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# Differences across racial groups in caregiver ratings of symptoms in children diagnosed with autism spectrum disorders

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DIFFERENCES ACROSS RACIAL GROUPS IN CAREGIVER RATINGS OF SYMPTOMS  
IN CHILDREN DIAGNOSED WITH AUTISM SPECTRUM DISORDERS

A Dissertation

Submitted to the Graduate Faculty of the  
Louisiana State University and  
Agricultural and Mechanical College  
in partial fulfillment of the  
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in

The Department of Psychology

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## ABSTRACT

A great deal of attention from local, federal, and international communities has been focused on autism spectrum disorders (ASDs). As the prevalence of these disorders rise, researchers continue to investigate various unanswered questions. The goal of this study was to examine the differences across racial/ethnic groups in caregiver ratings of symptoms of children diagnosed with ASDs. Results from such research will help determine whether cultural background can influence the recognition of behaviors indicative of an ASD. Culturally-sensitive clinical practice stemming from the significant findings of this research project can help to reduce the age at which minority children are diagnosed. This study compared two groups each: 1) African American and 2) Caucasian. The study focused on caregiver ratings of infants and toddlers diagnosed with ASDs. The author hypothesized that significant differences will be found in the factor structure of the Baby and Infant Screen for Children with aUtIsm Traits (BISCUIT) Parts 1 and 3. Results suggested that Caucasians and African Americans differed in the underlying factor structure of the measures. Caucasians had a two-factor solution while African Americans had a four-factor solution for the BISCUIT Part 1. For the BISCUIT Part 3, the Caucasian group maintained the three-factor solution of the original measure while African Americans yielded a two-factor solution. Implications, limitations, and future directions for this study were also discussed.

## INTRODUCTION

The United States (US) federal government has shown increased commitment to improving health care in this country. A large focus of this commitment is aimed toward the field of mental health care. For its part, the National Institute of Mental Health (NIMH) has released a strategic plan designed to outline steps “to transform the understanding and treatment of mental illnesses through basic and clinical research, paving the way for prevention, recovery, and cure” (NIMH, 2008). One objective is to track the trajectory of mental illness, with a focus of determining how cultural diversity plays a role in shaping that trajectory. Another objective calls for further “personalization” of interventions designed to treat mental health disorders. A separate government agency, the Department of Health and Human Services (DHHS), has launched its Healthy People 2010 campaign (DHHS, 2000). One of the goals of the Healthy People 2010 campaign is to eliminate health disparities, with an added focus of closing the gap between the disparities of those with and without disabilities. This research endeavor was conceived with the goal of examining the differences across racial/ethnic groups in caregiver ratings of symptoms of children diagnosed with an autism spectrum disorder (ASD). Before delving into the methodology involved in this study, an overview of the current literature on ASD, culture, and the interplay of ASD and culture will be presented.

### Autism Spectrum Disorders (ASDs)

#### Diagnosis and Prevalence

ASDs represent a group of psychological conditions that begin in infancy and persist into adulthood. As the name implies, ASD represents a movement toward diagnosing Autistic Disorder, Asperger’s Disorder, Childhood Disintegrative Disorder (CDD), and Pervasive Developmental Disorder Not Otherwise Specified (PDD NOS) as varying severities of a

common underlying condition. Currently, the American Psychiatric Association (APA) is completing revisions for the *Diagnostic and Statistical Manual of Mental Disorders, fifth edition* (DSM-5), slated for publication in 2013. The DSM-5 is expected to include this new, dimensionalized view of classifying ASD based upon several major criteria (APA, 2010). These criteria include impairments to social communication, social interaction, as well as restricted interests and activities (Kanner, 1943; Matson, 2007; Wing, 2001) that are diagnosed in infancy (Ben-Itzhak, Lahat, Burgin, & Zachor, 2008; Matson, Nebel-Schwalm, & Matson, 2007).

The first criterion requires that children exhibit persistent and clinically significant levels of impairments to social communication and interactions (APA, 2010). This deficit to social communication and interaction must include impairments in both nonverbal and verbal communication. Children must also exhibit a lack of social reciprocity, referring to an inability to properly share in the enjoyment of social activities. The final requirement under the social communication and interaction domain is the “failure to develop and maintain peer relationships appropriate to developmental level.” This subcriterion suggests that children who are diagnosed with an ASD must display deficits in their ability to interact with other children their age.

The second criterion pertains to restricted, repetitive patterns of behavior, interest, and activities (APA, 2010). Children must display at least two behaviors related to rigid adherence to routines, unusual preoccupations, or repetitive movements to receive a diagnosis of ASD according to the DSM-5. Specifically, the DSM-5 outlines three categories of these interests. The first category, “stereotyped motor or verbal behaviors or unusual sensory behaviors,” includes behaviors such as echolalia, body rocking, and hypersensitivity to sounds. The second category includes “excessive adherence to routines and ritualized patterns of behavior.” This group describes a set of behaviors including arranging items or engaging in activities in the same



fashion each time they are performed. “Restricted, fixated interests” represents the third category of restricted, repetitive patterns of behavior or interests. Sometimes children diagnosed with ASD show preoccupations with parts of objects, cars, or other items or activities (Folstein, 1999). The final criterion for a diagnosis of ASD requires that the symptoms of ASD are present in early childhood, although the full scope of symptoms may not be exhibited until the child is older (APA, 2010; Charman et al., 2005). Usually, deviations from typical development are observed before the child is 3 years old (Center for Disease Control, 2009; CDC).

Since the DSM-5 is still several years away from publication, diagnosing ASDs is currently conducted in more of a categorical fashion, as dictated by the *International Classification of Diseases, 10<sup>th</sup> edition* (ICD-10; World Health Organisation, 1993; WHO) and the *Diagnostic and Statistical Manual of Mental Disorders, fourth edition-text revision* (DSM-IV-TR; APA, 2000). The ICD-10 and DSM-IV-TR have separate diagnoses for autism, Asperger’s Disorder, PDD NOS, CDD, and Rett’s Disorder. For the purposes of this literature review, only the diagnosis for autism will be discussed.

Autism is categorized as “Childhood Autism” in the ICD-10, placing emphasis on it being a disorder of childhood. The first major criterion for receiving a diagnosis of Childhood Autism requires that children display deficits in: 1) both expressive and receptive communication, 2) the development of social attachments and reciprocal social interaction, or 3) functional/symbolic play prior to the age of three years old. The second major criterion requires that children display at least one impairment in communication, two impairments in social interaction, and the presence of restricted, repetitive, or stereotyped behavior, interests, and activities. In total, children must have at least six symptoms across these three areas. Finally, the ICD-10 requires that the symptoms are not better explained by other pervasive

developmental disorders, disorders of receptive language, reactive attachment disorder, disinhibited attachment disorder, mental retardation with an associated behavioral or emotional disorder, early onset schizophrenia, or Rett's Disorder.

The DSM-IV-TR also requires three major criteria to be met for a diagnosis of Autistic Disorder to be given. As with the ICD-10, there must be at least one deficit in communication and two deficits in social interaction. Impairments in communication can affect spoken language, initiating and maintaining conversation, make-believe play, or can manifest as stereotyped and repetitive or idiosyncratic use of language. Impairments in social interaction can affect joint attention, peer relationships, facial expressions, or body postures. Additionally, the child must exhibit some form of restricted, repetitive and stereotyped behaviors, interests, or activities. The DSM-IV-TR also requires that impairments to social interaction, social communication, or symbolic or imaginative play occur before the child is 3 years old. Finally, the pattern of behavior exhibited by the child cannot be better explained by Rett's Disorder or CDD.

Prevalence refers to the number of individuals diagnosed with a disorder during a specific period of time (CDC, 2009). Until recently, ASD was considered to be a fairly rare disorder. A meta-analysis was conducted that synthesized the findings of 21 epidemiological studies on ASDs (Fombonne, 2005b). This study yielded a mean prevalence of 10.0 in 10,000 children for Autistic Disorder specifically. Other research found that the overall prevalence of ASDs is at least 36.4 in 10,000 children, based on a conservative estimate (Fombonne, 2005a). More recently, the prevalence of ASDs has increased quite dramatically. Research suggests that the current prevalence of ASD ranges from 1 in 100 to 1 in 300, averaging about 1 in 150 children (CDC, 2009). ASDs are also approximately four times as common in boys as they are in girls

(Fombonne, 2005a). Across racial/ethnic lines, differences exist in the prevalence of ASD (CDC, 2009). Caucasians have a prevalence rate of about 9.9 in 1,000 children, while African Americans and Hispanics have prevalence rates of 7.2 and 5.9 in 1,000, respectively (CDC, 2009). Furthermore, rates of ASD increased for Caucasians in 14 of the 17 states surveyed, while rates for African-Americans increased in only four states (CDC, 2009). Given the differential prevalence rates, researchers should investigate the nature of these differences.

Although ASDs were first discovered nearly seventy years ago (Kanner, 1943), our understanding of them continues to evolve. This is due, in part, to the fact that the presentation of ASDs differ not only from individual to individual but also across an individual's lifetime. Since the diagnostic requirements and prevalence rates for the diagnosis of ASD has been discussed, this paper next turns to an examination of the clinical presentation of ASD from infancy to adolescence.

#### Presentation from Infancy to Adolescence

Symptoms of ASD begin in infancy and persist into adulthood. As a result, distinct behavioral deficits can be observed in children with ASD at a very early age. Studies have investigated the vocalization patterns of preverbal children who are typically developing, diagnosed with a developmental disorder (DD), and diagnosed with an ASD (Sheinkopf, Mundy, Oller, & Steffens, 2000; Wetherby, Yonclas, & Bryan, 1989). Infants diagnosed with an ASD were found to have similar rates of communication when compared to children with Down's syndrome, language impairments, and typically developing children (Wetherby et al., 1989). The same study found, however, that infants diagnosed with an ASD had deviant syllable production. Other researchers found that children with ASDs engaged in similar rates of babbling as DD comparison groups but had abnormal vocal quality (Sheinkopf et al., 2000).

Furthermore, infants with ASDs engaged in more growling, tongue clicking, trills, squeals, and yells when compared to other infants (Sheinkopf et al., 2000; Wetherby et al., 1989). In general, the vocalizations of children with ASDs are marked by abnormal sound production and atypical phonological and prosodic features (Chawarska & Volkmar, 2005).

Another characteristic of ASD that is evident in infants and toddlers is impaired nonverbal communication. Nonverbal communication includes social gestures and body language that add to the subtleties of language. Research suggests that infants with ASD use nonverbal language in a less complicated fashion when compared to other children (Stone, Ousley, Yoder, Hogan, & Hepburn, 1997). These children engage in less eye contact, less pointing gestures, and fewer showing gestures. Additionally, toddlers with ASD are less likely to use eye contact in conjunction with vocalizations to communicate with others (Stone et al., 1997). Another hallmark feature of ASD is deficits in joint attention. Joint attention is the coordinated following or directing of the attention of another person toward an object of interest or enjoyment (Mundy & Sigman, 1989). Research suggests that infants with ASD show deficits in the use of joint attention when compared to typical and children with DD (see Chawarska & Volkmar, 2005 for review). In contrast, infants with ASD engage in a greater number of protoimperative communication for the purpose of requesting objects or actions.

Even in infancy, children display deficits in social interactions with others. These deficits are exemplified in problems with attention, attachment, play, and imitative behaviors. In addition to deficits in the coordinated directing of another's attention to a shared enjoyment, children with ASD display more general impairments in attention. Young children diagnosed with ASD tended to be less responsive to the sound of others speaking (Lord, 1995; Osterling & Dawson, 1994). During interactions with adults, infants with ASD visually oriented toward the

adults less frequently than typically developing children as well as children diagnosed with DD (Baranek, 1999; Maestro et al., 2002). Furthermore, infants with ASD seemed to take notice of adult communicative behaviors less frequently than other groups of children (McArthur & Adamson, 1996). Toddlers with ASD have been shown to be less responsive to the sound of their mothers' voices (Klin, 1991). With respect to their own names, young children in an ASD group were less responsive to having their names called when compared to other children (Lord, 1995; Osterling & Dawson, 1994). Research indicates that 20-month-old children with ASD have difficulties when imitating simple actions with everyday objects (Charman et al., 1997). Additionally, deficits in both gestural (Aldridge, Stone, Sweeney, & Bower, 2000) and oral-motor (Rogers, Stackhouse, Hepburn, & Wehner, 2003) imitation were displayed by young children with ASD. What play they are able to engage in is usually characterized by restricted play with objects, toys, or interests (O'Neill & Happé, 2000). Unfortunately, decreased levels of adult and peer interactions were associated with increased levels of stereotypic, aggressive, destructive, and self-injurious behaviors (Matson, Neal, Fodstad, & Hess, 2010).

ASDs include a symptom profile that is evident very early in development. By two years of age, children with ASD already display noticeable deviations in social communication (Dahlgren & Gillberg, 1989; Wetherby et al., 1989). Preverbal children exhibit abnormal patterns of vocalization with reduced frequency of nonverbal communication. Play and imitational skills are delayed and lack an element of symbolism and abstraction. Furthermore, challenging behaviors can result in decreased opportunities for interactions with others (Matson et al., 2010). As the demands of social interaction increase with age, the symptoms of ASD in children continue to be evident (Matson, Hess, Neal, Mahan, & Fodstad, 2010).

