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A Delphi Study Regarding Assessment of Intelligence in the Presence of Autism

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Sara Spencer

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Walden University
2011

Abstract

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Dissertation Submitted in Partial Fulfillment

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Abstract

Research has indicated children with autistic disorder often demonstrate below average intelligence. Others have suggested intelligence of the autistic population has been underestimated. A gap in the current literature reflects the need to examine the accuracy of assessment of intelligence of children with autistic disorder. The research questions underlying this study addressed tools professionals use to assess intelligence of children with autistic disorder, how tools are selected, the level of confidence in the accuracy of results, and what level of consensus exists among experts. This Delphi study used a panel of 20 autistic disorder experts and 3 rounds of surveys to establish expert consensus of practices for gaining an accurate measure of intelligence and to determine if an appropriate tool is available to measure intelligence of children with autistic disorder. This study was based on the Lockean inquiring systems philosophical perspective with a sequential, exploratory, mixed methods design and employed the constant comparative method for data analysis. Emergent themes included strategies used for assessing intelligence in this population, barriers to determining accurate results, and methods for mitigating the influence of barriers. With moderate to strong consensus among participants, the findings demonstrated lack of availability of an appropriate measure of intelligence for children with autistic disorder. This study has the potential to contribute to positive social change with findings justifying the development of an appropriate assessment tool which will enhance life opportunities of children with autistic disorder when more accurate measures lead to appropriate placement in academic, vocational, and social settings.

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Dedication

I dedicate this research to individuals with developmental disabilities who rely on the proactive response of others to ensure equal access to opportunity and optimal quality of life. This work is also dedicated to stewards of human service who are resolved in their efforts to serve vulnerable populations, are charged with the responsibility to seek change where a need is recognized, and carry out a plan to help rectify instances of injustice and inequality.

Finally, I dedicate this work to my cousin, Sheri. It is due to your special presence in this world that I have chosen a path toward making a difference in the lives of many. You teach us all everyday that assumptions made about individual potential may never be fully captured by the scientific methods we often rely upon. Your clever ways and the *knowing* glimmer in your eye, recognizable to all who know you, inspire me to understand the world from your perspective, and to change the world accordingly.

Acknowledgments

I would like to acknowledge my mother, Linda, for inspiring me to achieve all that I have dreamed, for always being my biggest cheerleader, and for consistently beaming with pride in response to great and small accomplishments alike. The patience and genuine interest demonstrated through many hours of what some may have perceived as monotonous rambling about my research, will be something I will always appreciate and value. Mom, some of the most significant milestones reached in my research have been a result of your commitment as my sounding board for the generation of ideas.

I would like to acknowledge my family and friends for supporting me through this long, yet rewarding, process and for understanding the missed social events and family gatherings that allowed me to accomplish this goal. I share this triumph with you.

I have been honored to share this academic journey with a new and cherished friend, Adrianna, along with several other amazing Walden University students who became a source of encouragement and support toward the completion of our common goals. Throughout the country and across time zones, the commitment made to hold each other accountable for consistent progress toward our end goal has been an invaluable gift that will always be a part of this step in my life long journey of learning.

I also wish to express immense gratitude to Dr. Benita Stiles-Smith for serving as my chairperson with an unmatched commitment to guiding me through each phase of the dissertation process. Your thoughtful interest in my research, paired with a rate of response that any doctoral student would rave about, contributed to my success in

completing this dissertation. Thank you for your commitment to your students and to the quality of our work.

Finally, I would like to acknowledge the support from my committee member Dr. Andrea Miller and University Research Reviewer Dr. Ruth Crocker. The interest you have each taken in my research and the contributions you have made to the refinement of a completed product I can be proud of is something I greatly appreciate.

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Chapter 1: Introduction to the Study

Introduction

Intelligence has been measured with a variety of standardized assessments, each one most often resulting in a determination of one's level of intelligence (Floyd, Clark, & Shadish, 2008). Such scores have been considered a measure of an individual's ability to learn or a predictor of intellectual potential. Decisions for educational or vocational placement, coordination for support services, and life opportunities in general have been influenced by the assessment of intelligence (Garcia-Villamisar & Hughes, 2007; Kasa-Hendrickson, 2005). The demonstration of intelligence among those with developmental disabilities, such as autistic disorder, has presented qualitatively different from other populations (Kuschner, Bennetto, & Yost, 2007).

Autistic disorder is a neurological disorder which includes numerous atypical behaviors, responses, and social interactions (American Psychiatric Association [APA], 2000). Such responses may contribute to an external perception of lack of ability or intelligence as demonstration of ability may differ in appearance from the typically developing population (Dawson, Soulieres, Gernsbacher, & Mottron, 2007). Although intellectual capacity is not an aspect of the diagnostic criteria for autistic disorder, compromised intellectual ability is commonly referred to throughout the literature (Edelson, 2005). The basis of this reference has been loosely based on assumption, unsupported claims, and results from standardized assessments that have not been developed with the individual with autism in mind (Edelson, 2005).

The research was explored for a more detailed discussion of the established standards for assessment of intelligence of individuals with autistic disorder. Many traditional assessments have failed to account for the unique characteristics of the disorder (Edelson, 2005). A gap in the current literature demonstrated a failure to examine the validity of traditional standardized measures for individuals with autistic disorder.

Problem Statement

Intelligence level is a significant factor in treatment planning and life opportunities for individuals with autistic disorder (Garcia-Villamisar & Hughes, 2007). The most commonly used tools for assessing intelligence for individuals with autistic disorder have not taken into account the unique characteristics of the disorder which confound the validity of results (Delmolino, 2006; Edelson, 2006). Characteristics, such as restricted social interactions with others and barriers to functional communication, have hindered performance required for successful completion of a standardized test of intelligence (Mayes & Calhoun, 2008). The problem addressed by this study was the lack of availability of assessment tools for accurately determining the level of intelligence in the autistic population.

Nature of the Study

A sequential, exploratory, mixed methods design was used to explore the phenomena under study. This study was primarily qualitative in nature with quantitative data collected to further establish qualitative findings. Qualitative Delphi methodology enabled multiple rounds of information gathering from a pool of experts of autistic disorder. The Delphi method was employed as a strategy to determine common themes within the professional community regarding assessment of intelligence in children with autistic disorder. A one-group, posttest, quantitative design elicited quasiexperimental data collection to further support the qualitative findings collected with Delphi procedures. Purposeful sampling included direct identification of expert informants who met criteria for participation. Random sampling was not an appropriate fit for this study with the basis of a Delphi study including the collection of participants meeting particular criteria for inclusion. More detailed discussion of research objectives and design has been provided in chapter 3.

Variables

The independent variable for this study was the experience of the expert participants with selection, administration, and interpretation of results of intelligence assessments for children with autistic disorder and the resulting responses to the Delphi questioning. A qualitative open-ended survey provided an opportunity for expert participants to develop narrative responses chronicling their individual experiences with assessing intellectual capacity of children with autistic disorder. The dependent variable for this study was the degree of consensus found among expert participants demonstrated by the culminating Likert scale survey.

Research Question and Hypothesis

The research questions underlying this study were:

1. What tools are used to assess intelligence as an accurate reflection of intellectual capacity of children with autistic disorder?

2. How do autistic disorder experts go about selecting assessment tools that are thought to accurately measure intellectual capacity of children with autistic disorder?
3. What level of certainty do autistic disorder experts hold regarding the accuracy of assessments of intellectual capacity of children with autistic disorder?
4. What degree of consensus will there be among expert participants with regard to lived experiences and professional opinions of the assessment of intelligence in children with autistic disorder?

It was hypothesized that a mixed methods investigation would demonstrate consensus in overall experiences and professional opinions of autistic disorder experts of the assessment of intellectual capacity in children with autistic disorder.

Purpose of the Study

I sought to broaden the understanding of how impairments found to be common in autistic disorder, such as social interaction, communication, and restricted interests, have contributed to the need to evaluate traditional assessment tools used to determine a measure of intelligence. A review of the literature has consolidated historically accepted explanations of intelligence theory including psychometric theory (Spearman, 1904), cognitive theory (Hunt, Frost, & Lunneborg, 1973), cognitive-contextual theory (Gardner, 1983), and biological theory (Connolly, Marchand, Major, & D’Arcy, 2006). Traditional theories of intelligence have not accounted for the diversity of intellectual capacity demonstrated by individuals with autistic disorder. Emphasis on processing speed and social associations, paired with lack of consideration for environmental influences and individual differences, has hindered the assessment of individuals with autistic disorder (Edelson, 2006). The purpose of this study was to establish group consensus regarding best practices for gaining an accurate measure of intelligence of individuals with autistic disorder and determine to what extent appropriate tools are available to professionals who administer intelligence assessments.

Conceptual Frameworks

Multiple theoretical models contributed to the conceptual framework for this mixed methods study. Theoretical models presented below include social constructivism, interpretive research, Lockean theory, and intelligence theory. A final consideration has suggested an alternative cognitive style found in autistic disorder.

Social Constructivism

The social constructivist worldview represented the philosophical perspective forming the lens from which the current research has been conducted. Assumptions held within this view include the human motivation to seek greater understanding of the world in which individuals live and work (Creswell, 2009). The intent of research is to discover meaning through interactive data collection in order to better understand particular phenomena (Guba & Lincoln, 1994). The social constructivist research does not often begin with a particular theory from which research is conducted; instead, it employs inquiry generating techniques to inductively develop an emerging theory or pattern of shared meaning among the participants of the study (Creswell, 2009).

Interpretive Research

Interpretive research represents the approach to inquiry within the social constructivist worldview. Interpretive research is based on the assumption that access to reality and truth are only found through social constructions, such as shared meanings among individuals (Orlikowski & Baroudi, 1991). Interpretive studies attempt to understand phenomena through meanings assigned by individuals to produce an understanding of the context in which the phenomena is experienced (Walsham, 2005). Interpretive research has been used due to valuable qualities including flexibility in interdisciplinary research, comprehensive narratives from participants, and rich contributions provided in the analysis of a phenomena (McQueen & Zimmerman, 2006).

