at the Psychological Services Center. Once consent is granted, participants will be given assessment packets regarding the following either in person at the outpatient clinic, mail, or Internet link. Participants will provide information regarding the individual's: 1) demographics (e.g., age, gender, ethnicity, parents' names, number of siblings, etc.); 2) current psychotropic drug use and diagnoses; 3) developmental milestones; 4) social skills (e.g., turns head toward caregiver, initiates verbal communication, complains often, prefers to be alone, disturbs others, interacts positively with others, etc.); 5) challenging behavior (i.e., circumstances which the target behavior occurs); and 6) symptoms of other difficulties (e.g., tantrums, excessive worry or concern, initiates fights, fidgets or squirms excessively, stereotypies, intellectual disability, impaired social interactions, has odd gait when running, language delays, etc.). Participants who receive the packet via mail will receive a follow-up phone call to ensure that they have received the packet and have the opportunity to ask questions. This study will take approximately 1 hour to 1.5 hours for each participant. Additionally, children (recruited from the outpatient clinic) of a subset of the sampled adult participants (i.e., parents of child participants) will be administered an abbreviated assessment of intellectual functioning.

7. **Benefits:** Participants under the age of 18 years may benefit from this study by taking advantage of reduced price assessment services at the Psychological Services Clinic in Baton Rouge, Louisiana. If participants decide to take advantage of this offered benefit, participants will be required to come into the clinic to complete a parent interview and child observation session. If further assessment services are recommended, the participant may receive these services at half of the normal fee. All treatment services will be full price. Further, participants may benefit from professionals developing more reliable and valid assessment measures, suggesting improved diagnostic capabilities and more effective treatment interventions.

8. **Risks/Discomforts:** There is a small possibility of disclosure of personal information associated with this study. There are no other known risks resulting from participating in this study. Risks experienced should be those limited to those commonly experienced when receiving services from a public mental health clinic.

9. **Measures taken to reduce risk:** All participants will be given participant numbers. All data collected will be stored in reference to this number only. There will be one (1) master list which will list patient number by participant number to provide a means by which participants can chose to remove their data from the data set after participation. This list will be the only means by which data collected can be linked to personal information such as name or patient number. This list will be stored in a locked file cabinet, separately from the data collected.

10. **Right to Refuse:** Participation is voluntary. Participants may change their mind and withdraw from the study at any time before the conclusion of the study without penalty or loss of any benefit to which they may otherwise be entitled.

11. **Privacy:** This study is confidential. Data will be kept confidential unless release is legally compelled.

12. **Financial Information:** There is no cost to the participant and no payment will be provided for participation.

13. **Withdrawal:** There are no consequences for terminating participation in this study, which will last approximately 1 hour and 30 minutes in duration for each participant. To withdraw from the study, participants must inform the principle investigator of their desire to do so before the end date of the study.

14. Removal: A participant's data may be removed from the study if it is discovered that there were errors in the administration of any measure for that particular participant.

ASD Consent Form—Detach this page, Complete, and Return

The study has been described to me and all my questions have been answered. I may direct additional questions regarding study specifics to the investigators by contacting Megan Hattier at 225-578-1494 or asdlsu@gmail.com.

If I have questions about subjects' rights or other concerns, I can contact Robert C. Mathews, Chairman, LSU Institutional Review Board, (225) 578-8692. I agree to participate in the study described above and acknowledge the researchers' obligation to provide me with a copy of this consent form if signed by me.

_____Parent/Guardian/Informant Signature _____Date

_____ (Please Print Name of Parent/Guardian/Informant)

_____Signature of Adult Participant (if applicable)_____ Date

_____ (Please Print Name of Adult Participant if applicable)

The participant has indicated to me that he/she is unable to read. I certify that I have read this consent form to the participant and explained that by completing the signature line above he/she has given permission to participate in the study.

_____Signature of Reader _____Date

****

PLEASE FILL OUT THE FOLLOWING CONTACT INFORMATION:
(A research assistant will contact you to obtain additional information and answer any questions you may have before mailing questionnaires or sending email link to survey)

Telephone number(s) where informant can be reached: _____

Best time of day to be reached: _____

Mailing Address: _____

Email Address: _____

Circle to indicate your preference for the question below:

| INTERNET (electronic) | MAIL (paper) | Would you prefer to be mailed the questionnaires in paper with a prepaid envelope included OR receive an Internet link via email to the questionnaires to complete the questionnaires electronically on the Internet. |

If you answered MAIL (paper), please answer the following additional questions:

| YES | NO | 1. Would you be willing to complete a shorter set of similar questions approximately 2 weeks after completing the first? |

| YES | NO | 2. Is there a second adult who knows your child well (other parent, |

grandparent, etc.) who would be willing to complete the questionnaires for your child independently from yourself?

YES   NO   3. Do you consent to your child's teacher completing a similar set of questionnaires for your child?

VITA

Jennifer Susan Beighley, a native of Canton, Ohio, received her bachelor's degree at Ohio Wesleyan University in 2002. Subsequently, she worked with children diagnosed with autism spectrum disorder in Columbus, Ohio; Hilo, Hawaii; and Seattle, Washington. She entered the Clinical Psychology program at Louisiana State University in 2010. She will receive her master's degree in May 2013 and plans to continue her education, working toward a doctorate.