The characteristic symptoms of ASD are more pronounced in school-aged children because of the increased social demands. Many children diagnosed with ASD who had little language development in infancy still lack functional communication when beginning school (Loveland & Landry, 1986). Additionally, impairments in nonverbal communication persist (Loveland & Landry, 1986). In children with lower intelligence, the use of joint attention is inconsistent or sometimes lacking altogether. At other times, the response of these children to the attempts of others to engage in joint attention is inconsistent or nonexistent. For those school-aged children who develop language, their use of language is often inappropriate or developmentally delayed (Loveland & Tunali-Kotoski, 2005). Although echolalia is replaced by spontaneous speech in those who acquire language (McEvoy, Loveland, & Landry, 1988), pronoun reversals become evident. In particular, children with ASD, despite their ability to demonstrate appropriate pronoun usage on tests, are prone to using pronouns incorrectly in their daily lives (Lee, Hobson, & Chiat, 1994). Research has also suggested that school-aged children with ASD exhibit articulation errors, odd phrasing, and impaired prosody (Shriberg, Paul, McSweeney, Klin, & Cohen, 2001).

Deficits in the social communication of school-aged children are also evident in the conversational skills of the children. High functioning children with ASD have shown a tendency to fail to link current conversational topics to statements made earlier (Fine, Bartolucci, Szatmari, & Ginsberg, 1994), thus making it difficult to follow the line of conversation. This was further complicated by the fact that the listener often needed this additional information to properly follow the conversation, a fact not noticed by the children. For children who are able to navigate conversations with others, the content of their language is often literal and concrete, lacking in verbal nuances, while at other times is socially inappropriate (Joanette, Goulet, &

Hannequinn, 1990). Furthermore, these children have exhibited more errors in understanding jokes when compared to other groups (Ozonoff & Miller, 1996).

Although some gains can be made in areas of communication (e.g., echolalia developing into spontaneous speech), problems with social interaction persist as these children get older. School-aged children with ASD generally have a difficult time engaging in reciprocal, pretend, and cooperative play (Wing, 2005). Three subtypes of children have been described in the literature with respect to social interaction styles (Wing, 2005; Wing & Attwood, 1987; Wing & Gould, 1979). The first subtype is the aloof group, which reflects what is most commonly considered autism by popular culture. These children tend to avoid close proximity to others and physical and social contact. Furthermore, children in the aloof group refrain from pursuing interactions with peers and adults (Rutter, 1974; Wing, 2005). Oftentimes interaction occurs to obtain basic needs or wants such as food and preferred toys. Children in this group tend to have deficits in eye contact/gaze and gestures (Buitelaar, van Engeland, de Kogel, de Vries, & van Hooff, 1991; Wing, 2005). Also, verbal children in the aloof group tend to say inappropriate statements in public social situations due to a lack of understanding of social norms.

The second group defined by Wing and colleagues is characterized by acceptance of the social advances of others, despite being unable to appropriately respond (Wing, 2005). This passive group of children is typically unable to initiate spontaneous social interactions. Since they will accept the approaches of others, generally, passive children with ASD can be prompted to interact with others in games, sometimes to their own enjoyment (Wing, 2005). Due to their openness to social interactions, these children can imitate the actions of others, even if their comprehension of the actions is limited. Similar to the aloof group, the children of the passive group have poor eye contact (Wing, 2005).

The third and final subtype is the active-but-odd children (Wing, 2005). The active-but-odd children differ from the passive and aloof children in that they actively seek out social interactions. Unfortunately, inabilities to focus on interests but their own, inappropriate social behaviors (e.g., not respecting personal space), and repetitive questioning renders their interactions odd. As they age, some children in this group are able to adjust to the social demands of adolescence and adulthood (Wing, 2005).

In addition to impairments in communication and social interactions, school-aged children also exhibit various behavioral problems that are often part of the clinical diagnosis of autism (APA, 2000; Gray & Tonge, 2001). Ritualistic or repetitive behaviors that are sensory-based tend to persist in school-aged children with ASD who are intellectually lower functioning. In those children who are higher functioning but continue to engage in sensory-based stereotypies, these behaviors tend to be less severe and more amenable to interruption (Wing, 2005). Some children progress from sensory stereotypies to complex and elaborate activities or behaviors that sometimes have features similar to obsessive-compulsive disorder (OCD; Militerni, Bravaccio, Falco, Fico, & Palermo, 2002). These OCD-like behaviors, including arranging and organizing objects and toys, are exhibited by school-aged children who are higher functioning (Gray & Tonge, 2001).

Particularly challenging behaviors such as aggression, self-injurious behavior, and temper tantrums are observed in both higher and lower functioning children with ASD (Wing, 2005). For lower functioning children, these behaviors can serve as a way to gain access to preferred items, escape non-preferred tasks, or as a result of sensory stimulation (Iwata, Dorsey, Slifer, Bauman, & Richman, 1982/1994; Matson & Minshawi, 2006). In higher functioning children,



these behaviors can emerge for similar reasons and in reaction to various social factors such as teasing, pestering, etc. (Wing, 2005).

For some school-aged children, the progression into adolescence translates into increased developmental gains and the amelioration of some symptoms. Research suggests that improvements in communication occurred for 82% of subjects from childhood to the time of testing during adolescence (Piven, Harper, Palmer, & Arndt, 1996). Most of these individuals, however, continue to display abnormalities in communication (Howlin, 2003; Tager-Flusber, 2001). Adolescents diagnosed with an ASD demonstrate continued impairments to the prosody of speech. They show higher frequencies of misplaced stress, nasality, and excessive loudness (Shriberg et al., 2001). They also engage in articulation errors as well as repetitions of sounds, syllables, and words. Unlike typically developing peers, adolescents with ASDs show delay in the use of words to describe mental states, such as “think” and “wonder” (Lord, 1996). Lord (1996) also found that adolescents with an ASD were more likely to say unusual words or phrases when compared to typically developing peers.

The deficits in social interaction demonstrated by adolescents with ASDs become particularly pronounced as these individuals attempt to navigate the intricacies of middle and high school. At these grade levels, organizational demands are increased as they are expected to move from class to class and keep track of homework and projects for multiple classes (Klin & Volkmar, 2000). Socially, these children must avoid violating social taboos, and appropriately cope with the stressors of bullying, teasing, and being ostracized. For children with ASDs, who by the very nature of their disorder are impaired socially, such stressors can be overwhelming (Green, Gilchrist, Burton, & Cox, 2000). Higher functioning adolescents with ASDs who are interesting in developing and maintaining friendships often lack the skills necessary to do so

(Shea & Mesibov, 2005). Research comparing adolescents with ASDs to children with intellectual disability and typically developing children found that the children with ASDs engaged in fewer instances of spontaneous greetings and farewells and had less eye contact (Hobson & Lee, 1998). For those in the ASD group who waved as a part of their greetings or farewells, their waves were oddly coordinated and sometimes limp. Yet another study compared adolescents with ASDs to those with Down's syndrome and found that the ASD group had a fewer number of social interactions with peers (Attwood, Frith, & Hermelin, 1988).

In addition to deficits in communication and interactions, some adolescents with ASDs continue to display behavior problems while others show improvement. Forty-five percent of parents of individuals with ASDs reported that their child continued to exhibit restricted and repetitive behaviors (Piven et al., 1996). Other research suggests that as many as 93% of children and adolescents with ASDs exhibit at least one challenging behavior (Matson, Wilkins, & Macken, 2009). Associations have emerged suggesting that the level of ASD severity and the severity of repetitive behaviors are linked (Bodfish, Symons, Parker, & Lewis, 2000). Higher frequencies of repetitive behaviors occurred in those individuals with lower functioning levels of ASD. Stereotypic behaviors, self-injury, and compulsions occurred more frequently in those diagnosed with an ASD when compared to those who did not have an ASD. Other significant behavioral problems exhibited by adolescents with ASDs include tantrums, aggression, and tantrums (DeMeyer, 1979; Fong, Wilgosh, & Sobsey, 1993; Matson, Wilkins, et al., 2009b).

Indeed, ASDs are a group of disorders that begin in infancy and, in many cases, persist into adolescence and beyond. With the increasing prevalence of ASDs and the pervasiveness of symptoms throughout the lifespan, the study of ASD is receiving increased international attention. Despite what is known about the symptoms and presentation of ASDs, not much is

known about the potential differences across cultures in how ASDs are manifested. In line with the government's focus on reducing health care disparities in mental health disability, it is imperative that research focus on differences in the presentation of ASD across cultures.

### Culture, Race, Ethnicity, and Psychopathology

#### Definitions and Concepts

Given the challenge put forth to reduce disparities in mental health care, an important question to answer next is: why use culture, race, or ethnicity as an indicator of vulnerable populations? Simply put, evidence points to differences in medical care between racial and ethnic groups (Diala et al., 2000; Flores, Bauchner, Feinstein, & Nguyen, 1999; Kakai, Maskarinec, Shumay, Tatsumura, & Tasaki, 2003) suggesting that racial and ethnic minorities are at risk for poor psychological, social, and physical health due in part to their social status (Aday, 2001; Kilbourne, Switzer, Hyman, Crowley-Matoka, & Fine, 2006). This leads to the implication that social status "highlights the essential social roots of discrimination experienced by certain groups" (Kilbourne et al., 2006, p. 2115). The differences in social status that are uniquely felt by racial and ethnic minorities occur beyond the influence of class because of the unique bias, racism, and discrimination felt by these groups throughout US history (Williams, 1996).

Before delving into a discussion on the current literature on disparities in health care across cultures, first the concept of culture will be discussed. Culture is defined as a set of learned behaviors and attitudes that are passed down to future generations (as cited in Brown & Rogers, 2003; Pachter & Harwood, 1996). An important facet inherent within the idea of culture is that it shapes perception, thought, feeling, and behavior (Gollnick & Chinn, 1990). This is achieved partly due to the predictable standards and patterns of the behaviors, values, and beliefs

that are defined by the culture (Mandell & Novak, 2005). From these standards desirable behaviors are thereby dictated to the members of that society.

A common theme in literature on the notion of culture is that culture can be conceptualized in many different ways. Bryan (2007) clarified the most frequent points from a range of definitions. The first commonality is the emphasis on the group orientation. Specifically, culture is not determined by individuals as much as it is a function of the shared values, behaviors, and beliefs of a group of people. The second commonality is the idea that culture is learned rather than inherited. This suggests that the environment in which a person is raised has profound effects on behaviors and beliefs that the person adopts as the norm. Stated differently, "...one may argue that the purpose of behavioral and psychosocial development is the adaptation to, and acquisition of, the particular culture into which one is born" (Pachter & Harwood, 1996, p. 191). The final commonality among definitions of culture is that the learning process is not achieved by formal teaching, but instead by socialization. In this way, culture is passed along through social, religious, and familial gatherings.

Since culture is learned through the informal interactions of groups of people, additional characteristics define the scope of culture. Culture is further defined as being 1) influenced by proximity, 2) unrestricted by race or ethnicity, and 3) mobile (Bryan, 2007). Bound by proximity, culture requires that its members be immersed within its physical or geographical boundaries. Although members of a cultural group are bound by proximity, the members themselves can be of differing races or ethnic groups. For example, African Americans and Caucasians of southern Louisiana share a common culture that is distinct from the culture of African Americans and Caucasians in the Baltimore/Washington, D.C. metropolitan area. Though culture is influenced by proximity, it is not bound to one particular geographical

location. Instead, cultures are able to move and relocate as circumstances may demand. Take the Haitian culture, for example. Until the last half of the twentieth century, Haitians resided almost exclusively in Haiti on the island of Hispaniola. Today, significant groups of Haitians reside not only in Haiti, but also in the states of New York, New Jersey, Massachusetts, and Florida, in Montreal, Canada, France, the Bahamas, and the Dominican Republic. Haitians in these areas have maintained their traditions and beliefs while living thousands of miles from the country of Haiti. These satellite groupings of Haitians typify the mobile nature of cultures.

Another defining feature of culture is its changing nature (Brown & Rogers, 2003; Johnson, 1990). Since human interaction is a fundamental characteristic of culture, culture therefore must change and adapt to those situations in which the interactions occur. This means that culture is the “process that specifies the contexts of human behavior” (Johnson, 1990, p. 4). For example, culture may dictate certain norms for behavior during a social event such as a high school prom that differs from the norms of a religious event for the same group of people. As new contexts are introduced to a society, culture then dictates the behaviors that are considered appropriate for its group members.

A key factor to discussing the differences in cultures is the ability to measure the relationship of cultural characteristics to psychological phenomena (Betancourt & Regeser López, 1993). Researchers often use race and ethnicity as a proxy measure of culture (Betancourt & López, 1993; Carter, 2004; Williams, 1994). This is in part due to ambiguous, or non-existent, definitions of these concepts in the literature. Still others have argued that race and ethnicity are more appropriate measures of differences in healthcare (Egede, 2006; LaVeist, 1994), suggesting that race and ethnicity are distinct from culture and each other in very important ways.