Lockean Theory

Research conducted with use of the Delphi methodology is guided by one of several philosophical theories of epistemology including unique *inquiring systems* to establish truth through the process of data collection (Mitroff & Turoff, 1975). The Lockean inquiring system represents the philosophical mood underlying the basic tenets of the current study. The Lockean inquiring system is characterized by the assertion that truth is experiential and truth is measured in terms of the reduction of complex propositions to simple empirical referents or observations in which the validity of such referents is established through the consensus reached among multiple observers (Mitroff & Turoff, 1975).

Lockean inquiring system does not represent prior assumptions of theory, just as in Locke's theory of *tabula rasa* indicating a blank slate from which theory is developed and discovered through the shared meanings and interpretations (Locke, 1689; Mitroff & Turoff, 1975). With experience and widespread agreement as an indicator for truth, the Lockean inquiring system seeks to build an empirical, inductive representation of phenomena and reach a generalization of understanding based on individual experiences expanded within a group of experts to establish a final truth (Mitroff & Turoff, 1975). The validity of such evaluation is measured by consistent, clear agreement and the degree of consensus among the experts through anonymous collection of views (Mitroff & Turoff, 1975).

Intelligence Theory

Theories of intelligence have traditionally emerged from the assumption that representations of cognitive abilities across populations are measured along a continuum of related and comparable levels of intelligence, resulting in the determination of a standard intelligence quotient (IQ) score (Wechsler, 2003). The measured IQ has commonly informed expectations for current cognitive ability as well as potential for future achievement and success. Exchangeability of cognitive ability has been found across various intelligence tests and the resulting measure of level of intelligence (Floyd et al., 2008). Theoretical underpinnings of intelligence testing have suggested the measures gained from standardized testing can be confidently used to determine an individual's potential for learning and future success. This assertion has been indicated in a longitudinal study reviewing the successes of individuals in adulthood as compared to their childhood intelligence measures (Firkowska-Mankiewicz, 2002).

Alternative Intelligence Theory

Goldstein et al. (2008) recognized inconsistency of exchangeability in the structure of intelligence in those with autistic disorder when compared to other populations. This discrepancy was due to the interference of autistic symptoms which compromised assumptions of universality of measures of intellectual capacity. A prerequisite for successful participation in the assessment process is the ability to communicate in a consistent manner with implicit and explicit forms of communication atypical in autistic disorder (Edelson, 2005).

Specific characteristics of the diagnostic criteria for autistic disorder may influence the outcome of traditional intelligence tests. Symptoms include significant impairment in social interaction, relationship development, social and emotional reciprocity, communication, conversational skills, and repetitive behaviors, interests, and activities (APA, 2000). The unique characteristics of autistic disorder have challenged the assumption that standardized tests measure comparable demonstrations of intellectual capacity among the average population for whom tests are designed and the population of autistic individuals (Edelson, 2006; Wechsler, 2003).

The recent literature has suggested a different cognitive style in autistic disorder and may provide a better understanding of how the presentation of intellectual capacity varies from normed expectations. Kuschner et al. (2007) reported children with autistic disorder have demonstrated abilities in advance of their age group on tests of nonverbal abilities. Advanced performance on perceptual and visual-spatial tasks has suggested a variance in cognitive style rather than deficiency in intellectual capacity. Related literature further challenged the traditional expectation for standard communication abilities and suggested intelligence of those with autistic disorder has been underestimated due to varied demonstration of intelligence in this unique population (Dawson et al., 2007).

Literature has suggested the predictive qualities of intelligence tests among the general population are not likely to be extended to an individual with autistic disorder (Firkowska-Mankiewicz, 2002). Poor test performance does not necessarily correlate to a universal inability to learn (Kasa-Hendrickson, 2005). The absence of evidence about one's ability to think and problem solve within the format of standardized tests has contributed to the misconception that thinking ability is unrefined (Biklen & Burke, 2006). Alternative methods in which the abilities of those with autistic disorder may be more appropriately elicited have not been considered (Biklen & Burke, 2006).

Recent research has suggested working memory is a more accurate prediction of future success of individuals with developmental disabilities than IQ alone (Alloway, 2009). The strict administration protocols of traditional tests of intelligence, such as the Stanford-Binet Intelligence Scales and the Wechsler Intelligence Scale for Children, have revealed weak scores in working memory subtests for children with autistic disorder (Coolican, Bryson, & Zwaigenbaum, 2008; Mayes & Calhoun, 2008). The perspective that children with autistic disorder demonstrate a unique cognitive style has challenged the validity of measured deficits in working memory when the symptoms of autism were controlled (Dawson et al., 2007; Edelson, 2005; Kuschner et al., 2007).

Operational Definitions

Autism: A term used interchangeably and with the same meaning as autistic disorder.

Autistic disorder: Autistic disorder is a “complex developmental disability which typically appears during the first three years of life and is the result of a neurological disorder that affects the normal functioning of the brain, impacting development in the areas of social interaction and communication skills. Both children and adults with autistic disorder typically show difficulties in verbal and non-verbal communication, social interactions, and leisure or play activities” (APA, 2000).

Autistic disorder expert: For the purposes of this study this term was defined as a professional with a masters or doctoral degree in psychology or related field, currently working in the field of autistic disorder, with at least 5 years experience with assessment of children with autistic disorder, and proficiency in clinical assessment and diagnosis of autistic disorder and intelligence in autistic disorder (Sulzer-Azaroff, Fleming, Tupa, Bass, & Hamad, 2008).

Autistic spectrum disorder: A more broad perspective of disorders closely related to autism, such as Asperger’s syndrome, Rett’s disorder, and childhood disintegrative disorder (Volkmar, State, & Klin, 2009).

Delphi method: A data collection method using several rounds of questions and controlled feedback to find consensus on a particular topic from a group of experts on the topic (du Plessis & Human, 2007).

Emotional intelligence: The ability to recognize emotions of self and others, appropriate application of emotion to best serve one's needs, understanding complex emotions and their influence on one's emotional status, and the ability to manage the emotions of self and others (Mayer, DiPaolo, & Salovey, 1990).

Intelligence: A historical perspective of the meaning of intelligence encompasses an ability to learn; adapt and adjust to new situations; carry on abstract thinking; capacity for independence; originality; productive thinking; and a group of mental processes: sensation, perception, association, memory, imagination, discrimination, judgment, and reasoning (Edwards, 1928).

Intelligence quotient test: An assessment tool used to establish the intellectual capacity and potential by way of administration of a series of questions including problem solving, associations, concept formation, memory, and other indicators of intellectual capacity (Wechsler, 2003).

Multiple intelligences: The theory that rather than one general factor of intelligence, seven primary abilities represent intelligence, including linguistic, logical-mathematical, spatial, musical, bodily-kinesthetic, interpersonal, and intrapersonal intelligence (Gardner, 1983).

Nonverbal intelligence: Broad reasoning used for solving problems without the use of language and without extended education or acculturation (Albanese, De Stasio, Di Chiacchio, Fiorilli, & Pons, 2010)

*Verbal intelligence: K*nowledge of words, the capacity for formation of definition of verbal concepts, and the ability to form associations with the use of words (Garaigordobil, 2005).

Assumptions

Assumptions underlying this exploratory research included the expectation that there is a significant gap between available tools to assess intelligence and the accurate diagnosis of intellectual disability of those with autistic disorder. It was also assumed that experts in the field of autistic disorder would recognize this discrepancy as a critical concern worth exploring further as a participant in this inquiry-response model of information gathering. Expectations also presupposed that autistic disorder experts would have a developed professional opinion about the nature of the investigation and would provide the valuable insight anticipated in its design.

Limitations

The limitations, which provided the scope of the research, include constraints on gaining thorough and consistent participation from participants throughout several rounds of information gathering in the data collection process of this Delphi study. In addition, the recruitment of a greater number of participants who met the criteria for inclusion has limited the ability to fully generalize findings to the greater population of autistic experts. Finally, the ability to generalize the results of the study were further influenced by the regions, cultures, professional status, experience, and specialties represented by the participants of the study.

Delimitations

The focus of this study has been delimited by the pursuit of more information regarding the availability of appropriate tools for assessing intelligence in individuals with autistic disorder. Expert participants were asked to limit their report of professional experiences with assessment of intelligence of children with autism who were 12 years of age and younger. The narrow scope of this research deliberately excluded the exploration of assessment of autistic disorder as a diagnosis, specific subgroup diagnoses, intervention and treatment models, cause and cure for autistic disorder, and assessment of intelligence in populations other than that of autistic disorder. The bounds of this study included expert participants throughout the United States and Canada in the field of assessment in autistic disorder. In addition, although there is a range of disorders along the autistic spectrum, the focus of this study was autistic disorder and not Asperger's syndrome, Rett's disorder, or childhood disintegrative disorder.

Significance of the Study

This study has contributed to the existing body of research of autistic disorder and intellectual functioning with a contribution to positive social change for individuals with disabilities and their families. Recent rates of autistic disorder have grown to affect 1 in 110 children, indicating approximately 500,000 affected children throughout the United States (Centers for Disease Control and Prevention [CDC], 2009). The nationwide impact of this disorder has demanded the attention of clinicians and treatment teams to clearly and accurately understand the treatment and support needs of this special population.