The concept of race is generally operationalized using biological and social terms. Biological definitions of race draw from the idea that groups of individuals within close geographic proximity share phenotypic and genetic traits that are distinctive from other groups (Johnson, 1990; LaVeist, 1994). Defined in this way, the concept of race carries little negative consequences. These biological definitions, however, rely upon shared physical characteristics to investigate common genetic heritages (Johnson, 1990). Flaws in biological definitions of race arise because there are actually greater genetic differences within races than there are between races (Betancourt & López, 1993; Edles, 2004; Latter, 1980; Polednak, 1989; Zuckerman, 1990). Furthermore, studies of blood groups, serum proteins, and enzymes have found that more variance is accounted by tribes and nationalities than by racial groupings (Latter, 1980; Zuckerman, 1990). It would appear then that on the basis of physical characteristics, races are more similar to one another than they are dissimilar. Yet, clear differences are observed between races on biological factors such as hypertension (Anderson, 1989). As a result, other factors must play a role in the definition of race that can also explain differences observed across races.

Social connotations to the definition of race are introduced when methods of classification are based upon human observation. These socially propagated beliefs attempt to connect physically observable characteristics such as skin color, hair type, and facial features to genetics (Betancourt & López, 1993; Johnson, 1990). Assigning racial status to others on the basis of appearance is known as physiognomy. Racial classifications done in such a fashion fail to take into account the continuum that characteristics such as skin color, hair type, and facial features inherently include. Unfortunately, such methods of classification are rooted in political views designed to promote racial domination and inferiority (Lillie-Blanton & LaVeist, 1996; Williams, 1996). This was achieved by using research to find that racial minorities were inferior

based upon biological or genetic factors. Indeed, racial minorities have suffered a disproportionate amount of social barriers that have resulted in unequal access to social and health opportunities. “Race is a concept that is determined fundamentally by political and social forces without regard to biogenetics or scientific rigor” (LaVeist, 1994). When seen in this light, race is indubitably a social, not biological, category.

In an attempt to move away from politically motivated conceptions of race, research began using ethnicity as a measure of culture (Betancourt & López, 1993). The word ethnicity is derived from two related Greek words: 1) ethnos, meaning nation or tribe and 2) ethnikos meaning national. The Greek roots of the word, then, suggest that ethnicity reflects a common nationality or heritage among a group of people. This idea is supported by Betancourt and López (1993) who write that individuals who are part of the same ethnic group share a common nationality and language. They further assert that ethnicity is the means for determining and transmitting culture. Given this conceptualization of ethnicity, one can further extrapolate that any given culture can have multiple ethnic groups within it. All of these groups, in turn, provide an avenue for the values, norms, and behaviors of the culture to be passed along to its individual members. Since “...an ethnic group is likely to interact with other ethnic groups, such interactions should not be ignored as possible sources of cultural influences” (Betancourt & López, 1993, p.631). Furthermore, ethnicity can not only be determined by culture, ethnicity can also determine the specific culture itself (Betancourt & López, 1993). This suggests that certain ethnicities exist specifically within the confines of one culture and none other.

Others have argued, however, that the distinction between culture, race, and ethnicity is not so clear. Some contend that the determination of ethnicity requires interaction with other ethnic groups within the same culture (Johnson, 1990). As a result, this conceptualization

suggests that ethnicity exists only in reference to how it functions within the culture with respect to other ethnicities. Therefore, ethnicity acts more as a categorization than a social fact (Johnson, 1990). Viewed in this way, ethnicity becomes “mobile”, able to create differing ethnicities depending on the circumstances, or culture, in which it occurs (Johnson, 1990). Alternatively, others have posited that ethnicity is merely a replacement for race in current psychological research (Edles, 2004). This depiction rests upon the notion that ethnicity is in fact the individual’s of a line of descent who share physical, customs, or based upon shared historical events (for discussion see Edles, 2004). Yet another line of discussion contends that ethnicity defines the degree and circumstances under which culture occurs (see Johnson, 1990). That is, ethnicity sets the scenario for the behaviors and norms for a culture to be transmitted.

As mentioned earlier, psychological research has moved towards using race and ethnicity as a measure of culture. In terms of individual variables, race/ethnicity is one of the most widely used in the fields comprising health services research (Lillie-Blanton & LaVeist, 1996). At times it is used as a measure of biological underpinnings while other studies use race/ethnicity as a proxy for socioeconomic status (SES) or other socioeconomic risk factors (Lillie-Blanton & LaVeist, 1996). Current research has focused on the use of race and ethnicity as an approximation of SES. SES is considered “an expression of the educational and economic opportunities available in one’s social environment” (Lillie-Blanton & LaVeist, 1996, p. 84). That is, SES is a measure of a person’s familial status with respect to social hierarchies or the person’s ability to compete for resources (Lillie-Blanton & LaVeist, 1996; Strickler, 1980).

A popular method for determining SES is the Hollingshead Four Factor Index of Social Status (Hollingshead, 1975). This index is based upon three premises. The first premise suggests that the social status structure in our society is differentiated and unequal. The second



premise contends that status is largely influenced by a person's occupation, level of education, marital status, and sex. The third premise maintains that occupation, level of education, marital status, and sex can be used to meaningfully approximate the social status of individuals and families within our society. Regarding the four factors themselves, Hollingshead (1975) discusses the significance of each. Education is used as a factor because it is a reflection of "acquired knowledge and cultural tastes" (Hollingshead, 1975, p. 1). Furthermore, education serves as the foundation to more prestigious occupations. This factor is scored on a scale of 1 to 7, ranging from "less than seventh grade" to "graduate professional training (graduate degree)". Occupation, a second factor, represents the level of skill that the individual or family unit is able to contribute to the society. With scores ranging from 1 to 9, the occupation scale varies from "farm laborers/mental service workers" to "higher executives, proprietors of large businesses, and major professionals." Marital status is a factor in social status because it has implications regarding how family members contribute to the economic system. These members can contribute full-time or part time depending on the demands of the marital and familial demands. Marital status takes into account (1) whether the partners are married or have ever been married and (2) whether the individual is or has ever been employed. Sex rounds out the four factors that contribute to social status.

The use of SES as an indicator of vulnerable populations in health services research is contested. Measuring vulnerability based on social status attempts to capture the notion that groups, other than racial/ethnic minorities, experience health disparities. In some cases, social class has been found to underlie differences in health across segments of our population (Isaacs & Schroeder (2004). One study found that income level was associated with adult mortality (McDonough, Duncan, Williams, & House, 1997). These researchers found that lower income

was associated with earlier mortality while higher income ranges were associated with increased longevity. Furthermore, they found that this association was stepwise such that age of death increased incrementally with progressively higher income levels. Other research has found that occupation and education are also associated with health disparities (Kaplan & Keil, 1993). Those individuals in highly specialized occupations requiring higher levels of education generally have better health outcomes than those with jobs demanding lower levels of education. SES as an individual variable takes into account the influence that education, occupation, and income have on health disparities.

Criticisms of the use of SES as an individual variable should also be noted. Of the Hollingshead Four Factor Index of Social Status, Schneider (1986) stated that “the complexity, dynamism, and humanity from the household” is lost by collapsing social factors into a ranking system (p. 213). As a result, several factors such as social relationships, household patterns, and social histories are not taken into account (Schneider, 1986). Another problem with the use of SES in psychological research is that it does not fully take into account the history of racism, discrimination, and bias that is felt by racial/ethnic minorities that is associated with health disparities (Williams, 1996). In light of this, researchers have suggested incorporating race/ethnicity as well as measures of work history, autonomy, decision-making, income, etc. (Isaacs & Schroeder, 2004; Schneider, 1986).

Unfortunately, researchers are not always able to employ measures that take an in-depth look at culture, race, ethnicity, and SES. The use of race/ethnicity as a variable of interest in psychological research is justifiable for several reasons. Differences in SES across the racial/ethnic groups are well-known (Isaacs & Schroeder, 2004; Lillie-Blanton & LaVeist, 1996). Specifically, African Americans and Hispanics are more likely to be poor than are Caucasians.

African Americans are more likely to be less educated and more likely to live in unhealthy and dangerous communities (Isaacs & Schroeder, 2004). Relating to heart health, African Americans are more likely to die of a heart attack when compared to Caucasians, a finding that holds true at all income levels (Isaacs & Schroeder, 2004). It is imperative that researchers conducting psychological research not equate race/ethnicity to SES (Lillie-Blanton & LaVeist, 1996). Perhaps it is more appropriate to regard race/ethnicity and SES as different manifestations of a common construct.

Another justification for the use of race/ethnicity in psychological research has been put forth. Williams (1996) stated that what underlies the discrepancies across racial/ethnic lines is the experience of racism and discrimination that is deeply rooted in US history. These experiences, he contends, exist independent of class. Given that race has been shown to be a factor in health disparities, this notion attempts to use historical and political happenings as a possible reason for these differences. Biases and discriminatory practices have led to obstacles inherent within the work force that has in effect altered the behavior and perceptions of culture (Schneider, 1986). Seemingly race/ethnicity is the most sensitive social variable to the influence of temporal, historical, and political contexts (Johnson, 1990).

Despite the flaws in the use of race and ethnicity, the importance of using these concepts as variables in psychological research is clear. Edles (2004) notes that although differences across races in the biological sense are largely unfounded, "...we must not ignore this deep sense of belonging and the social consequences that such belonging and categorization creates" (p. 43). Previous research has demonstrated the persistence of differences across racial/ethnic lines even after controlling for other social variables. As a result, continued psychological research on

health disparities across racial/ethnic groups is warranted and consistent with current governmental efforts.

### Evidence of Disparities from Research on Other Child Psychopathologies

An important area to explore in health disparities research is how parents may differentially perceive psychopathology in their child. The implications of such research impact how symptoms are reported to caregivers as well as whether services are pursued at all (Kleinman, Eisenberg, & Good, 1978). Yeh, Hough, McCabe, Lau, & Garland (2004) conducted a study investigating the differences in parental beliefs about the etiology of their child's psychopathology. Their goal was to determine whether parents across four racial/ethnic groups, African American, Asian/Pacific Islander, Latino, and non-Hispanic white, would respond differently to survey questions regarding biopsychosocial, sociological, or spiritual/nature disharmony causes of their child's problems. Participants were randomly chosen from a sample of children ages 6 to 17 years old. These children were receiving services through at least one of five public sectors of care: alcohol/drug, child welfare, juvenile justice, mental health, and public school services for children with emotional disturbance. Chi-square analyses with Bonferroni corrections suggested that seven of the eleven etiological subcategories indicated significant differences across racial/ethnic groups. Post hoc analyses suggested that African American, Asian/Pacific Islander, and Latino parents reported Relational causes less frequently than non-Hispanic white parents. Meanwhile, Asian/Pacific Islander and Latino parents were less likely to endorse Physical, Personality, or Familial Issues as causes of their child's problems. Additionally, the four groups demonstrated patterns of commonality. The groups reported Personality causes as one of the top two endorsements, and they reported Spiritual and Nature

Disharmony causes as one of the three least often endorsed causes. Generally though, racial/ethnic minorities were less likely to endorse biopsychosocial beliefs.

The findings of Yeh and colleagues (2004) demonstrate that racial/ethnic groups sometimes display differential patterns of responding. In this case, parents reported disparate beliefs regarding the biopsychosocial causes of their children's psychopathology. The children in this study were all reported to have clinically significant levels of problem behaviors, as reported by either self or parental report. An avenue that would be of interest regarding the sample used in this study is whether parental ratings of the child's symptoms also differ by race/ethnicity. Perhaps varying presentations of symptoms could contribute to differences in perceived etiologies. Or, it is possible that differing perceptions of etiology and symptom presentation are rooted in a common cultural element.

While Yeh and colleagues (2004) investigated a range of child psychopathology, other researchers have investigated racial/ethnic differences in children diagnosed with attention-deficit hyperactivity disorder (ADHD; Bussing, Schoenberg, & Perwien, 1998; Bussing, Schoenberg, Rogers, Zima, & Angus, 1998; Reid et al., 2000). Bussing and colleagues (1998b) also investigated whether explanatory models would differ by race/ethnicity. Data were collected in two phases, one conducted via telephone interviews and the second via in-person interviews. Parents answered questions regarding demographic variables, ADHD treatment status, diagnoses and comorbid psychopathology, and explanatory models. The sample was dichotomized into African American and non-Hispanic white respondents. The first finding of the study was that African American parents had significantly greater odds of using the "bad child" and "behavior problem" label when compared to non-Hispanic white parents. Also, African American parents had significantly lower odds of using medical labels. Additional

results suggested that African American parents were less likely to believe that their child's ADHD would persist to and throughout adulthood, use school interventions, cite academic success as an important outcome, and cite social or role functioning as important outcomes for their child. The authors note that such cultural differences can explain or contribute to treatment seeking and adherence behaviors on the part of parents.

The implications of Bussing et al.'s (1998b) findings extend to how mental health professionals should engage patients and their caregivers. The authors noted the importance of using these differences across racial/ethnic groups to guide clinicians in providing culturally appropriate education strategies. Similarly, such differences should also be used to guide treatment planning and implementation in an attempt to increase compliance with treatment recommendations (Kleinman, 1978). As with the study reviewed by Yeh and colleagues (2004), it would be interesting to know whether there are also racial/ethnic differences in how parents report symptoms of their child's disorder. Such information would further guide clinicians regarding what symptoms are seen as problematic for different racial/ethnic groups.

Another study compared how knowledge of ADHD may differ across races (Bussing et al., 1998a). This study investigated how African American and Caucasian parents differed on self-rated knowledge of ADHD and sources of ADHD. Participants were parents or caregivers of children in 2<sup>nd</sup> through 4<sup>th</sup> grades receiving services for learning disabilities and/or "emotional handicapping" conditions. In the first phase of data collection, parents answered questions regarding ADHD knowledge, symptoms of ADHD in the child, and general information about existing ADHD treatments. In the second phase, children were categorized as high-risk for ADHD if they scored in the clinically elevated range on two of the ADHD screening measures, or if they had previously received treatment services for ADHD. Caregivers of these high-risk

children then completed a structured interview about explanatory models of ADHD. Regarding general knowledge of ADHD, results revealed several relevant findings. When compared to Caucasian caregivers, African American caregivers were less likely to have heard of ADHD, fewer indicated knowing anyone diagnosed with ADHD personally, and fewer estimated that they knew a lot about ADHD. African American caregivers were more likely to name sugar consumption as a factor in the etiology of the child's ADHD, less likely to use a medical label, and less likely to attribute the child's ADHD to genetic causes, but were more likely to label the child as "bad". Finally, results suggested that African American parents were less likely to report receiving information about ADHD from doctors. This finding is in spite of the fact that 52% of African American caregivers and 53% of Caucasian caregivers reported doctors as their preferred method of receiving information.

The findings of this study have great implication regarding how psychopathology is viewed across racial/ethnic groups. Bussing and colleagues (1998b) concluded their findings highlight that cultural background plays an important role in shaping one's conceptualization of a disorder. It is possible that different cultural groups have dissimilar views on what behaviors constitute a disorder as well. Given the lack of research in parental perception of symptoms of ASD in children, research is greatly needed in this area. If such research were to find significant differences, clinicians would be responsible for providing information to racial/ethnic minorities on symptoms of ASD, particularly since doctors are preferred sources of information (Bussing et al., 1998b).

#### ASDs and Race/Ethnicity

Although ASD-related research is lacking studies on possible differences in racial/ethnic groups on symptom presentation, distinct areas of research have emerged. The existing literature

on the differences across races/ethnicities in ASD has concentrated on three topics: appraisal of stress, community and social support, and diagnosis.

### Disparities in Appraisal of Stress

Magaña and Smith (2006) investigated cultural views of coresidence with youth and adult children with ASD. They believed that coresidence would be associated with greater well-being in Latina mothers due to strong sense of familism, the feelings of unity among family members (Marin & Marin, 1991). Conversely, the Magaña and Smith (2006) hypothesized that disruptions to the launching (i.e., the stage where the child leaves the home in late adolescence or early adulthood; Carter & McGoldrick, 1989) of a child can be associated with an increase in psychological distress for parents. Their sample consisted of Latina (N = 20) and non-Latina white (N = 88) mothers living in either Wisconsin or Massachusetts. The researchers set out to answer four questions: 1) do psychological distress and well-being differ between the groups, 2) which sociodemographic and child characteristics account for differences, 3) do the mothers differ in their satisfaction with their coresident child, and 4) whether satisfaction with coresidence mediates the relation between culture and well-being. Consistent with expectations, race/ethnicity correlated with the psychological variables. Latina mothers displayed greater well-being and less distress, while non-Latina white mothers displayed significantly greater distress and lower well-being. Implications of this study highlight the importance of framing services within the context of cultural traditions. In particular, treatment plans should assess whether providing home support is necessary for those families who find familism important (Magaña and Smith, 2006). Despite the contributions this study makes to the field, the authors note that results are not easily generalizable since the sample size of Latina mothers was small



(Magaña and Smith, 2006), particularly when compared to the sample of non-Latina white mothers. It is imperative that future research use larger samples of ethnic minorities.

Yet another study investigated how behavioral problems of various developmental disabilities can affect family functioning (Blacher & McIntyre, 2006). These researchers set out to determine whether cultural factors mediate the effect of adaptive behavior and maladaptive behavior on family well-being for Latina families as compared to white families. Specifically, Blacher and McIntyre (2006) were interested in whether any differences persisted across caregivers of low-functioning children with Down syndrome, cerebral palsy, and autism. Caregivers filled out questionnaires relating to family demographics and acculturation, the child's adaptive and maladaptive behavior, and measures of parental well-being relating to depression and morale. The results suggested that the groups did not differ on behavior problems, although white families reported higher levels of adaptive behavior, particularly for those with Down syndrome. The results also suggested that Latina mothers scored higher on depression, lower on morale, but higher on the child's positive impact when compared to white mothers. These authors concluded that Latina mothers tend to attribute behavioral problems differently than white mothers.

Despite the clinical implications of this study, it is not without limitations. First, the sample size of children with autism was small for each ethnic group (Latino = 11, White = 12). As a result, the findings of this study should be interpreted with caution. Second, the sample included only low-functioning individuals with intellectual disability. To determine whether these findings are supported for all functioning levels, it is important that future research include higher functioning individuals. Third, the process for diagnosing autism was not clearly stated or verified. The authors noted that they did not have access to the exact diagnostic instruments

used, only stating that “the State of California has published procedural guidelines for such diagnosis” (Blacher & McIntyre, 2006, p. 188). Due to this lack of verification, the validity of the diagnosis of autism for the participants is in question. Future studies should include methods of validating the diagnoses of participants.

One study investigated predictors of negative impact for African American and Caucasian mothers of children with ASD (Bishop, Richler, Cain, & Lord, 2007). These researchers wanted to determine if there is a cultural difference in the negative perceptions and experiences of parents of children with disabilities. Such differences clarify the types of support services that should be provided to different cultural groups. Caregivers completed interview-based questionnaires pertaining to the impact of parenting a child with disability, child adaptive behavior, and symptoms of ASD. The ages of the children who were rated ranged from 8 to 10 years old. Furthermore, the children were assessed for a clinical diagnosis of ASD, IQ scores, and adaptive behavior scores. Results of this study suggested that Caucasian mothers reported greater levels of perceived negative impact when compared to African American mothers. Furthermore, African American mothers reported that their children had significantly lower adaptive skills. The authors stated that the differences in endorsements of African American and Caucasian mothers can be attributed to African American mothers having better coping strategies. They also stated that the differences could be due to African American mothers attributing sources of stress to factors other than parenting a child with ASD.

The findings of this study are qualified by several limitations (Bishop et al., 2007). The measure used to assess perceived negative impact had limited reliability and validity data. To ensure the results are legitimate, it is imperative that authors use measures that have been empirically validated. Furthermore, this study involved children of a restricted age range. As a

result, conclusions can be generalized to neither children of other ages nor infants. Future research should include participants of a wide age range.

### Disparities in Community and Social Support

Discrepancies across cultures in ASD research are evident in the use of community and social support. Researchers have investigated the use of parent support groups by African American, Asian/Pacific Islander, Native American, and European American parents of children with ASD (Mandell & Salzer, 2007). Specifically, they were interested in how child characteristics and family factors interacted to affect support seeking in different cultural groups. Conducted as part of a statewide effort to expand care for individuals with ASD, parents of children with ASD in Pennsylvania completed a survey pertaining to support group participation, clinical characteristics of the child, interactions with the health system, and general demographical information. Results suggested that African Americans were less likely than whites to be members of support groups. Furthermore, Mandel and Salzer (2007) found that parents whose children exhibited sleep problems, self-injurious behavior, or severe language impairments were also more likely to belong to support groups. They believe that this can be due to African American parents feeling uncomfortable with discussing such problems with others. They also stated that the observed differences could be due to African American parents feeling that support groups cannot adequately address their needs, or that support groups are not as readily available to African Americans.

There are several important implications of this study. First, the finding that two-thirds of the study participants attended some type of parent support group suggests that these parents value this as a service resource (Mandell & Salzer, 2007). Support groups are often a place where families can meet to share common experiences regarding the challenges of raising

children with ASD. Second, this study further suggests that such services should be made more readily available to underserved communities. Finally, this study suggests avenues for future research. Given Mandell and Salzer's findings that both African American parents and parents whose children exhibited less behavior problems were less likely to participate in support groups, future research should investigate whether African American children with ASD exhibit fewer behavior problems than Caucasian children.

Another research study examined characteristics associated with the use of services (Thomas, Ellis, McLaurin, Daniels, & Morrissey, 2007). Conducted in North Carolina, participants were recruited through known ASD advocacy and treatment groups. Families answered questionnaires pertaining to types of ASD services received, family stress, insurance coverage, and demographical characteristics. Results suggested that minority families were less likely to use the services of a case manager, psychologist, developmental pediatrician, or sensory integration practitioners. The authors attributed these results to several factors under the control of service providers (Thomas et al, 2007). They stated that the lack of appropriate community outreach and lack of cultural competency in working with diverse groups can partly explain the less frequent use of services by African Americans. African American families often experience institutionalized racism that can evolve into a more general mistrust of the system (Thomas et al., 2007). Additionally, religious and spiritual beliefs as well as perceptions of stigma can affect tendencies to use psychological services (Schnittker, 2003; Thomas et al., 2007). Thomas and colleagues (2007) encourage researchers to conduct studies that specifically investigate the perceptions of minority groups.

Differences across cultural groups in individuals with ASD are also apparent in psychiatric hospitalizations. Mandell (2008) set out to assess what demographic and clinical

characteristics of children with ASD are most associated the risk for hospitalization. Participants were Pennsylvania residents who completed either paper or internet versions of a survey as part of a state-wide endeavor to improve the care of individuals with ASD. Regarding demographic characteristics, findings suggested that African American children as well as older children were more likely to be hospitalized. Furthermore, children who displayed self-injurious and aggressive behavior were more like to have been hospitalized, while the presence of stereotypies was associated with a decreased chance of hospitalization. Taken together, these findings suggest that caregivers of African American children with ASD may report a greater occurrence of behavioral problems in their children when compared to caregivers of Caucasian children. Mandell (2007) notes that this study did not include symptoms associated with socialization, communication, or specific stereotypies. Therefore, future research should assess whether there are indeed differences on other traits of ASD that would differentiate cultural groups.

#### Disparities in Diagnosis

Aside from the differences observed in appraisals of stress and community and social supports, disparities are evident in how ASDs are diagnosed. Early research in the disparities in diagnosing ASDs across cultures looked at the age at which the diagnosis was given (Mandell, Listerud, Levy, & Pinto-Martin, 2002). Motivated by research suggesting that African American families were less likely to utilize mental health services (Cooper-Patrick et al., 1999; Diala et al., 2000), Mandell et al. (2002) set out to determine whether there are discrepancies in the age at which children are diagnosed with an ASD. They hypothesized that African American children would receive these diagnoses at an older age when compared to white children. The study included African American, white, Latino, American Indian, and Asian children, with African American children representing 59.6% of the sample. The results of this study yielded several

findings. First, white children tended to enter the mental health system sooner than both African American and Latino children with an ASD. On average, 50% of the white children received an ASD diagnosis by the age of 5.5 years old, while only 28% of the African American children had received a diagnose by that same age. Furthermore, 57% of African American children received an ASD diagnosis on their first visit to a mental health professional, compared to approximately 72% of white children in the sample. Additionally, white children received the diagnosis 1.4 years earlier than the African American children. Surprisingly, African American children received diagnoses after a greater number of visits and months of service when compared to white children. Mandell and colleagues (2002) note that delayed diagnosis can have negative consequences given the importance of early detection and treatment in improved outcomes for ASDs. Some of the findings were attributed to possible clinician bias (Mandell et al., 2002). Clinicians may regard the concerns of African Americans caregivers pertaining to developmental delay in their children differently than the same concerns voiced by white caregivers. Alternatively, African American families may not bring developmental delays to the attention of health care professionals, particularly if they feel that visits are not participatory (Cooper-Patrick et al., 1999; Mandell et al., 2002).

Despite the important implications of this study, future research should aim to improve upon two flaws. First, the researchers relied upon ASD diagnoses provided by Medicaid claims. As a result, the diagnoses were not standardized (Mandell et al., 2002). To ensure that diagnoses are valid, it is important that researchers include measures designed to confirm the presence of an ASD. Second, the study did not include any measure of symptom severity (Mandell et al., 2002). It is possible that differences in the severity of symptoms across races can explain the differences observed.

Given the findings of differences between races in the age at which ASDs are diagnosed, a natural extension to this research is to investigate what diagnoses were given prior to the final diagnosis of autism. Such research would clarify whether certain races are likely to be given diagnoses for particular disorders, other than an ASD, prior to an ASD diagnosis. Just such research was conducted with a sample of Medicaid-eligible children in the Philadelphia area (Mandell, Ittenbach, Levy, & Pinto-Martin, 2007). Data was collected on missed diagnoses (i.e. any diagnosis assigned on the first mental health visit other than an ASD), demographic characteristics, and all diagnoses assigned prior to the ASD diagnosis. Results suggested that 15.7% of the African American children received a diagnosis of conduct disorder. This percentage was roughly twice the number of the other children in the sample. Additionally, 2.5% of white children were diagnosed with an adjustment disorder, approximately 5 times less than the 12.8% of other children who were diagnosed. When compared to the rate at which ADHD was diagnosed, African American children were 5 times more likely to be diagnosed with adjustment disorder and 2.4 times more likely to be diagnosed with conduct disorder when compared to white children. Overall, Mandell and colleagues (2007) found that African American children were more likely than white children to receive a diagnosis other than autism as their first diagnosis.