Although significant research has reported deficient intellectual functioning in autistic disorder, true empirical support for this claim has been largely unfounded (Edelson, 2006). Preliminary assumptions of clinicians regarding the cognitive abilities of children with autistic disorder have reflected an overestimation of impairment as compared to actual measures (Wiggins, Rice, & Baio, 2009). A recent study presented by a workgroup from CDC reported that clinicians estimated 80% of children with autistic disorder were cognitively impaired, while only 60% revealed actual test scores ranging from mild, moderate, to severe cognitive impairment (Wiggins et al., 2009). With the consideration of autistic characteristics contributing to potential testing confounds aside, the degree of assumption of lowered cognitive functioning has represented risk of inaccurate clinical assessment and potentially decreased level of standards for success and achievement within this population.

Given the findings offered from Wiggins et al. (2009) and the current rates of diagnoses of autistic disorder as provided by CDC (2009), it can be presumed that approximately 100,000 children who are diagnosed with autistic disorder may have been inadvertently dually diagnosed with an intellectual disability. Implications associated with the potential substantial oversight of ability in this population may include a dramatic economic impact to society. Inappropriate educational development and treatment opportunities for individuals, who otherwise may have demonstrated the capacity for gaining skills contributing to gainful employment, may not be afforded the opportunity to contribute to society through participation as employable, productive, tax paying citizens.

The combination of the lowered standards and expectations for individuals with autistic disorder presented above (Wiggins et al., 2009) and the influence of autistic tendencies on the accuracy of assessments of intelligence (Edelson, 2006) provided cause to explore the practice of selection, administration, and interpretation of intelligence assessments in this population. The current investigation incorporated the practical experience of autistic disorder experts to explore the strategies used to establish a measure of intellectual abilities and review the appropriateness of assessment tools used with this unique population. Results have contributed to the research with an indication of the lack of availability of an accurate measure sensitive to the primary characteristics of autistic disorder, which hinders the ability to accurately measure intellectual capacity in this population.

Implications of this study toward positive social change include the recognition of the need for more appropriate assessment tools for assessing intelligence in this population. Findings are anticipated to lead to the development of a more accurate measure of intelligence. The development of an accurate assessment tool is expected to contribute to significant life changes, such as school placement, intervention and support, and opportunities throughout life often influenced by the assignment of intellectual functioning. Findings from this study hold practical implications for professionals in the selection of assessment tools and strategies for gaining an accurate measure of intellectual capacity of children with autistic disorder.

Summary

In chapter 1, I provided an introduction to the study about assessing intelligence of children with autistic disorder, highlighted the critical social problem under investigation, introduced the purpose and objectives of the study, presented the conceptual framework supporting the study, proposed operational definitions of key terms and concepts, and reviewed the significance of the study toward positive social change for individuals with autistic disorder. In chapter 2, I have presented a thorough review of the relevant research exploring assessment of intelligence in autistic disorder, intelligence theory, and the construction, administration, and interpretation of intelligence tests. In chapter 3, the methodology employed is reviewed. In chapter 4, the results of the study have been presented, and in chapter 5 a summary, conclusions, and recommendations based on the findings of the study are each provided.

Chapter 2: Literature Review

Introduction

Chapter 1 provided an introduction to the purpose and direction of this study with brief reference to the conceptual framework and research questions, which will be explored in greater detail in this chapter. The goal of this study was to better understand the strategies and tools used for determining an accurate assessment of intellectual capacity of children with autistic disorder. Emphasis has been placed on the definitions of intelligence in the field, the availability of appropriate tools for measuring typical or atypical intelligence in the autistic population, and the identification of indicators of successful test construction and procedures for administration, interpretation, and use for individuals with autistic disorder.

This literature review begins with an overview of the diagnosis of autistic disorder, including primary strengths and deficits common to this disorder. A brief review of the increasing prevalence and rate of diagnosis has also been included. A comprehensive overview of the various theories of intelligence developed throughout the 20th century has identified common characteristics of intelligence one would expect an assessment of intelligence to reflect. Contrasts of early developmental progress of typically developing individuals and those with autistic disorder have been presented to better understand the influences atypical development in autistic disorder may have on the assessment of intelligence. Examination of the construction of intelligence tests has provided insight into the process for establishing standardized measures which accurately represent the wide-ranging cognitive abilities uniquely demonstrated by individual skill and ability. Review of commonly used assessment tools and the appropriateness for measuring the level of intelligence of individuals with autistic disorder has prompted the reader to consider the unique perspective from which individuals with autistic disorder may approach the testing environment, potentially influencing the accuracy of the results. Further exploration included an analysis of the recent literature challenging traditional assumptions of the high rate of comorbid diagnoses of intellectual disability alongside autistic disorder. Arguments have been made to reconsider the apparent acceptance and promotion of often weakly supported claims of impaired intellectual ability (Edelson, 2006).

The following sections are focused on specific components of this extensive research endeavor: overview of autistic disorder, autistic disorder and intelligence, history of intelligence theory, test construction and administration, interpretation of test results, and expert perspective as a catalyst for research methodology. Each section of this review of the literature has underscored the gap in the literature and the need for a more accurate measure of intelligence for individuals with autistic disorder. The conclusion of this review has included an appraisal of the use of the Delphi method for effectively exploring expert insight of the assessment of intelligence in children with autistic disorder.

The process for reviewing the current, relevant research primarily included keyword searches of several research databases available from the Walden University library per the EBSCOhost search engine, including PsycARTICLES, Education Research Complete, PsycINFO, PubMed, and Academic Search Premier. The search terms included *autism, autistic disorder, intelligence, mental retardation, intellectual ability, intellectual disability, assessment,* and *cognitive ability*. To further focus the literature search and avoid the inclusion of common extraneous search results, the terms *Attention Deficit Hyperactivity Disorder* and *ADHD* were eliminated from the search. In order to ensure the most current findings from empirical research, the majority of the research used in this study was limited to peer-reviewed work published from 2005 to 2010. In order to gain valuable historical perspective on the progression of intelligence theory throughout the 20th century, reference to dated seminal sources were also integrated into relevant areas of the following review of the literature.

Autistic Disorder

Kanner (1943) first coined the term autism to sum the numerous characteristics recognized to represent a unique disorder among many other disorders of development. The diagnosis of autistic disorder was identified on a spectrum of pervasive developmental disorders, each with distinct characteristics and featured criteria for an established diagnosis. In addition to autistic disorder, the spectrum includes Rett's disorder, Asperger's syndrome, and childhood disintegrative disorder (APA, 2000). Rett's disorder presents with more severe and prolonged regression in skill as compared to autistic disorder, with only transient delays in social interactions, and only diagnosed in females, as compared to the more common diagnosis of autistic disorder in males (APA, 2000). Childhood disintegrative disorder presents with a more global and degenerative regression of skill and functioning, as compared to the primary regression areas in communication and social interaction found in autistic disorder (APA, 2000).

Asperger's syndrome is distinguished from autistic disorder with the absence of language delay or loss of developmental skills, with primary deficits in appropriate social interactions with others (APA, 2000). For the purposes of narrowing this study, classical autistic disorder was maintained as the focus of analysis.

Prevalence of Autistic Disorder

A 13-fold increase in the diagnosis of autistic disorder since 1997 has prompted significant attention to the disorder when compared to the maintained or lowered rate of growth of other developmental disabilities (Brock, 2006; Department of Developmental Services, 2008). While some have suggested the rise in diagnosis has been due to greater awareness and the broadening of the diagnostic criteria for autistic disorder (Brock, 2006), other findings revealed a consistent increase in autistic disorder without a decrease to other classifications, such as mental retardation, to which individuals with autistic disorder may have been assigned prior to the greater awareness of autisitic disorder (Newschaffer, Falb, & Gurney, 2005). Regardless of the cause for the increased need for diagnostic and intervention services, there are significant implications impacting the service delivery system and financial resources available to support the expansive population of individuals with a variety of developmental disabilities (Sack-Min, 2008).

Primary Characteristics of Autistic Disorder

The current Diagnostic and Statistical Manual (DSM-IV-TR) provides a comprehensive presentation of the most significant deficiencies to functions of daily living characterizing the diagnosis of autistic disorder (APA, 2000). Primary deficiencies of this neurological disorder are noted in communication skills and interpersonal interactions with others, uniquely focused interest areas, and little regard for typically motivating activities and interests (APA, 2000). Interference with the development of interpersonal relationships is prompted by an inability to interpret nonverbal behavior and cues of others, as well as regulate the same nonverbal behaviors in oneself (Cashin, 2005). While children with autistic disorder have been recognized to display strengths in learning with visual rather than auditory cues, such skills have not been shown to extend to the visual cues of facial expressions and other interpersonal nonverbal cues (Dawson et al., 2004; West, 2008). Deficits in social orienting, joint attention, and response to distress are compounded by the delayed and inconsistent development of expressive language, each pivotal aspects of relationship development with others (Chan, Cheung, J., Leung, Cheung, & Cheung, 2005; Dawson et al., 2004).

Children with autistic disorder are often observed to engage in either solitary play or parallel play with nearby peers and while they may display similar play behavior as peers, interaction with peers is lacking or absent (Holmes & Willoughby, 2005). Play behavior has also been described as rigid with restricted a range of variety and is commonly accompanied by ritualistic, repetitive actions with preferred items. Children with autistic disorder have frequently used traditional play objects as tools for reinforcing the requirement for structure and sameness by sorting and organizing objects in preferred sequences or arrangements (Honey, Leekam, Turner, & McConachie, 2007). Effective intervention strategies for addressing social relating and increased interaction have included social skills training in dyads and small groups. For example, social stories are brief narratives describing common social situations across various environments identifying commonly anticipated responses according to social norms in order to practice appropriate response in a variety of social situations, as well as learn the natural consequences of socially inappropriate responses (Mackay, Knott, & Dunlop, 2007; Reynhout & Carter, 2007).