The researchers believed that the differences observed could be due to several factors. The response of clinicians to the child's symptoms and the complaints of the parents can differ across racial groups (Mandell et al., 2007; Mandell & Novak, 2005). Given that African Americans report that clinicians do not properly address their concerns (Cooper-Patrick et al., 1999), it is possible that these same clinicians hold beliefs about the prevalence of certain disorders among different racial groups, thereby biasing their diagnoses (Mandell et al., 2007).

The differences across races in this study could also be explained by parental behavior. Since it has been shown that certain cultural groups place emphasis on different symptoms (Coonrod & Stone, 2004; Daley, 2004), the results of this study can be due to the unique ways in which African American and White caregivers describe their children's behavior. Since this study did not incorporate an examination of the clinical presentation of ASD across racial groups, future studies should investigate whether specific symptoms characteristic to ASD differ across cultural groups (Mandell et al. 2002; Mandell et al., 2002).

A recent study, published in 2009, extended the research on disparities in the diagnosis of ASDs across cultures. Prior to this time, research focused on children who had an existing diagnosis of an ASD, but had not included those who met criteria for an ASD diagnosis and had not been identified by health care or educational professionals. Therefore, research was conducted to determine patterns of the identification of ASD across cultural groups (Mandell et al., 2009). The investigators hypothesized that Black and Hispanic children would be less likely to be identified as having an ASD when compared to white children. Health and educational records, provided by the Centers for Disease Control, were reviewed for evidence of features of an ASD based upon the presence of developmental or behavioral concerns. Results of a logistic regression suggested that Black, Hispanic, and children categorized as having a race of "other" (i.e. American Indian, Alaska Native, Native Hawaiian, Pacific Islander, or multiracial) were less likely to have a documented ASD diagnosis when compared to white children.

Research has also investigated the prevalence of ASDs in Hispanic school-aged children in the state of Texas (Palmer, Walker, Mandell, Bayles, & Miller, 2010). Palmer and colleagues (2010) were interested in uncovering possible explanations for why the prevalence of ASDs differed across Hispanic and non-Hispanic White children. Results suggested that for each 10%



increase in the number of Hispanic students, the number of children diagnosed with an ASD decreased by 11%. As with the other studies discussed in this literature review pertaining to disparities in across races on issues relevant to ASDs, the results of this study were significant even after controlling for socioeconomic and health care factors.

## PURPOSE

Given its prevalence, ASDs have received a great deal of attention from the media and researchers alike. Our society is concerned with discovering behavioral phenotypes and biological correlates as well as assessing the effectiveness of diagnostic tools and treatment interventions in the hopes of solving the mystery that is autism. While those obstacles are being tackled, yet another important area is left relatively untouched. Few researchers have investigated the ways in which ASD are manifest across different racial/ethnic groups. Most of the literature on autism and race/ethnicity has examined disparities in access to services and in parental stress. Given existing research suggesting that there are ethnically-based differences in the diagnosis of ASDs (Mandell et al., 2009), delving further into the relationship of race/ethnicity and the presentation of ASD symptoms is clearly justified.

The purpose of this current study is to investigate differences across racial/ethnic groups in caregiver ratings of symptoms of children diagnosed with an ASD. The goal of this project is to examine the pattern of item endorsement on measures designed to screen for the core features of ASDs as well as maladaptive behavior in Caucasian and African American children with an ASD as reported by caregivers. Undertaking such research will help determine whether racial or ethnic background can influence the recognition of behaviors as indicative of an ASD (Wallis & Pinto-Martin, 2008). The discovery of such differences can lead to culturally-guided clinical practice, with the hope of reducing the age that minority children are diagnosed. Given the importance of early intervention and routine follow-up care in the outcome of children with ASD (Zachor & Itzchak, 2010), this study is a necessary first step in closing the gap of healthcare disparities among those with ASD.

## METHOD

### Participants

The participants in this study are from the state of Louisiana's Early Steps program. Early Steps is the Early Intervention System for Louisiana, formed under the Individuals with Disabilities Education Act Part C, and provides services to young children age birth to 36 months and their families. Children within this age range who have developmental delay or who have medical conditions that can lead to developmental delay qualify to receive services. This study includes both male and female participants of varying levels of developmental functioning. This study was approved by the Louisiana State University Institutional Review Board and by the state of Louisiana's Office for Citizens with Developmental Disabilities (OCDD) as one portion of a larger body of research.

Of the children receiving services through Early Steps, 473 were identified as being diagnosed with Autistic Disorder or Pervasive Developmental Disorder Not Otherwise Specified between June 2006 and December 2009. The diagnosis of ASD was determined by a licensed doctoral level psychologist with over 30 years of experience in the field of developmental and intellectual disabilities. This psychologist used various sources to arrive at a diagnosis of ASD: 1) clinical judgment, 2) the DSM-IV-TR criteria for Pervasive Developmental Disorders (APA, 2000), 3) scores on the Modified Checklist for Autism in Toddlers (M-CHAT; Robins, Fein, & Barton, 1999; Robins, Fein, Barton, & Green, 2001), and 4) the Battelle Developmental Inventory-Second Edition (BDI-2; Newborg, 2005). The children in this study ranged in age from 17 to 36 months ( $M = 26.87$ ,  $SD = 4.73$ ). The children in this study were African American ( $n = 195$ ) and Caucasian ( $n = 243$ ). Nearly three times as many of the children were male ( $n = 319$ ) than were female ( $n = 118$ ). While more than half of the children in the study had no

diagnoses other than autism (n = 253), common comorbid diagnoses included cerebral palsy (n = 19), seizure disorder/epilepsy (n = 15), and Down's syndrome (n = 5). Eighty-five point two percent of the respondents in this study were the biological parents of the children (n = 373). Grandparents represented the second largest group of respondents (n = 26) while the foster/adoptive parents represented the third largest group of respondents (n = 19). Table 1 depicts a listing of the demographic variables for the total sample of the study.

Table 1

Demographic Characteristics of Participants

Characteristic	n	%
<b>Ethnicity</b>		
African American	195	44.5
Caucasian	243	55.5
<b>Gender</b>		
Female	118	26.9
Male	319	72.8
<b>Other Diagnoses</b>		
Down's Syndrome	5	1.1
Seizure Disorder/Epilepsy	15	3.4
Cerebral Palsy/hypotonia	19	4.3
None	253	57.8
<b>Caregivers</b>		
Mother/Father	373	85.2
Grandmother/Grandfather	26	5.9
Aunt/Uncle	4	0.9
Foster/Adoptive Parent	19	4.3
Other	16	3.7

Participants whose ethnicity was not reported were excluded from the study. The participants in this study were chosen based upon ethnicity: 1) African American and 2) Caucasian. The ethnic distinctions were provided by caregiver report given at the time of the interview. The African American group included 195 children while the Caucasian group

included 243 children. The age range of children in the non-Caucasian group was 18 to 35 months ( $M = 26.66$ ,  $SD = 4.68$ ) while the age range for children in the Caucasian group was 17 to 36 months ( $M = 27.05$ ,  $SD = 4.77$ ). Table 2 includes a complete listing of the demographic variables for the two groups in this study. Results of analyses suggested no significant differences between the groups on the variables of age, gender, and for most of the most commonly reported comorbid diagnoses. Results suggested significant differences between the African American and Caucasian groups on diagnoses of cerebral palsy/hypotonia,  $\chi^2(1) = 4.29$ ,  $p = 0.04$ . These findings suggest that the Caucasian group had a greater number of individuals endorsing the presence of cerebral palsy/hypotonia when compared to the African American group.

Table 2

Demographic Characteristics of Groups

Characteristic	African American %	Caucasian %
<b>Gender</b>		
Female	28.2	25.9
Male	71.8	73.7
<b>Other Diagnoses</b>		
Down's Syndrome	0.5	1.6
Seizure Disorder/Epilepsy	4.1	2.9
Cerebral Palsy/hypotonia	2.1	6.2
None	57.9	57.6
<b>Caregivers</b>		
Mother/Father	84.1	87.5
Grandmother/Grandfather	7.7	4.5
Aunt/Uncle	1.5	0.4
Foster/Adoptive Parent	5.1	3.7
Other	1.5	5.3

## Measures

### M-CHAT

The M-CHAT is a 23-item revision of the CHAT (Baron-Cohen, Allen, & Gillberg, 1992) for use in the United States. Designed to be a parent report-based screener, items are endorsed as “yes” or “no.” A child is considered to have screened positive, or “failed”, the M-CHAT when any three of the 23 items have been endorsed or when two of the six critical items have been endorsed.

### BDI-2

The BDI-2 is an instrument designed to measure developmental milestones in children from birth to 7 years 11 months old. This 450-item measure has five domains: 1) adaptive, 2) personal/social, 3) motor, 4) communication, and 5) cognitive. Raters score the child’s ability according to the following three point system: 0 (no ability in this skill), 1 (emerging ability), or 2 (ability in this skill). The BDI-2 incorporates parent/caregiver interviews, observations of the child, and interactions with the child using various tasks (e.g. toys, games) and can be completed in 1-2 hours.

### BISCUIT Parts 1 and 3

The BISCUIT Part 1 is the diagnostic portion of a three-part assessment battery designed to aid in the identification of symptoms of ASD and associated psychopathology in infants and toddlers. Each of the 62 items of the BISCUIT Part 1 is rated on a 3-point Likert-type scale. Caregivers rate the child according to how the child compares to typically developing children of the same age: 0 (not different; no impairment), 1 (somewhat different; mild impairment), or 2 (very different; severe impairment). The BISCUIT Part 1 meets the standard for good internal

consistency (Cicchetti, 1994; Clark & Watson, 1995) with an internal reliability coefficient of 0.97 (Matson, Wilkins, et al., 2009c).

The BISCUIT Part 3 is a 17-item scale designed to assess challenging behaviors that are commonly associated with ASD. The BISCUIT Part 3 also has 3 subscales: 1) aggressive/disruptive behavior, 2) stereotypic behavior, and 3) self-injurious behavior. Items are rated on 3-point Likert-type scale: 0 (not a problem or impairment; not at all), 1 (mild problem or impairment), or 2 (severe problem or impairment). There is an additional option for raters to mark an “X” to indicate “does not apply or don’t know.” The BISCUIT Part 3 also has excellent internal consistency with an internal reliability coefficient of 0.91 (Matson, Wilkins, et al., 2009a).

#### Procedure

Data for this study was extracted from a larger database collected as a portion of the Early Steps assessment. Data collectors were service providers in the Early Steps program who held bachelors, masters, or doctorate level training in various areas relevant to developmental delay: occupational therapy, physical therapy, psychology, special education, speech-language pathology, or social work. With certification or licensure in their respective areas, data collectors were also required to attend a full day training seminar on ASD and the administration of the BISCUIT. Each data collector had an active caseload as well as experience in the assessment and treatment of children with developmental delay. Furthermore, the data collectors were native to the areas which they serviced and, therefore were familiar with the norms of the regions. The BISCUIT was administered as part of the regular screenings and assessments of the Early Steps program in the participant’s home or daycare. Early Steps personnel administered the BISCUIT to the caregiver via individualized in-person interviews. Children were often

present during the assessments to allow for observation by the assessor. All demographic and BISCUIT data were de-identified and entered into a separate database.

### Analyses

To examine whether any fundamental differences exist in how symptoms of ASD are reported across ethnicities, factor analysis was conducted. Research suggests that factor analysis is the preferred method to principal components analysis (PCA) for investigating the underlying structure of a data set (Costello & Osborne, 2005). While PCA is fundamentally a procedure for data reduction (Costello & Osborne, 2005; Fabrigar, Wegener, MacCallum, & Strahan, 1999), exploratory factor analysis is the appropriate method of data analysis when the goal is to elucidate the “underlying processes that could have produced correlations among the variables” (Tabachnick & Fidell, 2007, p. 610). Therefore, exploratory factor analysis was used to examine the latent structure of the BISCUIT Parts 1 and 3 for each group. Given that these data sets were shown to violate assumptions of normality, the method of Principle Axis Factoring was used (Fabrigar, et al., 1999). Since factor extraction in the absence of rotation is difficult to interpret, rotation was used to increase the clarity of the data structure (Costello & Osborne, 2005; Tabachnick & Fidell, 2007). In the social sciences correlated factors can be expected, therefore, an oblique rotation procedure was employed (Costello & Osborne, 2005). Furthermore, examinations of the factor correlation matrices were used to further justify the use of oblique rotations of the factors (Tabachnick & Fidell, 2007). Specifically, this study used the promax rotational technique.

A critical component to factor analysis is the determination of the number of factors to retain. A common method is to retain those factors with eigenvalues greater than 1.0 (Tabachnick & Fidell, 2007). The author did not rely solely on this method since this it is



considered one of the least accurate (Velicer & Jackson, 1990). The inaccuracy of this method stems partly from its likelihood to overestimate the number of factors (Tabachnick & Fidell, 2007). Therefore, the scree test in addition to the comprehensibility of and the amount of variance explained by the factors were used to determine the factor structure (Cattell, 1966; Costello & Osborne, 2005; Floyd & Widaman, 1995) of the BISCUIT Parts 1 and 3 for the Caucasian and African American groups.

Once the number of factors is determined, factor loadings must then be clarified. Factor loadings are considered meaningful when they exceed 0.30 (Floyd & Widaman, 1995). Although the precise cutoff level can be left to the discretion of the researcher, the current study used 0.32 as the minimum cutoff level (Tabachnick & Fidell, 2007). Items that crossloaded (i.e., items that load at 0.32 or more on at least 2 factors) were removed from the analysis (Costello & Osborne, 2005).

The factorability of the data set is another component to consider when conducting factor analysis. A Monte Carlo study suggested that sample sizes of 150 were adequate when at least 10 items loaded at a minimum of 0.40 on each factor or with fewer than 150 observations when at least four items loaded at a minimum of 0.60 (Floyd & Widaman, 1995). A data set should have correlations of at least 0.30 to merit the use of factor analysis (Tabachnick & Fidell, 2007). The Kaiser's measure of sampling adequacy, for example, represents the ratio of the sum of squared correlations with the sum of squared correlations plus the sum of squared partial correlations (Tabachnick & Fidell, 2007). This indicator requires that correlations are above 0.60 to yield a "good" factor analysis (Tabachnick & Fidell, 2007). Kaiser's measure of sampling adequacy values for both the African American and Caucasian groups on the BISCUIT Parts 1 and 3 were greater than 0.6, indicating that factor analysis is appropriate.

Finally, the internal consistency was examined for the factors yielded by the factor analysis conducted on the BISCUIT Parts 1 and 3 for each group. Using Cronbach's alpha, alpha values of at least 0.80 were considered as ideal (Clark & Watson, 1995; Nunnally, 1978).

## HYPOTHESIZED RESULTS

Findings from previous research suggest the existence of disparities in diagnosis (Mandell et al., 2002; Mandell et al., 2007) and beliefs in etiology across races and ethnicities (Bussing et al., 1998). Other research in ASDs has found that ethnic minorities report fewer endorsements of items relating to communication when compared to Caucasians (Coonrod & Stone, 2004; Daley, 2004). Regarding behavior problems, previous research has found that ethnic minorities report maladaptive behavior in their children less frequently than Caucasian parents (Lau et al., 2004). Therefore, the author expected that in the current study, the underlying factor structure of the BISCUIT Parts 1 and 3 will differ between the African American and Caucasian groups. Given the dearth of published research in this area, and due to the exploratory nature of this study, no formal hypotheses are presented with respect to how the factors for the BISCUIT Parts 1 and 3 differed across the groups. Furthermore, no formal hypotheses were made with respect to the ways in which specific items might differ across the groups in how they might load onto factors.

## RESULTS

This study used an exploratory factor analysis technique to determine whether endorsements of symptoms of ASD differed between Caucasian and African American caregivers of toddlers with ASD. First, the Principle Axis Factoring method with the promax oblique rotation was conducted on the BISCUIT Part 1 for the African American group. A four-factor solution accounted for 41.49% of the total variance. Factor 1, named Socialization, accounted for 24.49% of the variance. Factor 2, entitled “Repetitive Behavior/Restricted Interests, accounted for 6.71% of the variance. Factor 3, Nonverbal Communication, accounted for 5.55% of the variance, while Factor 4, named Communication, accounted for 4.74% of the variance. Eight items were removed due to loadings less than 0.30 and four items were removed due to crossloadings. Table 3 includes a complete listing of the factors and the corresponding items for the BISCUIT Part 1 as endorsed by the African American group. With several of the factor correlations above 0.32, the use of an oblique rotation was justified (see Table 4).

Cronbach’s alpha was used to calculate the internal consistency of the four factors of the BISCUIT Part 1 for the African American group. The four factors of the BISCUIT Part 1 for the African American group had the following alpha values, factor means, and factor standard deviations: Factor 1 “Socialization” ( $\alpha = 0.90$ ,  $M = 11.53$ ,  $SD = 7.53$ ); Factor 2 “Repetitive Behavior/Restricted Interests” ( $\alpha = 0.86$ ,  $M = 7.73$ ,  $SD = 6.62$ ); Factor 3 “Nonverbal Communication” ( $\alpha = 0.84$ ,  $M = 8.38$ ,  $SD = 7.07$ ); and Factor 4 “Communication” ( $\alpha = 0.89$ ,  $M = 9.95$ ,  $SD = 2.73$ ). Additionally, when item 31 is removed from the Nonverbal Communication scale, the alpha value for the scale increases to 0.86. See Table 5 for alpha values, factor means, and standard deviations.

The Principle Axis Factoring method with promax oblique rotation was then conducted on the BISCUIT Part 1 for the Caucasian group. A two-factor solution accounted for 32.83% of the variance. Factor 1, named ASD Features, accounted for 25.1% of the variance while Factor 2, Communication, accounted for 7.74% of the variance. Five items were removed due to loadings less than 0.30 and one item was removed for crossloading. Table 6 presents the complete listing of the factors and the corresponding items for the BISCUIT Part 1 as endorsed by the Caucasian group. Since the factor correlation was above 0.32, the use of an oblique rotation was appropriate (see Table 7).

Cronbach's alpha was used to calculate the internal consistency of the two factors of the BISCUIT Part 1 for the Caucasian group. The two factors of the BISCUIT Part 1 for the Caucasian group had the following alpha values, factor means, and factor standard deviations: Factor 1 "ASD Features" ( $\alpha = 0.94$ ,  $M = 28.79$ ,  $SD = 18.73$ ) and Factor 2 "Communication" ( $\alpha = 0.84$ ,  $M = 13.66$ ,  $SD = 4.83$ ). See Table 8 for alpha values, factor means, and standard deviations.

Then, the Principle Axis Factoring method with the promax oblique rotation was conducted on the BISCUIT Part 3 for the African American group. A two-factor solution accounted for 49.74% of the total variance. Factor 1, named Aggressive/Destructive, accounted for 37.88% of the variance. Factor 2, entitled Stereotypies, accounted for 11.85% of the variance. One item was removed due to a loading less than 0.30 and no items were removed due to crossloadings. Table 9 includes a complete listing of the factors and the corresponding items for the BISCUIT Part 3 as endorsed by the African American group. With a factor correlation of 0.44, the use of an oblique rotation was justified (see Table 10).

Table 3

Factor Structure of the BISCUIT Part 1 for African American Group

Item	Factor 1 Socialization	Factor 2 Repetitive Behavior/ Restricted Interests	Factor 3 Nonverbal Communication	Factor 4 Communication
14 Peer relationships	0.89			
10 Social interactions	0.85			
52 Socializes with other children	0.80			
35 Plays appropriately with others	0.74			
59 Development of social relationships	0.71			
18 Ability to make and keep friends	0.65			
62 Participation in games or other social activities	0.59			
17 Shares enjoyment, interests, or achievements with Others	0.56			
7 Ability to recognize the emotions of others	0.50			
19 Interest in participating in social games, sports, and Activities	0.50			
25 Likes affection	0.40			
3 Age appropriate self-help and adaptive skills	0.38			
56 Imitation of an adult or child model	0.36			
41 Use of facial expressions	0.35			
26 Displays a range of socially appropriate facial expressions	0.34			
33 Sticking to odd routines or rituals that don't have a purpose or make a difference		0.68		
42 Abnormal fascination with the movement of		0.61		

(table continued)

spinning objects		
34	Abnormal preoccupation with parts of an object or Objects	0.60
48	Becomes upset if there is a change in routine	0.60
39	Interest in a highly restricted set of activities	0.59
58	Abnormal, repetitive motor movements involving entire body	0.54
61	Needs reassurance, especially if events don't go as Planned	0.53
49	Needs reassurance, especially if events don't go as Planned	0.52
55	Limited number of interests	0.51
4	Engages in repetitive motor movements for no Reason	0.48
44	Saying words and phrases repetitively	0.47
37	Speaks in monotone	0.45
57	Abnormal, repetitive hand or arm movements	0.44
6	Prefers foods of a certain texture or smell	0.40
43	Curiosity with surroundings	0.33
46	Understanding of age appropriate jokes, figures of speech, or sayings	0.79
47	Gives subtle cues or gestures when communicating with others	0.74
21	Able to understand the subtle cues or gestures of Others	0.67
23	Body posture and/or gestures	0.58
36	Reads nonverbal cues of other people	0.58
38	Expects others to know their thoughts, experiences, and opinions without communicating them	0.58

(table continued)

22	Use of too few or too many social gestures	0.56	
20	Interest in another person's side of the conversation	0.49	
12	Response to others' social cues	0.40	
40	Talking to others in a social context	0.40	
60	Respect for others' personal space	0.39	
28	Motivated to please others	0.38	
31	Awareness of the unwritten or unspoken rules of social play	0.38*	
15	Rhythm of speaking	0.32	
5	Verbal communication		0.86
9	Use of language to communicate		0.83
1	Communication skills		0.81
50	Language development		0.76
16	Use of language in conversations with others		0.67
24	Communicates effectively		0.64

\* alpha value increases when item is removed

Table 4

Factor Correlation Matrix for the BISCUIT Part 1 African American Group

Factors	1	2	3	4
1	1.00	--	--	--
2	0.47	1.00	--	--
3	0.54	0.50	1.00	--
4	0.34	0.19	0.28	1.00



Table 5

Reliability Statistics for the BISCUIT Part 1 for African American Group

Factors	$\alpha$	$M$	$SD$
Socialization	0.90	11.53	7.53
Repetitive Behavior/Restricted Interests	0.86	7.73	6.62
Nonverbal Communication	0.84	8.38	7.07
Communication	0.89	9.95	2.73

Table 6

Factor Structure of the BISCUIT Part 1 for Caucasian Group

	Factor 1 ASD Features	Factor 2 Communication
55 Limited number of interests	0.68	
39 Interest in a highly restricted set of activities	0.64	
27 Restricted interests and activities	0.63	
52 Socializes with other children	0.62	
35 Plays appropriately with others	0.60	
34 Abnormal preoccupation with parts of an object or objects	0.59	
14 Peer relationships	0.58	
32 Facial expression corresponds to environmental events	0.58	
26 Displays a range of socially appropriate facial expressions	0.57	
31 Awareness of the unwritten or unspoken rules of social play	0.56	
59 Development of social relationships	0.56	
8 Maintains eye contact	0.56	
29 Eye-to-eye gaze	0.56	
61 Needs reassurance, especially if events don't go as planned	0.55	
10 Social interactions	0.54	
30 Reaction to sounds and sights	0.53	
48 Becomes upset if there is a change in routine	0.52	
28 Motivated to please others	0.52	
11 Reactions to normal, everyday sounds	0.51	
49 Needs reassurance, especially if events don't go as planned	0.51	
12 Response to others' social cues	0.51	
62 Participation in games or other social activities	0.51	
43 Curiosity with surroundings	0.50	
57 Abnormal, repetitive hand or arm movements	0.50	

(table continued)

58	Abnormal, repetitive motor movements involving entire body	0.50
33	Sticking to odd routines or rituals that don't have a purpose or make a difference	0.49
36	Reads nonverbal cues of other people	0.49
46	Understanding of age appropriate jokes, figures of speech, or sayings	0.49
20	Interest in another person's side of the conversation	0.47
41	Use of facial expressions	0.47
42	Abnormal fascination with the movement of spinning objects	0.47
44	Saying words and phrases repetitively	0.45
4	Engages in repetitive motor movements for no reason	0.44
21	Able to understand the subtle cues or gestures of others	0.44
47	Gives subtle cues or gestures when communicating with others	0.44
60	Respect for others' personal space	0.43
13	Reaction to normal, everyday lights	0.42
51	Responds to others' distress	0.42
7	Ability to recognize the emotions of others	0.41
18	Ability to make and keep friends	0.40
38	Expects others to know their thoughts, experiences, and opinions without communicating them	0.39
25	Likes affection	0.39
56	Imitation of an adult or child model	0.38
17	Shares enjoyment, interests, or achievements with others	0.37
19	Interest in participating in social games, sports, and activities	0.34
9	Use of language to communicate	0.88
5	Verbal communication	0.80
1	Communication skills	0.80
50	Language development	0.77
16	Use of language in conversations with others	0.72
24	Communicates effectively	0.70
23	Body posture and/or gestures	0.46
45	Make-believe or pretend play	0.44
53	Use of nonverbal communication	0.43
2	Intellectual abilities	0.38
3	Age appropriate self-help and adaptive skills	0.34

Table 7

Factor Correlation Matrix for the BISCUIT Part 1 Caucasian Group

Factors	1	2
1	1.00	--
2	0.45	1.00

Table 8

Reliability Statistics for the BISCUIT Part 1 Caucasian Group

Factors	$\alpha$	$M$	$SD$
ASD Features	0.94	28.79	18.73
Communication	0.84	13.66	4.83

Cronbach's alpha was used to calculate the internal consistency of the two factors of the BISCUIT Part 3 for the African American group. The two factors of the BISCUIT Part 3 for the African American group had the following alpha values, factor means, and factor standard deviations: Factor 1 "Aggressive/Destructive" ( $\alpha = 0.89$ ,  $M = 6.01$ ,  $SD = 5.99$ ) and Factor 2 "Stereotypes" ( $\alpha = 0.69$ ,  $M = 1.49$ ,  $SD = 1.99$ ). Removing items from the Aggressive/Destructive scale did not result in an increase in the alpha value while removing item 1 from the Stereotypes scale improved alpha to 0.70. See Table 11 for alpha values, factor means, and standard deviations.