Common behavioral characteristics unique to autistic disorder include repetitive motor gestures, such as hand flapping, fixation on particular objects or movements, poor eye contact, and emotional outbursts (APA, 2000). The literature has indicated that such behavioral responses are likely associated with the communication and social deficits, rather than serving as isolated symptoms (Murphy et al., 2005). Social challenges prompt anxiety and the desire for sameness, inciting a cycle of preferred repetitive behaviors as a coping strategy (Cashin, 2005; Richler, Bishop, Kleinke, & Lord, 2007). Behavior intervention strategies for children with autistic disorder have maintained an emphasis on normalizing ritualistic behaviors as well as training of daily living skills with goals for greater capacity for future independence (Lovaas, 1987; Reed, Osborne, & Corness, 2007a, 2007b). The key to successful outcomes for intervention methods include catering to the strengths of characteristics of autistic disorder with an emphasis on repetition, routine, and visual cues (Reed et al., 2007a).

Autistic disorder has been described as a variable disorder with severity of symptoms demonstrated along a wide ranging spectrum from mild, moderate, and severe presentation of symptoms (APA, 2000). The intensity of symptoms along this spectrum can result in increased behavioral challenges and social deficits consistent with increased level of severity (Matson et al., 2009). The severity of symptoms is indicated as a part of the diagnostic process and can also be identified as high-functioning or low-functioning according to the level of severity (Reaven, 2009).

Diagnostic Tools for Autistic Disorder

The Autism Diagnostic Observation Scale (ADOS) is a commonly used tool for assessing a diagnosis of autistic disorder. This tool includes interactive measures of social skills, motor skills, and behavioral indicators most common to the diagnosis (Akshoomoff, Corsello, & Schmidt, 2006). Results of the ADOS provide diagnostic results consistent with the criteria indicated by the DSM-IV-TR for establishing a diagnosis of autistic disorder in the areas of communication, social interaction, and play or imaginative use of materials (APA, 2000). Multiple modules provide a selection for use based on level of expressive language and chronological age. Although the ADOS assessment is the most widely used diagnostic tool for assessing autistic disorder in children, it does not have a module for testing non-verbal adolescents and adults (Akshoomoff et al., 2006).

The Autism Diagnostic Interview- Revised (ADI-R) is also commonly used to diagnose autistic disorder as an alternative to an interactive measure with the individual (Le Couteur, Lord, & Rutter, 2003). The ADI-R is a 90 minute interview completed with a primary caregiver about a child’s communication and language, social interaction, and restricted, repetitive behaviors. Results of the ADI-R contribute to the development of treatment and educational planning with the ability to identify boundaries of influence of a diagnosis of autistic disorder on the functioning of the individual in a variety of treatment settings (Le Couteur et al., 2003).

While the Social Communication Questionnaire (SCQ) is often used as a brief evaluation of the social and communication skills of an individual, it has more often been used as a screening tool to indicate the need for a full diagnostic review (Rutter, Bailey, & Lord, 2003). In addition the SCQ has been used to compare symptom levels across groups. The inexpensive and time saving attributes of this tool make it a likely choice for use at the first sign of autistic characteristics.

The Childhood Autism Rating Scale (CARS) is a behavior observation tool used to identify the presence of a diagnosis of autistic disorder, as well as to confirm the severity of the diagnosis (Schopler, Reichler, & Renner, 1998). Results from the CARS provide an analysis of the symptoms of autistic disorder ranging from mild, moderate, and severe. Although it is not as procedurally stringent as the ADOS in its structure or administration, the CARS has consistently provided a reliable measure for the diagnosis and the extent of influence of the disorder on an individual's level of functioning (Perry, Condillac, Freeman, Dunn-Geier, & Belair, 2005). A second edition of the CARS has recently been released with little research yet produced about the value of the revisions, including the evaluation of Asperger's syndrome (Schopler, Van Bourgondien, Wellman, & Love, 2010).

The Gilliam Autism Rating Scale-2 (GARS-2) is another diagnostic tool assessing autistic disorder according to a series of descriptive statements of the presence and frequency of stereotyped behaviors, communication, and social interaction (Gilliam, 2005). Results indicate presence of autistic disorder and severity of symptoms according to parent, teacher, and clinician report. The GARS-2 has strong psychometric properties with the ability to distinguish behaviors as a result of an autistic disorder diagnosis and other behavioral disabilities. With similar properties to the CARS, the GARS-2 is used often, but not as widely as the CARS (Allen, Robins, & Decker, 2008).

Autistic Disorder and Intelligence

The diagnostic criteria for autistic disorder does not indicate level of intelligence as a marker of the disorder, and therefore the aforementioned assessments for diagnostic purposes do not provide a measure of intellectual ability, capacity, or potential (APA, 2000). However, the DSM-IV-TR does suggest most cases of autistic disorder are also identified with a diagnosis of intellectual disability (APA, 2000). Poor performance on standardized intelligence tests has been widely accepted as an indication of intellectual disability within this population (Edelson, 2005). Subtests typically rely on social interaction and prompted response to questions based on prior knowledge, motivation for social relationships, and relationships among concepts within one's environment (Edelson, 2005; Edelson, M., Schubert, & Edelson, 1998). Common strengths identified among individuals with a diagnosis of autistic disorder include nonverbal task performance, fluid reasoning, quantitative reasoning, and visual spatial processing (Coolican et al., 2008; Mayes & Calhoun, 2008). Each of these areas of strength is dependent on internal processes of understanding and demonstration rather than reliant on social interactions with others.

Symptoms of autistic disorder which may interfere with the successful demonstration of one's knowledge and abilities may include compromised functional verbal expression abilities, processing disorders, and lack of joint attention skills (APA, 2000). Such challenges lead to compromised ability to successfully complete test items within the parameters imposed by standardized procedures (Edelson, 2005). The notion of likely comorbid diagnoses of autistic disorder and intellectual disability has been generally accepted among the professional community, as indicated by references made in various recent and historical research articles (Bolte & Poustka, 2002; Creak, 1963; Dennis et al., 1999). Some researchers have begun to question the validity of such claims. Further investigations into the true level of intelligence of the autistic population has been spurred by parent, teacher, professional, and researcher inquiries of the accuracy of measurement of intelligence of those with autistic disorder (Edelson, 2006; Kasa-Hendrickson, 2005; Rutter, 2005). Common among these researchers is the concern that instruments used to assess intelligence are not constructed to effectively mitigate confounds of autistic symptomology (Edelson, 2006; Kasa-Hendrickson, 2005; Rutter, 2005). Intelligence in autistic disorder may be demonstrated differently than in individuals who are typically developing or have a diagnosis of a different disorder (Dawson et al., 2007; Edelson, 2006; Kuschner et al., 2007). To begin an investigation into this potentially discrepant measure between actual intelligence and the level assessed by standardized assessment tools, an evaluation of the various theories of intelligence have been reviewed in consideration of typical areas of cognitive strengths within the autistic population. Primary interest is centered on the manner in which intelligence is demonstrated in autistic disorder as compared to typical development and what the appropriate standard may be for establishing an appropriate assessment tool.

History of Intelligence Theory

Theoretical underpinnings supporting the study of the human mind have been pursued by numerous theorists with speculations along an extended trajectory of causes, influences, and responses to and from one's environment and individual experiences. Assertions found within the constructs of theories of intelligence are centered on characteristics of ability, demonstration of such abilities, and consistency and longevity of skills over time (Floyd et al., 2008; Hagan, Drogin, & Guilmette, 2008). While the reliance on ability represents strength of intelligence throughout various theories, the unique tenets of each approach distinguishes one from another. The following section has introduced contributions to four major areas of intelligence theory; psychometric theory, cognitive theory, cognitive-contextual theory, and biological theory. Consideration for influences of a diagnosis of autistic disorder in the demonstration of intelligence from each of these four theoretical constructs was also be explored in relation to the various perspectives.

Psychometric Intelligence Theory

Early emphasis on psychometric theories of intelligence sought to understand the structure of intelligence through an evaluation of a composite of abilities which were measured with tests of mental ability (Furr & Bacharach, 2008). Spearman (1904) proposed a general factor, or *g* factor, which represented an individual's likelihood to perform similarly across a variety of tasks suggesting an all encompassing determination of intelligence. Later findings revealed consistent, distinct differences of performance of children with autistic disorder among the subtests of psychometric tests of intelligence, with great strengths in performance as compared to verbal tests (Mayes & Calhoun, 2008). Further studies of the capabilities of the human mind explored the potential for multiple factors of intelligence rather than one general factor. Thurstone (1936) proposed seven mental abilities unique to each individual which contributed to an overall level of intelligence; verbal comprehension, verbal fluency, number, spatial visualization, inductive reasoning, memory, and perceptual speed. Consideration for a stratified presentation of abilities provided flexibility with identifying an individual's strengths and weaknesses, which allowed for various layers of human intelligence, as well as underscored individual strengths.

As the psychometric theory of intelligence progressed through the 20th century, previously independent ideologies merged to combine theories of both Spearman and Thurstone. A hierarchical approach developed, placing the *g* factor at the top of a theoretical pyramid, with wide ranging ability areas narrowed to more specific aptitudes (Cattell, 1971). This proposed progression of intelligence was later reversed by Carroll (1993) to include narrow abilities at the top, broader abilities in the middle, and finally the *g* factor at the bottom. This suggested that without the two preceding stratum one could not be guaranteed a general factor of intelligence. Of the two, Carroll's theory may be considered more favorable to the consideration of intelligence in autistic disorder. The narrow to broad nature of Carroll's theory allowed for more diversity in a starting point from which abilities are influenced by individual differences to a more general determination, rather than assuming a collective general factor from which all intelligence is based (Delmlino, 2006; Edeslon, 2006).