Finally, the Principle Axis Factoring method with the promax oblique rotation was conducted on the BISCUIT Part 3 for the Caucasian group. A three-factor solution accounted for 57.59% of the total variance. Factor 1, named Aggressive/Destructive, accounted for 39.77% of the variance. Factor 2, named Stereotypes, accounted for 10.07% of the variance. Factor 3, Self-Injurious Behaviors, accounted for 7.75% of the variance. One item was removed due to a loading that was less than the 0.30 cutoff and no items were removed due to crossloadings.

Table 12 includes a complete listing of the factors and the corresponding items for the BISCUIT Part 3 as endorsed by the Caucasian group. With the factor correlations above 0.32, the use of an oblique rotation was again appropriate (see Table 13).

Table 9

Factor Structure of the BISCUIT Part 3 for African American Group

Item	Factor 1 Aggressive/ Destructive	Factor 2 Stereotypes
13 Property destruction	0.87	
10 Aggression towards others	0.86	
7 Throwing objects at others	0.79	
11 Pulling others' hair	0.73	
3 Kicking objects	0.70	
12 Yelling or shouting at others	0.70	
8 Banging on objects with hand	0.52	
4 Removal of clothing at inappropriate times	0.44	
9 Leaving the supervision of caregiver without permission	0.43	
2 Harming self by hitting, pinching, scratching, etc.	0.32	
6 Playing with own saliva	0.31	
5 Unusual play with objects		0.78
14 Repeated and unusual vocalizations		0.63
15 Repeated and unusual body movements		0.60
1 Poking him/her self in the eye		0.37*

\* alpha value for factor increases when item is removed

Table 10

Factor Correlation Matrix for the BISCUIT Part 3 African American Group

Factors	1	2
1	1.00	--
2	0.42	1.00

Table 11

Reliability Statistics for the BISCUIT Part 3 African American Group

Factors	$\alpha$	$M$	$SD$
Aggressive/Destructive	0.89	6.01	5.99
Stereotypies	0.69	1.49	1.99

Cronbach's alpha was used to calculate the internal consistency of the three factors of the BISCUIT Part 3 for the Caucasian group. The three factors of the BISCUIT Part 3 for the Caucasian group had the following alpha values, factor means, and factor standard deviations: Factor 1 "Aggressive/Destructive" ( $\alpha = 0.90$ ,  $M = 3.90$ ,  $SD = 4.80$ ); Factor 2 "Stereotypies" ( $\alpha = 0.72$ ,  $M = 1.28$ ,  $SD = 1.74$ ); and Factor 3 "Self-Injurious Behaviors" ( $\alpha = 0.53$ ,  $M = 0.61$ ,  $SD = 1.04$ ). See Table 14 for alpha values, factor means, and standard deviations.

Table 12

Factor Structure of the BISCUIT Part 3 for Caucasian Group

Item	Factor 1 Aggressive Destructive/	Factor 2 Stereotypies	Factor 3 Self-Injurious Behaviors
7 Throwing objects at others	0.88		
10 Aggression towards others	0.81		
13 Property destruction	0.76		
9 Leaving the supervision of caregiver without permission	0.68		
12 Yelling or shouting at others	0.66		
11 Pulling others' hair	0.60		
8 Banging on objects with hand	0.58		
3 Kicking objects	0.56		
4 Removal of clothing at inappropriate times	0.55		
15 Repeated and unusual body movements		0.87	
14 Repeated and unusual vocalizations		0.61	
5 Unusual play with objects		0.51	
2 Harming self by hitting, pinching, scratching, etc.			0.75
1 Poking him/her self in the eye			0.56

Table 13

Factor Correlation Matrix for the BISCUIT Part 3 Caucasian Group

Factors	1	2	3
1	1.00	--	--
2	0.47	1.00	--
3	0.62	0.34	1.00

Table 14

Reliability Statistics for the BISCUIT Part 3 Caucasian Group

Factors	$\alpha$	$M$	$SD$
Aggressive/Destructive	0.90	3.90	4.80
Stereotypies	0.72	1.28	1.74
Self-Injurious Behaviors	0.53	0.61	1.04

## DISCUSSION

The purpose of this study was to determine whether differences exist across ethnic groups in caregiver ratings of symptoms of children diagnosed with an ASD. Findings from this study suggested that differences exist in how caregivers of children with ASD rate symptoms in those children. The African American group yielded a four-factor solution to the BISCUIT Part 1. Although this solution represents a departure from the three core areas of impairment in ASD (Matson, 2007; Wing & Gould, 1979) and the original BISCUIT Part 1 factor structure (Matson, Boisjoli, & Dempsey, 2009), closer inspection reveals that this solution is consistent with these factor structures. Factor 1, Socialization, is composed of items that relate to the one of the hallmark impairments in ASD (Kanner, 1943). Repetitive Behavior/Restricted Interests, the second factor, comprises items that describe stereotypies, rituals, and sensory sensitivities. Although sensory sensitivities are not part of the diagnostic criteria, their close association with the core features of ASD is well documented (APA, 2000; Gabriels et al, 2008; Kanner, 1943). One item that is not associated with repetitive, restricted interests and activities, “curiosity with surrounding” loaded onto Factor 2. Further research is needed to determine whether this item is a true representation of repetitive interests and behaviors. Factors 3 and 4, “Nonverbal Communication” and “Communication”, adhere to the third core area of impairment in ASD (APA, 2000; Gabriels et al, 2008; Kanner, 1943).

Similar to the African American group, the factor solution for the Caucasian group also departed from the strict three core areas of impairment in ASD. The factor solution also differed from that of the African American group in that rather than having four factors, it had only two factors. Factor 1 (ASD Features) included items that cut across the three core areas of impairment, socialization, communication (primarily nonverbal), and restricted, repetitive

interests and behaviors. The fact that core features of ASD loaded onto one factor provides support for the notion of a dimensionalized method for diagnosing ASD (APA, 2010). The second factor, Communication, reflect items that relate to language impairments that are characteristic to ASD (APA, 2000; Gabriels et al, 2008; Kanner, 1943). “Make-believe or pretend play” and “Age appropriate self-help and adaptive skills” are two items that loaded on to the Communication factor, yet do not intuitively load to this construct. Possibly, these items loaded onto this factor due to error. Alternatively, aspects of pretend play and adaptive skills can reflect a facet of communication. Future research should attempt to investigate whether these behaviors are representative of communication in infants and toddlers with ASD.

In addition to differences in the factor structure of the BISCUIT Part 1, the two ethnic groups in this study also differed in the factor solution of the BISCUIT Part 3. The finding of differences between ethnic groups on endorsements of problem behavior is in opposition to those of Blacher and McIntyre (2006). The African American group yielded a two-factor solution while the Caucasian group yielded three. Both groups had aggressive and destructive behavior problems as the first factor of the solution. Several items loaded onto this factor for the African American group that do not inherently reflect aggressive or destructive behaviors. These items included: “removal of clothing at inappropriate times” and “leaving the supervision of caregiver without permission”. A third item also loaded to the Aggressive/Destructive factor, “harming self by hitting, pinching, scratching, etc.” Although such an item is reflective of self-injurious behavior (Iwata et al., 1994), the association of this behavior with aggression is understandable. Research should investigate whether African Americans consistently endorse self-injurious behaviors differently from Caucasians. The Caucasian group also had “removal of clothing at inappropriate times” and “leaving the supervision of caregiver without permission” as items that



loaded onto the Aggressive/Destructive factor. Researchers should examine the possible link between these items and aggressive and destructive behavior.

Both groups also had stereotypic behaviors as the second factor in their solution. “Poking him/her self in the eye” was an atypical loading to this factor for the African American group. Again, future studies should determine whether ethnic minorities routinely endorse such self-injurious behavior as a form of stereotypy. The Caucasian group had a third factor that was not common to the African American factor solution. This Self-Injurious Behavior subscale included items relating to harming oneself by hitting, pinching, or scratching, and a second item regarding eye poking. As a result, the factor solution for the Caucasian group is identical to the factor structure of the original BISCUIT Part 3. The results of this study suggest that for infants and toddlers diagnosed with an ASD, caregivers of African American children report symptoms in a less stratified form than caregivers of Caucasian children. Since this study is the first of its kind to study differences in caregiver endorsements across ethnicities, the findings of this study must be verified. Future research should first attempt to replicate the results of this study. One way to accomplish this is by determining whether the disparity is maintained with other measures. Additionally, future studies should investigate the nature of the differences.

To clarify the nature of differences and similarities of endorsements for the BISCUIT Parts 1 and 3 across the groups, Table 15 summarizes how the two groups differed in their endorsements of items. This was achieved by first comparing the percentage of participants in each group that endorsed each item. In terms of a 5% difference in participants endorsing items, the African American group had a higher level of endorsement on 2 of the 62 items, while the Caucasian group had a higher frequency of endorsement on 7 of the 62 items. Then at a 10% difference across groups, the African American group had a higher level of endorsement for 2

items (“intellectual abilities” and “use of nonverbal communication”) and the Caucasian group was higher on two other items (“motivated to please others” and “abnormal preoccupation with parts of an object or objects”). With the exception of the 10% difference level, a higher number of caregivers of Caucasian children with an ASD reported symptoms than caregivers of non-Caucasian children.

The pattern of responding of this study mirrors prevalence data on ASDs and ethnicity. Data suggest higher prevalence rates for ASDs among Caucasians than other ethnicities (CDC, 2009; Mandell et al., 2002; Mandell et al., 2009). Given that all of the children in this study met criteria for an ASD diagnosis, finding differences in endorsements across ethnic groups is particularly striking. Based upon the results of this study, more caregivers of Caucasian infants and toddlers diagnosed with an ASD reported symptoms of ASD than African American infants and toddlers. This study does not clarify the nature of these differences. On one hand, this study provides support for true differences in the occurrence of ASDs across ethnicities, differences already represented by discrepancies in prevalence rates. On the other hand, the differences could reflect disparities in caregiver perception based upon the acceptance of the child’s diagnosis (Bishop et al., 2007; Blacher & McIntyre, 2006; Magaña & Smith, 2006) or the lack of awareness of the presence of psychopathology.

The percentage of item endorsements of the BISCUIT Part 3 also yielded differences across the groups. With a difference of at least 5% the African American group exhibited higher rates of endorsement on 6 of the items. At a 10% difference in participants endorsing items, the African American group had a higher level of endorsement on 3 items, “kicking objects (e.g., doors, walls)”, “throwing objects at others”, and “property destruction (e.g., ripping, breaking, tearing, crushing, etc.).

Table 15

Percent Table of Item Endorsements

Item	BISCUIT Part 1	Percent of Participants Endorsing Item		Common Items across Factors	
		African American	Caucasian	African American	Caucasian
1	Communication skills	95.4	96.3	C	C
2	Intellectual abilities	74.3	58.7	--	C
3	Age appropriate self-help and adaptive skills	72.8	68.7	So	C
4	Engages in repetitive motor movements for no reason	53.3	55.1	--	AF
5	Verbal communication	96.4	95.1	C	C
6	Prefers foods of a certain texture or smell	40.0	42.8	RB	--
7	Ability to recognize the emotions of others	49.7	46.1	So	AF
8	Maintains eye contact	49.2	56.4	So	AF
9	Use of language to communicate	96.9	94.6	C	C
10	Social interactions	73.3	72.7	So	AF
11	Reactions to normal, everyday sounds	34.0	38.4	--	AF
12	Response to others' social cues	50.8	46.1	NvC	AF
13	Reaction to normal, everyday lights	10.8	11.2	--	AF
14	Peer relationships	62.4	70.1	So	--
15	Rhythm of speaking	22.7	21.9	--	--
16	Use of language in conversations with others	92.3	88.5	C	C
17	Shares enjoyment, interests, or achievements with Others	55.4	49.0	So	AF
18	Ability to make and keep friends	54.9	51.9	So	AF
19	Interest in participating in social games, sports, and	49.7	49.4	So	AF

(table continued)

	activities				
20	Interest in another person's side of the conversation	52.3	49.0	NvC	AF
21	Able to understand the subtle cues or gestures of Others	40.0	44.6	NvC	AF
22	Use of too few or too many social gestures	33.3	34.7	NvC	--
23	Body posture and/or gestures	25.6	24.4	NvC	C
24	Communicates effectively	88.7	84.4	C	C
25	Likes affection	19.6	23.6	So	AF
26	Displays a range of socially appropriate facial expressions	27.7	28.9	--	AF
27	Restricted interests and activities	41.0	39.9	RB	AF
28	Motivated to please others	51.5	58.9	NvC	AF
29	Eye-to-eye gaze	42.1	43.4	--	AF
30	Reaction to sounds and sights	34.4	32.5	--	AF
31	Awareness of the unwritten or unspoken rules of social play	62.9	63.5	NvC	AF
32	Facial expression corresponds to environmental Events	33.0	28.9	--	AF
33	Sticking to odd routines or rituals that don't have a purpose or make a difference	27.3	35.1	RB	AF
34	Abnormal preoccupation with parts of an object or Objects	35.1	45.0	RB	AF
35	Plays appropriately with others	69.1	69.4	So	AF
36	Reads nonverbal cues of other people	42.3	40.1	NvC	AF
37	Speaks in monotone	10.3	9.5	--	--
38	Expects others to know their thoughts, experiences, and opinions without communicating them	37.4	37.1	So	AF
39	Interest in a highly restricted set of activities	38.7	31.5	RB	AF
40	Talking to others in a social context	22.2	29.3	NvC	--