The understanding of various cognitive abilities was further refined with the distinction between fluid and crystallized intelligence, with fluid intelligence represented by basic reasoning and problem solving abilities, and crystallized intelligence as general knowledge in response to experiences and influences from within one's environment (Horn & Cattell, 1966). Dawson et al. (2007) discovered children with autistic disorder had greater strength with fluid intelligence and struggled with the development of crystallized intelligence, which was primarily dependent on understanding the social constructs experienced in one's environment to adapt to new situations. With greater risk for decline of fluid intelligence with age and crystallized intelligence maintaining stability, the outlook for individuals with autistic disorder evoked concern. Tranter and Koutstaal (2008) discovered that such a decline of fluid intelligence can be counteracted by deliberate efforts toward participating in mentally stimulating tasks as a means for enhancing mental strengths. Implications of such findings inform the continued need for development of intervention strategies for treatment of autistic disorder in order to build upon strengths and support areas of weakness toward optimal success.

With a foundation for approaching the psychometric theory of intelligence from a wide range of skills and abilities, Guilford (1967) proposed over 100 cognitive abilities based on the mental combinations of relationships among five types of operation (cognition, memory, divergent production, convergent production, evaluation), six kinds of products (units, classes, relations, systems, transformations, implications), and five categories of content (visual, auditory, symbolic, semantic, behavioral). Since each of these dimensions were independent, theoretically 150 different components of intelligence were identified, which emphasized the interdependence of concepts as an indication of intelligence (Guilford, 1967). This perspective of intelligence accommodated a wide range of various mental constructs. A new diversity to the definition of intelligence emerged to encompass expanded considerations for the unique nature of intelligence as demonstrated through performance in addition to social interaction, as is also noted in autistic disorder.

The psychometric theory of intelligence has been criticized for the all encompassing tendencies of its early beginnings of the single *g* factor, to the endless array of attributes identified in later developments of this theory (Frederiksen, 1986; Sternberg 1985; Sternberg & Grigorenko, 2002). Theorists distrusted a theory which began with one true, general factor of intelligence to later give way to hundreds of separate explanations (Sternberg & Grigorenko, 2002). Theories to follow tended to represent more defined schools of thought with definitive theoretical backgrounds to the development of each additional theory.

Cognitive Intelligence Theory

In an effort to extend the strategies to measure intelligence, cognitive theorists were interested in understanding the cognitive processes which lead to the demonstration of intelligence (Hunt et al., 1973). Consideration for individual differences of mental representations among similar concepts and information, lead to the possibility that individual differences revealed variation in the manner in which knowledge was demonstrated through intelligence testing.

Cognitive theorists referred to indicators of intelligence such as processing speed, successful associations among concepts, ability to learn, memory, and accuracy of perceptions (Hunt et al., 1973). The difficulty experienced by a child with autistic disorder has been shown to include extending associations across social situations due to the rigidity of thinking, as well as from the potential misinterpreted or unrecognized social cues as a compass for navigating the social world (Dyck, Piek, Hay, Smith, & Hallmayer, 2006). In an effort to better understand how such problem solving occurs, Sternberg (1985) urged psychologists to study the mental processes and strategies employed to reach conclusions on tasks incorporated into intelligence tests. Such analysis of mental strategies demonstrated cross referencing of information based on prior knowledge of relationships among various concepts, beliefs, or ideas. Psychologists identified strengths and weaknesses in particular areas of information processing, which established the underlying basis of one’s level of intelligence. Sternberg found that the mental processes involved were found in a wide range of intellectual tasks and were therefore strong indicators of basic intelligence. Cognitive theorists were also prompted to consider the potential for cognitive processes to occur simultaneously and to be interconnected rather than discrete intellectual tasks in a series. This added an additional dimension to the study of cognitive processes.

Cognitive Contextual Intelligence Theory

The cognitive-contextual theory of intelligence revealed context relevant expressions of intelligence with variations in environment and experiences contributing to the identification of skill and ability. With countless opportunities for experiencing one’s surroundings, so was the potential for identifying unique strengths of individuals which extend beyond a general intelligence. Gardner’s theory of multiple intelligences contributed to this theoretical perspective as an extension to Thurstone’s seven primary abilities with his proposal of seven basic varieties of intelligence, including linguistic, logical-mathematical, spatial, musical, bodily-kinesthetic, interpersonal, and intrapersonal intelligence (Gardner, 1983). While intelligences such as linguistic, logical-mathematical, and spatial resembled those of psychometric and cognitive theories, musical, bodily-kinesthetic, interpersonal, and intrapersonal intelligences were unique additions to the conceptual framework of intelligence theory (Rettig, 2005). In addition, the suggestion that each type of intelligence had the capacity for remaining independent from all others provided a shift in thinking of how intelligence was assessed and represented on an individual basis. The acceptance of such diverse presentation of intelligence provided the opportunity for the unique skill set and often strict range of interests, such as individuals with autistic disorder exhibit, to be recognized as valid presentations of intelligence.

Sternberg (1985) proposed a similar view of intelligence represented in three different aspects of knowing, performing, and maintaining ability. Sternberg’s triarchic theory of intelligence referred to an individual’s internal world concerning how one mentally represents concepts and experiences, the manner in which these understandings are extended to the external world, and the ability to broaden developed skills and understanding to novel situations throughout life experiences (Sternberg, 1985). Automatization was described as an essential aspect of intelligence with the ability to adapt to new situations based on previous similar experiences, quickly mediating novelty in order to integrate new experiences into prior knowledge (Sternberg, 1985; Wang, 2007). This skill has shown to be a significant challenge to individuals with autistic disorder with weaknesses in shifting skills learned to novel situations (Koyama, Tachimori, Osada, & Kurita, 2006). Sternberg's theory integrated earlier generalities of attributes of intelligence, and suggested that the traits proposed by Gardner were better understood as talents due to their specific nature and lack of necessity for adaptation to new situations across cultures.

Mayer et al. (1990) contributed to the cognitive-contextual theoretical framework with the proposal of emotional intelligence as an additional measure of intelligence. Four aspects to emotional intelligence included the ability to recognize emotions of self and others, appropriate application of emotion to best serve one's needs, understanding complex emotions and their influence on one's emotional status, and the ability to manage the emotions of self and others. Although representative of one aspect of human behavior and experience, tests of emotional intelligence provided strong correlations to more traditional tests of intelligence, suggesting predictive qualities as well as relevant relationships between various attributes of intelligence. With primary deficits in interpreting social cues and interactions, individuals with autistic disorder have rated quite low on measures of emotional intelligence (Losh & Capps, 2006).

Biological Intelligence Theory

Quite different from all previously discussed theories of intelligence, the development of the biological theory of intelligence was particularly focused on the study of brain activity as the basis from which intelligence is demonstrated (Connolly et al., 2006). The biological perspective aimed to reduce the functions of human intelligence to the biological processes which are activated in tandem with human behavior and thought processes, without consideration for influences in one's environment as important factors to such brain based processes. Intelligence was understood in terms of differences between brain hemispheres, activity of brain waves, and influence of blood flow on mental processes.

Consistent findings were found in the analysis of demonstrated intelligence through tracking which region of the brain was most accessed by an individual (Stuadt & Neubauer, 2006). The left hemisphere of the brain exhibited greater functioning of analytical tasks as well as language based tasks. The right hemisphere of the brain indicated strengths in visual-spatial tasks such as object discrimination. Considering intelligence from a biological perspective provides insight into the strengths of individuals with autistic disorder. Research has consistently indicated that people with autistic disorder have typically revealed greater right hemispheric strengths with tasks reliant more on visual-spatial problem solving, as compared to expressive demonstration of knowledge (Coolican et al., 2008; Mayes & Calhoun, 2008). Findings of brain-based research clearly demonstrated both independent and interdependent qualities of hemispheric studies of brain activity during task completion (Shaw et al., 2006).

Other areas of interest of brain function and intelligence included the study of brain waves and blood flow. The speed at which one can arrive at a solution to a cognitive task can be measured by brain waves, suggestive of greater intelligence related to greater speed of performance (Rabbitt et al., 2006). In addition, blood flow within the brain has also been studied to reveal strengths and weaknesses of individuals throughout the lifespan (Rabbitt et al., 2007). Further findings suggested a progression in development of problem solving skills early in life, as well as decreased concentration, alertness, and the ability to encode new information as blood flow slowed in older age. Such brain based deficits have been consistently related to the cerebellum and cerebral cortex of the brain, which has been an area of significant interest of researchers studying the characteristics of cognitive functioning and processing speed in autistic disorder (Amaral, Schumann, & Nordhal, 2008).

Construction of Intelligence Tests

Development of a tool for measuring intelligence requires an extensive process of standardization and confirmation of validity and reliability in order to ensure consistency of results across a wide ranging population. Norming groups that represent the target population for testing establish what is considered to be a normal distribution of scores from which comparisons can be made to determine above average, average, or below average level of intelligence as compared to the norm group (Sattler & Hodge, 2006).

Intelligence Test Administration Procedures

An aspect of standardization of clinical tests of intelligence includes maintaining consistent administration procedures. Common procedures include structured recital of instructions, prompts and administrator comments, timing, presentation of test materials, and sequence of test items (Wechsler, 2003). Ensuring that each test taker has the same consistent experience is meant to contribute to the validity of the test across individuals.

Variation to the manner in which a test is administered and completed may lead to results which are inconclusive or unable to be interpreted accurately according to the intent of the test developer (Wechsler, 2003).

Unique characteristics of test takers can influence the degree to which the intended procedures are followed. Special populations of test takers may include diversity of culture, language, communication, age, gender, and medical or psychological conditions (Lang, Elliot, Bolt, & Kratochwill, 2008). Variation of information processing ability, attention to task, and motivation for test taking has also influenced the results of a test of intelligence when strict guidelines for administration procedures are adhered to (Kasa-Hendrickson, 2005). As such, many testing procedures have supported minor modifications to test procedures to accommodate for individual differences in test taking behavior (Wechsler, 2003). Consideration for potential confounded test results may be attributed to procedural accommodations which have placed the standardized qualities of the administration at risk of invalid test results. Extended time allotted for task completion, variation in the presentation of materials, additional gestural or verbal prompting, and test segments administered in phases rather than all at once may each influence the validity of findings in consideration of the normed standards involved in test construction (Sams, Collins, & Reynolds, 2006).

Individuals with autistic disorder have been reported to require varying degrees of modification to test administration procedures due to the brevity of attention span in some and the limitations of perspective taking and skills for following multistep instructions (Toth, Munson, Meltzoff, & Dawson, 2006). Frequent breaks and intermittent reinforcement may be required in order to support an individual with autistic disorder to maintain attention through the administration of intelligence tests (Coolican et al., 2008). Without such accommodations, an individual with autistic disorder may be hindered by the resultant low score on some or all tasks which have traditionally required fairly immediate response with limited to no prompting, per standardized procedures (Edelson, 2006). The fourth edition of the Wechsler Intelligence Scale for Children (WISV-IV) provides clear instruction for the test administrator to use verbatim instruction, avoid prompting, and limit guidance to the prescribed responses provided in the administration manual (Wechsler, 2003). Such rigidity in administration may hinder the successful performance of those with autistic disorder who may demonstrate increased levels of performance with minor variations to presentation of instruction and minimal prompts, including repeated instruction as needed (Goldstein et al., 2008).

Interpretation of Intelligence Tests

The interpretation of results of intelligence tests begins with a standardized procedure for scoring responses within the structure prescribed by the test developer (Roid, 2003; Wechsler, 2003). Scoring is followed by a systematic analysis of the data as compared to the performance of other individuals in order to determine the relationship to the norm (Sattler & Hodge, 2006). The often times strict scoring standards resist consideration outside of the boundaries of the standardized format, potentially discounting the unique presentation of an individual with alternative ways of approaching a test item, or with a delayed response resulting in a score of zero according to administration guidelines (Kuschner et al., 2007).

Due to the sensitivity of the scoring of standardized tests when used with individuals not represented in the normed population, the interpretation of such results has required consideration of mitigating factors influencing the performance on the test. While the flexibility of interpretation has contributed to a more individualized approach to understanding the intelligence of an individual, this must also be balanced with the value of maintaining a comparison group from which an individual can be measured against (Sattler & Hodge, 2006).

Interpretative analysis provided as a summary of performance and the resulting understanding of an individual's level of functioning has provided significant influence throughout the many aspects of an individual's life and future (Firkowska-Mankiewicz, 2002). Reference to the professional interpretation of results of intelligence testing has contributed to educational program placement, social integration opportunities, vocational training and opportunities, which all contribute to the overall quality of life and individual life satisfaction (Edelson, 2005). As such, the significant role of such interpretation has also contributed to lost opportunities and unexplored life experiences when an individual is inaccurately or inappropriately assessed with a tool not suited for capturing the essence of the cognitive abilities and higher order thinking that an individual may truly have.

Review of Methodology

The methodological approach from which research is developed and conducted reflects underlying perspectives and philosophical foundations driving the direction of the research (Creswell, 2009). The associated worldview or philosophical perspective guides the researcher toward a quantitative, qualitative, or mixed methods approach to answering a research question (Creswell, 2009). The epistemology or theory of knowledge, reflected within the various approaches to research is represented by the strategies implemented for collecting and analyzing data (Creswell, 2009).

Qualitative Methodology

Qualitative methods of research have been grounded in social constructivist philosophical assumptions in which the researcher has sought to better understand the ways in which individuals have experienced particular phenomena (Creswell, 2007). The constructivist worldview values multiple perspectives as contributing to the discovered truth or reality which emerge from the contributions of many through experiential findings (Guba & Lincoln, 1994). Such qualitative approaches are often represented by research strategies including open-ended questions to elicit data based on the interaction from each participant according to one's experience with the phenomena under study (Creswell, 2009).

Although subjective by nature, a constructivist approach to research and data collection has espoused validity in the compilation of shared experiences of individuals within similar contexts in order to establish truth based on interpretation (Weber, 2004). Complementary use of focus groups in qualitative research has enhanced the data collection process through the combination of perspectives from individual to group consensus (Ivanoff & Hultberg, 2006).

Phenomenological method of inquiry is based on the assumption that truth is only accessible through inner subjectivity, with the interaction of the individual within the environment of primary interest (Flood, 2010). The epistemology of phenomenological research has been grounded in the revelation of meaning and increased understanding of phenomena based on experience (Flood, 2010). Hermeneutical phenomenology is the interpretive evaluation of lived experiences which refrains from claiming absolute truth, while relying on individual experiences to inform discoveries and emerging themes of experience among individuals (Creswell, 2007).

Previous qualitative research of autistic disorder and intelligence has been characterized by suggestions that the quantitative findings of intelligence assessment may not reflect true ability accurately. Kasa-Hendrickson (2005) presented interviews with elementary school teachers and their experience with including children with autism in their general education classroom. Consistent reports of the recognition of greater cognitive strengths than suggested by results of intelligence tests were routinely challenged by school psychologists and administrators who insisted on trusting the intelligence measures as accurate assessments. Such bias demonstrated in school administration is reflective of the plight of individuals with autistic disorder in being provided opportunities for advancement and success, with lowered expectations from those who have the power to offer such opportunities.

Similarly, Biklen and Burke (2006) presented an interview with an individual with autistic disorder as a glimpse into the reality and perceptions of individual experience. Findings suggested that an individual’s level of intelligence cannot be known or measured if the individual doesn’t demonstrate this. The key informant in this research suggested discrepancy between assumptions made about level of functioning and actual experiences of those living with autistic disorder. Valuable information about successes and pitfalls of the educational experience of young people with autistic disorder are primary contributions to the literature, offered by first hand experience.

Quantitative Methodology

Quantitative methods for research rely upon a positivist empirical philosophy, with emphasis on established truth based on empirical testing and evaluation (Creswell, 2009). Quantitative methods employ direct strategies for testing hypotheses, such as treatment interventions, pretest and posttest measures, and statistical analysis of data to discover established theory in various research studies (Creswell, 2009). Quantitative researchers are interested in learning how a particular variable may influence one or more separate variables in order to determine a relationship among variables and the impact that one has on another.

The methodology found in the majority of the relevant quantitative research included the administration of various tests of intelligence with children with autistic disorder, compared to typically developing peers in order to identify areas of strength and weakness in the demonstration of intellectual ability (Chan et al., 2005; Dyck et al., 2006). Additional quantitative studies have compared performance of a sample of children with autistic disorder among several different tests of intelligence to determine the relative strengths and weaknesses demonstrated according to test style. Findings have suggested nonverbal tasks elicit higher test scores through the assessment of cognitive strengths (Dawson et al., 2007; Edelson, 2005). The majority of such studies failed to contribute an accurate reflection of ability with the comparison group for the established ranges of level of intelligence based on a standardized norm group not inclusive of individuals with autistic disorder.

Mixed Methodology

Although quantitative and qualitative research methodologies have historically been recognized as opposing approaches to inquiry, recent literature has suggested the growing acceptance of using the strengths of each approach as a contribution of a collaborative approach (Brannen, 2005). The theoretical underpinnings and divergent worldviews remain intact individually, with the merging of the two in order to add value to the overall interpretation of results and evaluation of data (Brannen, 2005). The practice of combining two methodologies is interpreted along a continuum of acceptance within the professional research community. While benefits from combining qualitative and quantitative approaches have included the ability to triangulate data and contributed to the validity and reliability of results, skeptics have also sought to maintain a separation as not to comingle the epistemologies and theoretical frameworks of the two (Nudzor, 2009). However, researchers have recognized that findings of quantitative research alone do not facilitate social progress the way it could with the incorporation of qualitative methods for data collection and analysis (Niaz, 2008).

Mixed methods research in the literature has often been presented as a primarily qualitative study with quantitative measures as a source of support to the qualitative findings. Researchers have attempted to use quantitative results of standardized tests to assist in interpreting qualitative findings gathered through interviews and in depth document analysis to establish a measure of intelligence in autistic disorder. Coplan and

Jawad (2005) employed a detailed review of records of individuals with autistic disorder in an effort to draw conclusions about the influence of the passing of time on intelligence measures and atypical behaviors of individuals with autistic disorder. Findings suggested that individuals assessed as having higher intelligence experienced a decrease in atypical behaviors over time, while those assessed as having lower intelligence demonstrated little change in atypical behavior over time. Although these authors acknowledged the challenge with obtaining an accurate measure of intelligence with this population, the findings of this study were still based on the assumption of accuracy of intelligence measures and failed to compare the assessment tools used for obtaining the measure of intelligence before drawing conclusions based on these measures.

Bolte and Poustka (2002) conducted a similar analysis of the influence of the measure of intelligence over time with special attention to adaptive skills and behaviors. In this study, interviews were conducted with parents and caregivers to better understand the portrayal of intelligence discovered through standardized methods for children with autistic disorder. Findings of this literature suggested that those who presented with a greater level of intelligence had increased adaptive skills over time as compared to those with lower measures of intelligence. Due to confounds with gathering desired data, these researchers eliminated participants who did not communicate verbally, failing to include those who may demonstrate intelligence by alternative means as compared to others.

Further contributions to the research with a mixed approach to methodology may include the administration of tests of intelligence to children with autistic disorder, followed by interviews with the test administrator about their perception of the level of intellectual capacity of the test taker as compared to the actual results of the testing. Such follow up may offer valuable insight into the anticipated accuracy of the measure within the confines of standardized assessment strategies.

Focus groups have served as a research strategy to successfully merge qualitative and quantitative research by engaging the strengths of each methodological approach (Ivanoff & Hultberg, 2006). As an example, focus groups have been used to assemble narrative data from which a resulting survey was developed in order to gain a quantitative measure of the primarily qualitative inquiry (Ivanoff & Hultberg, 2006).