(table continued)

41	Use of facial expressions	32.0	28.0	RB	AF
42	Abnormal fascination with the movement of spinning Objects	33.7	38.2	RB	AF
43	Curiosity with surroundings	22.2	20.2	RB	AF
44	Saying words and phrases repetitively	19.0	20.2	RB	AF
45	Make-believe or pretend play	52.3	51.4	--	C
46	Understanding of age appropriate jokes, figures of speech, or sayings	42.5	38.3	NvC	AF
47	Gives subtle cues or gestures when communicating with others	31.3	36.6	NvC	AF
48	Becomes upset if there is a change in routine	50.3	51.0	RB	AF
49	Needs reassurance, especially if events don't go as Planned	41.0	42.0	--	AF
50	Language development	98.5	96.7	C	C
51	Responds to others' distress	44.6	48.3	--	AF
52	Socializes with other children	68.7	68.7	So	AF
53	Use of nonverbal communication	67.2	56.8	C	C
54	Clumsiness	44.3	44.6		
55	Limited number of interests	39.5	39.1	RB	AF
56	Imitation of an adult or child model	36.8	36.4	So	AF
57	Abnormal, repetitive hand or arm movements	29.5	32.6	RB	AF
58	Abnormal, repetitive motor movements involving entire body	25.4	27.7	RB	AF
59	Development of social relationships	65.6	68.7	So	AF
60	Respect for others' personal space	33.2	36.0	NvC	AF
61	Needs reassurance, especially if events don't go as Planned	42.5	51.0	RB	AF
62	Participation in games or other social activities	47.4	47.7	So	AF

(table continued)

Item	BISCUIT Part 3				
1	Poking him/her self in the eye	9.4	13.3	St	SIB
2	Harming self by hitting, pinching, scratching, etc.	25.5	27.9	A/D	SIB
3	Kicking objects (e.g., doors, walls)	35.9	22.1	A/D	A/D
4	Removal of clothing at inappropriate times	23.4	18.8	A/D	A/D
5	Unusual play with objects (e.g., twirling string, staring at a toy, etc.).	29.2	29.2	St	St
6	Playing with own saliva	14.6	12.9	--	--
7	Throwing objects at others	51.6	37.9	A/D	A/D
8	Banging on objects (e.g., doors, walls, windows) with Hand	43.2	36.3	A/D	A/D
9	Leaving the supervision of caregiver without permission (i.e., elopement)	36.1	34.3	A/D	A/D
10	Aggression towards others	44.3	34.6	A/D	A/D
11	Pulling others' hair	34.9	28.3	A/D	A/D
12	Yelling or shouting at others	28.8	25.8	A/D	A/D
13	Property destruction (e.g., ripping, breaking, tearing, crushing, etc.)	36.2	25.9	A/D	A/D
14	Repeated and unusual vocalizations (e.g., yelling, humming, etc.)	27.6	25.9	St	St
15	Repeated and unusual body movements (e.g., hand flapping, waving arms, etc.)	30.2	31.3	St	St

A/D: Aggressive/Destructive

AF: ASD Features

C: Communication

NvC: Nonverbal Communication

RB: Repetitive Behavior/Restricted Interests

SIB: Self-Injurious Behavior

So: Socialization

St: Stereotypies

Results of this study suggest that although caregivers of African American toddlers with ASD reported symptoms of ASD less frequently than caregivers of Caucasian toddlers, they endorsed behavior problems more frequently. These findings are contrary to those of Lau et al. (2004), who found that caregivers of ethnic minority children endorsed fewer behavior problems when compared to Caucasian children. Mandell and colleagues (2007) found that African American children were more likely to be diagnosed with conduct disorder prior to receiving a diagnosis of an ASD. Findings from this current study may provide an explanation for the increased rate of an incorrect diagnosis of conduct disorder in African American children who were later diagnosed with an ASD. Perhaps African American children were incorrectly diagnosed with conduct disorder in part because their caregivers were more likely to report behavior problems than symptoms of ASD.

In addition to differences in the overall factor solution and overall item endorsements, the African American and Caucasian groups also differed in items not loading to a factor (see Table 15). Four items of the BISCUIT Part 1 did not load to the factor solution for the Caucasian group. These items were: “prefers foods of a certain texture or smell”, “peer relationships”, “use of too few or too many social gestures”, and “talking to others in a social context”. Two of these items previously loaded onto the Socialization/Nonverbal Communication scale of the original factor solution and one item previously belonged to the Restricted Behavior/Restricted Interests scale. Eleven items of the BISCUIT Part 1 did not load to the factor solution of the African American group but did load onto factors for the Caucasian group. Seven of these items belonged to the Restricted Behavior/Restricted Interests scale of the original BISCUIT Part 1 factor solution: “engages in repetitive motor movements for no reason”, “reactions to normal, everyday sounds”, “reactions to normal, everyday lights”, “displays a range of socially

appropriate facial expressions”, “eye-to-eye gaze”, “reaction to sounds and sights”, and “needs reassurance, especially if events don’t go as planned”. Why these items failed to load onto the Restricted Behavior/Restricted Interests subscale of the African American factor solution is unclear at this time. Also unclear is why these particular items differ between the groups themselves. Future research should investigate what aspects of these items cause them to load differentially for different ethnic groups. The other four items, “intellectual abilities”, “facial expression corresponds to environmental events”, “make-believe or pretend play”, and “responds to others’ distress”, originally belonged to the Socialization/Nonverbal Communication scale of the BISCUIT Part 1. Again, future studies should attempt to clarify the nature of the differences in these symptoms of ASD and why they differ across various ethnic groups.

#### Limitations

In spite of the differences across ethnic groups in caregiver ratings of symptoms of children with an ASD, this study is not without limitations. This study involved children ages 15 to 36 months old. These results, therefore, cannot be generalized to ratings of school-aged children or adolescents diagnosed with an ASD. To determine whether these results are replicated in older children, future research should examine the factor structure resulting from caregiver ratings of children ages 37 months to 18 years old. A third limitation relates to the sample size used in this study. Researchers suggest varying standards for the minimum number of participants per variable and total sample size for factor analysis. One recommendation is to have at least 5 participants per variable with a preferred sample size of 200 participants (Gorsuch, 1983). Streiner (1994) also recommended 5 participants per variable given a sample size of 100 participants. Still others have stated that 300 cases is the minimum number necessary for an adequate sample size (Comrey & Lee, 1992; Tabachnick & Fidell, 2007). Although this



study was demonstrated to have adequate factorability for the variables, future studies should repeat the methodology of this study with larger sample sizes. A fourth limitation to this study is the lack of SES data for the caregivers. Although research has shown differences to persist across various ethnic groups even after controlling for SES, as discussed earlier in this paper, future studies should assess the potential influence of caregiver SES on the differences uncovered in this study.

### Implications and Future Directions

Aside from addressing the confounds in this research endeavor, future studies could improve upon the methodology in several important ways. While the current research project manipulated the ethnicity of the children with an ASD, the ethnicity of the rater is another variable that merits investigation. Conceivably, ratings made by caregivers who are of a differing ethnicity from the child can yield different results from ratings made by caregivers of a similar ethnicity. Another extension to this study would be to assess whether caregiver knowledge of ASD affects the outcomes of this study. Uncovering whether knowledge of ASD symptoms affects how caregivers rate symptoms of ASDs in children would highlight the importance of providing education to underserved populations that might not be aware of the features of ASDs.

This research endeavor helps to fill the gap in current literature on ASD and ethnicity by investigating whether there are differences in reported symptoms. This study adds to the existing literature by the methodology that is used to determine ethnicity. This is first achieved by clearly describing the method used for determining ethnicity. Williams (1994) notes the importance of clearly identifying how ethnicity is assessed in scientific research. Reporting the method used for determining ethnicity clarifies whether ethnicity was inferred or it was reported directly by

participants. Methods for determining ethnicity include extraction from records, direct observation or interviewer assessment, proxy report, and self-report (Williams, 1994). All of these techniques, except for self-report, are rooted in assumptions being made regarding the ethnicity of the participant. Many studies rely upon interviewer assessment, proxy report, or extraction from records to determine the ethnicity of participants, rather than obtaining ethnicity directly from the respondent. Using such indirect methods can lead to discrepancies in how race is reported (Hahn, 1992; Hahn, Mulinare, & Teutsch, 1992). This points to a second strength of the methodology of this study—self-report. Rather than recording ethnicity based upon interviewer assessment or other indirect techniques, participants reported this directly. Using self-report provides for a more accurate assessment of ethnicity. A third strength in the methodology of this study is the question format used to assess ethnicity. Rather than having respondents indicate ethnicity from a list of pre-determined racial and ethnic groups, this question was open-ended. As a result, participants were free to write in the ethnic affiliation of their choosing, again providing for a more accurate report of ethnicity.

Findings from this study also have strong implications regarding the scale development of the measures used. As discussed earlier, the validity of the BISCUIT battery have been demonstrated. In keeping with the national movement to improve health care services for vulnerable populations, it is important to ensure that the content for these measures are appropriate across cultures. This study examined how caregivers of children with ASD may differentially endorse symptoms of ASD depending on ethnicity. Significant findings from this research can be used as a first step toward tailoring the BISCUIT battery for specific groups.

Specifically, separate norms pertaining to Caucasian and African Americans can be created. Alternatively, developing alternate questionnaire forms for various racial and ethnic groups could also be developed.

The significant findings from this research project also impact the ways in which clinicians should interface with their patients, their families, and their surrounding communities. First, the results from this study can help guide treatment planning. Results from this study suggest that differences exist in how caregivers report symptoms of ASD in children of differing races. Possibly, this difference stems from discrepancies in knowledge of psychopathology (Bussing et al., 1998a; Bussing et al., 1998b; Yeh et al., 2004). As a result, clinicians should be aware of these differences in their clients regarding particular symptoms of ASD and associated behavioral problems that are more salient or of greater social importance to certain ethnicities. This way, treatment plans can better address the unique concerns of underserved populations by providing recommendations specific to these groups. Results from this study highlight the importance of clinicians not only providing specific recommendations for problem behaviors in children who are ethnic minorities, but also regarding the occurrence of stereotypic behavior and sensory sensitivities.

Furthermore, results from this study can be used to help clinicians who are involved in community outreach. Based on the differences in caregiver ratings uncovered in this study, clinicians who interact with underserved populations need to address the symptoms of ASD that are problematic for these groups. Considering ethnic minorities find that medical professionals do not appropriately address their concerns (Cooper-Patrick et al., 1999), the importance of clinicians addressing the evaluation and treatment of ASD symptoms in a culturally sensitive fashion are of utmost importance. Clinicians can use the results of this study as a platform to

talk to ethnic minority groups about the presentation of ASD and how it contrasts from typical childhood development. Discussion should focus not only on those symptoms characteristic to ethnic minorities, but also to other symptoms of ASD that may present over time.

In conclusion, this study was the first of its kind to investigate differences across ethnicities in caregiver ratings of symptoms of toddlers diagnosed with an ASD. Participants in the non-Caucasian group were found to exhibit differences in how they rated children diagnosed with an ASD based upon the four factor solution yielded, in contrast to the two-factor solution obtained from the Caucasian group. The African American group also yielded differences in how problem behaviors were reported, providing some explanation for why ethnic minorities tend to be diagnosed with an ASD at a later time than Caucasian children. Furthermore, this study suggests that alternate forms of the BISCUIT battery may be warranted.

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## VITA

Cindy Terlonge Graham was born in Brooklyn, New York, and raised in Irvington, New Jersey, and Wellington, Florida. She received her Bachelor of Arts degree from Princeton University in Princeton, New Jersey in 2001. After graduating from Princeton University, she worked for several years at the Kennedy Krieger Institute on the Neurobehavioral Inpatient Unit in Baltimore, Maryland. This work involved the assessment and treatment of severe behavior problems (i.e., self-injury, aggression, property destruction) in children and adolescents with developmental disabilities. In 2004, she enrolled in the clinical psychology doctoral program at Louisiana State University (LSU). At LSU, Cindy worked under the supervision of Johnny L. Matson, Ph.D., specializing in work with individuals with intellectual and developmental disabilities. Cindy received her Master of Arts degree in 2007. She completed a pre-doctoral internship at the Johns Hopkins University School of Medicine in the Department of Pediatrics for the Kennedy Krieger Institute's Pediatric Developmental Disorders Clinic and the Neurobehavioral Inpatient Unit. Upon completion of her internship, Cindy worked as a Clinical Specialist III on the Neurobehavioral Inpatient Unit, under the supervision of Louis Hagopian, Ph.D., SungWoo Kahng, Ph.D., and Eric Boelter, Ph.D. In this capacity she co-supervised the assessment and treatment of severe behavior problems in children and adolescents. She has been a coauthor on a number of journal articles, tests, posters, and symposia presentations. Cindy has also served as guest reviewer for several journals in the area of intellectual abilities, and has served as a consultant for group homes and developmental centers in Louisiana. Currently, she is working as a psychology associate at Spectrum Behavioral Health in Arnold, Maryland and is studying for licensure.