Delphi Methodology

Exploratory methods for qualitative inquiry have provided better understanding of lesser known phenomena (Creswell, 2009). Preliminary insights which inform future directions of research can establish a foundation from which theory can be developed or existing theory can be refined or expanded upon. The Delphi method of research has been utilized for identifying emerging themes in new directions with input from a panel of experts in the related field as key informants on the topic under study (du Plessis & Human, 2007). Studies that have utilized the Delphi method have employed several rounds of information gathering, compiling, clarifying, and finally presenting a consensus among informants often leading to the development of new understanding or theory (Brown, 1968).

The Delphi method has been previously utilized for areas of research of intelligence in order to develop an instructional design based on the theory of multiple intelligences (Tracey & Richey, 2007). Investigations about the development of curriculum to address the treatment needs of children with autistic disorder also employed an expert panel utilizing the Delphi method (Sulzer-Azaroff et al., 2008). Each of these studies depended on the multiple rounds of information gathering in order to refine the data in the development of complex systems.

Expert Perspective

Experts in the field of autistic disorder research, diagnosis, and treatment have struggled with the use of traditional standardized tests of intelligence for the assessment of individuals with autistic disorder (Biklen & Burke, 2006; Edelson, 2006). Without access to an intelligence test specifically normed for children with autistic disorder, professionals have been limited to the use of tests which do not consider the unique characteristics of those with autistic disorder as an aspect of the standardization process (Mayes & Calhoun, 2008). Resulting practice has included the selection of various subtests from a variety of intelligence assessments which have been thought to best capture and demonstrate the problem solving abilities of those with autistic disorder. Some experts have suggested that the true measurement of intelligence with traditional testing strategies is not possible and the accepted notion that most individuals with autistic disorder have a co-occurring diagnosis of an intellectual disability has been called into question (Edelson, 2006).

Alternative Methodologies

The primary alternative methods for analysis of the assessment of intelligence in those with autistic disorder have included quantitative analysis often aimed at comparison analyses. Such quantitative comparisons have included the review of performance on particular intelligence tests with test groups represented by individuals with autistic disorder and those with typical developmental profiles (Chan et al., 2005). Quantitative comparisons have also been completed through analysis of performance of participants with autistic disorder across multiple measures to determine consistency or differences between performances on each (Mayes & Calhoun, 2008). Meta-analysis of historical and current studies has also furthered the base of research of the understanding of intelligence levels in autistic disorder (Bridgett & Walker, 2006; Edelson, 2006). Phenomenological qualitative analysis has also been pursued to better understand experiences of individuals with autistic disorder and the assumptions made about one's intelligence with or without confirming scores from standardized tests (Biklen & Burke, 2006). Such approaches have been successful with identifying the presence of discrepancies, and a qualitative analysis using the Delphi method has now provided opportunity for greater exploration of the reasons for the discrepancies and has offered solutions through narrative analysis from an expert panel.

Summary

In chapter 2, I presented a review of the means by which intelligence is defined, understood, and assessed according to a variety of theoretical perspectives and modes for measurement. Traditional practices were examined independently as well as with consideration for the unique contributions of the primary characteristics of autistic disorder in the methods for evaluation of intelligence. Evaluation of the construction and administration standards of intelligence tests was further appraised in consideration of use with the autistic population. Review of historical and current literature demonstrated a gap in the research indicating the accuracy and appropriateness of traditional assessment methods in establishing a valid measurement of intelligence in the unique population of those with autistic disorder.

In chapter 3, I have provided information on how this study was performed with use of the Delphi method, how the participants were identified, the questions that were asked, and how the information was organized and analyzed.

Chapter 3: Research Method

Introduction

The first two chapters concerned intelligence theory and traditional methods for assessing intelligence in typical and atypical populations. More specifically, considerations for such practices for individuals with a diagnosis of autistic disorder were explored in order to establish a foundation from which current assessment practices can be evaluated for accuracy, validity, and appropriateness. This chapter introduces the methodology used for pursuing a better understanding of which methods for assessing intelligence in this unique population are considered to be the most valid, given the unique characteristics of autistic disorder.

Results from psychometric intelligence tests are evaluated first from a standard quantitative analysis from which calculations of scores are generated to determine both performance on subtests and an overall indication of performance, or IQ (Wechsler, 2003). Such analysis does not capture the test administrator's reflection on the process of a qualitative review of the experience, the observation of behavioral strengths and weaknesses, participant motivation for engaging fully, and administrator reflection on the appropriateness of the particular test to accurately measure the participant's level of intellectual capacity. This qualitative analysis is often incorporated into the narrative of a culminating psychological report to provide a balance to the quantitative data (Sattler & Hodge, 2006). The value found in the administrator's qualitative analysis is dependent on the reviewer's attention to the perspective taken in order for this analysis to have any bearing on the conclusions drawn about an individual's intellectual capacity. Simply considering the quantitative results would not provide a complete and accurate reflection of and individual’s ability. The current study focused primarily on the qualitative experiences of the test administrator to provide rich context from which tests of intellectual capacity are evaluated.

Research Design

Creswell (2007) indicated the use of qualitative research methods is most useful when a problem or issue requires further exploration toward inductive data analysis. The findings of a qualitative study can often provide the parameters from which variables can be discovered for later quantitative measure, once the issue is better understood. Qualitative methodology was selected for primary inquiry in order to better understand the expert experience with methods and tools employed for assessing intelligence in individuals with autistic disorder. Creswell (2009) described the use of mixed methods in research when elements of both qualitative and quantitative approaches complement one another toward answering a research question. Quantitative methods were used to further establish the findings of the qualitative analysis. The narrative data discovered through the qualitative data collection process has been further analyzed through quantitative statistical analysis to ascribe a quantified representation of findings.

Qualitative data collection facilitated exploratory research with use of the Delphi method for gaining insights from experts in the field of autistic disorder and assessment. Such insights would not have been thoroughly captured through quantitative means alone. Following the qualitative data collection, including narrative accounts from expert participants, brief quantitative methods were mixed with the primarily qualitative approach in order to provide support to the qualitative findings. A Likert scale survey allowed for the qualitative results to be quantified for further analysis of the degree of consensus among expert participants.

The Delphi method as a qualitative research technique has been successful with informing the research questions through a process of gathering expert perspective on an area of research interest as a means for establishing a foundation from which theory can be developed (Brown, 1968; Cornish, 1977; Linstone & Turoff, 1975). The Delphi method is a structured research technique consolidating multiple rounds of narrative feedback with the goal for establishing consensus of group experience, knowledge, and judgment to better understand the nature of a problem or issue (Pulford, Adams, & Sheridan, 2009). This method has been used in research studies to identify the most relevant topics to include in professional training (Sulzer-Azaroff et al., 2008), recognize the criteria for necessary hospitalization for critical patients (O'Malley, Marcantonio, Murkofsky, Caudry, & Buchanan, 2007), and address the expert opinion about indicators for the assessment of various diagnoses (Maarsingh et al., 2009; Mease et al., 2008; Tinkelman et al., 2006).

This study generated collaboration among experts in autistic disorder who regularly navigate the challenges of obtaining an accurate measure of intelligence in the autistic population through the social constructivist lens of interpretive research (Guba & Lincoln, 1994; Orlikowski & Baroudi, 1991). Multiple rounds of information gathering from participants with extensive experience in the practice of diagnosing intelligence in children with autistic disorder have contributed to a more fully developed understanding of individual perspectives through the consensus among the expert participants.

Alternative qualitative and quantitative methods of inquiry were not considered for the present study following the determination that the Delphi methodology would ultimately better capture the essence of what constitutes best practice in assessing intelligence in autistic disorder. Quantitative comparisons of different measures of intelligence with the autistic population have been completed from a quantitative perspective revealing mean differences in intelligence determination across populations (Kuschner et al., 2007; Mayes & Calhoun, 2008). A quantitative survey alone would not provide an opportunity for the expression of experiences held by autistic disorder experts and would instead be limited by assumptions of the author of a survey as to the most critical considerations.

Even the most in depth case study could also fail to provide the level of insight sought for better understanding the collective experiences of experts in the field of autistic disorder. Although a longitudinal study comparing the results of tests of intelligence for a group of children with autistic disorder to adolescent and adult achievement for the same group would provide valuable research data, the time to complete such a process was not practical for the purposes of the current study.

Ethnographic research was also not an appropriate approach to data collection as it is not the behavior of the autistic disorder experts, or the children with autistic disorder themselves, that the current study aimed to learn more about. Ethnographic research is intended to learn how human behavior demonstrates how people construct and make meaning in life (Le Compte & Schensul, 1999). While the current study aimed to discover the experiences of the expert participants, the intent was not to discover how opinions were developed but to understand the opinions born from experience that do exist.

Although data in narrative format have been collected within the scope of this Delphi study, a classic narrative research study was not pursued. Narrative research typically includes one or few participants engaged in a prolonged interaction with the researcher in order to learn about an individual's life with the intent of reorganizing, or *restorying,* what each participant has shared in order to make linkages through the sequence of events in an individual's life (Creswell, 2007). An in depth analysis of any one autistic disorder expert's experience with assessing intelligence of children with autistic disorder would not have allowed for generalization among a larger group, and so the narrative method would not have contribute to the research objectives of this study.

Phenomenological research is aimed at describing the meaning of lived experiences for several individuals about a phenomenon of a personal nature, such as coping with grief, managing a disease or disorder, or navigating emotionally sensitive experiences (Creswell, 2007). The intent of the current study was not to explore the personal feelings of the participants, rather to gain a better understanding of their professional experiences as a means for identifying themes of perceived successes and failures of the process of assessment of intellectual capacity, which is not of a personal nature for the expert participants.

Finally, although grounded theory was not selected as the methodological approach to this study as a means for developing a new theory, a method of data analysis derived from grounded theory was useful for the purposes of this study (Creswell, 2007). The constant comparative method for data analysis is discussed in greater detail later in this chapter.

Role of the Researcher

In the role as the researcher, I actively recruited participants through phone and electronic communication, followed by repeated interaction with participants as the moderator of information gathering and dissemination according to the Delphi procedures. This involvement included the responsibility for careful analysis of the data collected from each participant and the development of a synthesis of data into a cohesive presentation of findings. The transcription of initial data was completed by each participant via computer based narrative response, or transcribed verbatim during a phone interview I completed with the participant. I then arranged the narrative data into categories as a process for identifying emerging themes according to Delphi procedures. Such categorization of the data was guided by my own interpretation, while taking on the perspective of each participant in order to evaluate the intent of communication. Finally, I facilitated the presentation of research findings described in greater detail later in this chapter.

A degree of subjectivity in analyzing and interpreting the data was influenced by personal and professional experiences, including a scholarly understanding of the characteristics of autistic disorder, as well as prior training in the administration and interpretation procedures of standardized intelligence tests. Skepticism of the accuracy and validity of intelligence tests for individuals with autistic disorder has guided the development of the research questions underlying this study. As such, it was essential to the validity of this research that objectivity was maintained and bias restricted by equitable analysis of the data.

I have been a professional in the field of human services for over 10 years, specifically serving individuals with intellectual and developmental disabilities, and have a passion for ensuring appropriate understanding of individual needs for support. This commitment also contributed to the development of the current research in ensuring consistent, accurate measures of ability as an influence in determining the circle of support made available to each individual. The member-checking nature inherent in the Delphi method helped to mitigate the influence of subjectivity with a balance from further review and refinement of documented data per the participants of the study.

Research Questions

The research questions that guided the current study included the following:

1. What tools are used to assess intelligence as an accurate reflection of intellectual capacity of children with autistic disorder?
2. How do autistic disorder experts go about selecting assessment tools that are thought to accurately measure intellectual capacity of children with autistic disorder?
3. What level of certainty do autistic disorder experts hold regarding the accuracy of assessments of intellectual capacity of children with autistic disorder?

4. What degree of consensus will there be among expert participants with regard to lived experiences and professional opinions of the assessment of intelligence in children with autistic disorder?

Context

Participants included experts of autistic disorder who, at the time of the study, were presently working with individuals with autistic disorder in the human services field throughout the United States and Canada. Internet searches to identify professionals specializing in autistic disorder were followed up by phone call or email inquiry to invite experts to participate in the study. Potential participants were introduced to the study via electronic mail or telephone with an initial description of the study (see Appendix A) and dissemination of the consent form (see Appendix B) as an invitation to initiate participation. Acceptance to participate was paired with the return of the signed consent form.

The development of a positive working relationship began with the tone of the introductory description of the study in which a primary aim was to incite a sense of duty or responsibility to bring greater clarity to the issues suspected in the accurate assessment of intellectual capacity of children with autistic disorder. This strategy for eliciting participation was further emphasized through explanation of how their contribution would benefit individuals with autistic disorder and that this could only be accomplished through participation of experts in the field, like themselves. The result of respectful imploring was the recognition of the importance of this new direction in research with a sense of belonging to a specialized group of professionals, and a responsibility to share expert experiences.

Three rounds of Delphi data collection took place via electronic communication or telephone contact with participants who identified themselves within the criteria set forth by this study of an expert in autistic disorder. Data collection took place primarily through the transfer of data over the internet, while some participants preferred direct telephone contact. No face-to-face interaction was required. Participants were unaware of the identity of other participants and reviewed the collective data anonymously from one another.

Research Participants

Sample size practices for Delphi research have not been based on strict parameters, rather have been developed based on the scope of the individual research goals, the type of inquiry, the time and resources of the researcher, and the availability of participants (du Plessis & Human, 2009; Skulmoski, Hartman, & Krahn, 2007). The qualifications of the participants hold far greater importance and the strength of the expert perspective available is a more significant contributing factor than an extensive sample size. In general a participant pool should not less than 10 and may range in size from 20-100 participants, although the sample size may vary according to the scope of the problem and the resources of the researcher (du Plessis & Human, 2009).

This study included 20 participants who were experts in the field of assessment and treatment planning for individuals with autistic disorder. Inclusion criteria for establishing expertise in the field for purposes of this study required (a) at least 5 years experience working with individuals with autistic disorder from the perspective of clinical assessment, (b) credentials demonstrating professional training in the area of clinical assessment such as masters degree or doctoral degree, and (c) current or recent practice within 5 years of clinical assessment of children with autistic disorder. Interested participants confirmed criteria for participation by selecting affirming fields on the consent form.

Creswell (2007) suggested the use of purposeful sampling in qualitative research when a target audience is sought in order to ensure the most effective and efficient data collection. Participant recruitment was targeted toward specialists serving individuals with autistic disorder. One suggested method for increasing the size of the participant pool for a Delphi method included requesting recommendations from active participants for other likely participants with whom they also hold in high regard as experts in the field of study (Brown, 1968; du Plessis & Human, 2007). This strategy of recruitment proved to be effective in the current study, as multiple participants joined the study upon the recommendation of a colleague. All participants were required to meet the same level of criteria for participation.

Ethical Protection

Participation in this study was voluntary with the option for ending participation at any time for any or no reason. Participants were provided with an informative consent which identified the researcher as a student completing research toward partial fulfillment of the requirements for a doctoral degree in psychology from Walden University. Confidentiality was protected through anonymization of the feedback among participants throughout the Delphi process. All data collected have been maintained on a password protected computer, which only I have access to. The IRB approval number for this research was 13:37:55-05’00’.

Measures

The purpose of this study was to establish group consensus regarding best practices for gaining an accurate measure of intelligence of individuals with autistic disorder and determine to what extent appropriate tools are available to professionals who administer intelligence assessments. The assessment practices were reviewed in consideration of administration procedures, continuity between collected data, and accuracy of results as compared to observed ability aside from the testing environment. The survey questions were open-ended questions included in an initial questionnaire to the key informants with subsequent rounds of consolidation and clarification of anonymized findings from the group.

Procedures

The following procedures were used for participant recruitment, data collection, data analysis, and verification of findings:

1. Identified a potential pool of participants through research of autistic disorder experts through an internet search.
2. Contacted potential participants via electronic mail or telephone with a description of the study and the consent form.
3. Interested participants returned the electronically signed consent form electronically or by facsimile transmission, affirming their interest to participate,

confirming criteria for inclusion was met, and provided basic demographic data (age, gender, location, highest educational degree held, and length of time in profession).

4. Round 1 of data collection proceeded with response to three survey prompts through an online survey tool provided by Survey Monkey (see Appendix C) or through direct telephone communication, upon request of the participant.
5. The data were reviewed and analyzed to identify common themes found throughout all respondents' input and the data were consolidated as a summary of responses.
6. The Round 2 data collection tool was developed and submitted to the Institutional Review Board for approval prior to continuing with data collection.
7. Round 2 of data collection included the electronic dissemination of summarized findings including the consolidation of input from all participants (see Appendix D).
8. In Round 2, participants responded to the consolidated findings of Round 1 and had the opportunity to either add additional information or confirm that no additional information was necessary to include. This provided the opportunity for participants to further clarify and refine the data.
9. Round 2 data were reviewed and analyzed to identify areas of additional input and clarification from the participants toward the development of the Likert scale survey that was distributed in Round 3 (see Appendix E).

10. The Round 3 data collection tool was developed as Likert scale survey which elicited the degree of agreement or disagreement with affirmative statements generated from the data collected in previous rounds. This final data collection tool was submitted to the Institutional Review Board for approval prior to continuing with data collection.
11. Round 3 of data collection included participant response to a final Likert scale survey via Survey Monkey or U.S. mail, upon request of the participant. Response options included a range from *strongly agree, agree, disagree,* and *strongly disagree.*
12. Data from Round 3 were analyzed for degree of consensus with the survey statements among expert participants and is discussed in detail in chapter 4.

Data Collection

Participation was tracked with the use of custom values placed on the unique link to the electronic survey for individual responses. A separate link to the survey was established with a simple numerical code at the end of the URL string, such as 001, 002, 003, and so forth. This enabled a system for tracking participation or attrition rates through the multiple rounds of data collection. The assignment of unique identifier numbers was made in sequence of participation in Round 1. Participants who chose to participate via telephone communication were also assigned a unique identifier number based on the sequence of their participation along with all other participants. In addition to tracking participation and attrition rates, such tracking was also useful in identifying modification of responses based on new information presented in the review of consolidated responses from all participants in subsequent rounds.

Qualitative Data Collection

Qualitative data were collected through a series of Delphi rounds in an effort to establish increasing levels of clarification and consensus among the responses of the expert participants. Once the informed consent was received, each participant was sent the link to access the online survey tool provided by Survey Monkey. Instructions were provided that guided the respondent through proper completion and submission of the responses to the survey questions. Those participants who preferred direct contact with the researcher provided answers to the survey questions through a telephone interview and responses were transcribed verbatim for later analysis.

Round 1 posed the following three survey questions to the participants for a narrative response based on their own experiences and professional perspective:

1. What ways and means have you used to describe intellectual capacity in children (0-12 years) with autistic disorder?
2. When you have used standardized tests to measure the intelligence of children (0-12 years) with autistic disorder, what has been your experience with the following three aspects of assessment: (a) selecting assessment tools, (b) administering assessments, (c) interpreting assessment results?
3. How would you describe the demonstration of intellectual capacity of children (0-12 years) with autistic disorder to be qualitatively different from other populations?

Responses to the posed questions were then consolidated into themes and categories representing the various contributions from the expert group.

Round 2 included participant review of the consolidated findings of themes that emerged from Round 1 responses. The consolidated findings were presented as a summarized list of the most salient data provided in Round 1. Participants provided further feedback as necessary if the participant did not find agreement with the findings, or if the participant desired to contribute additional input for inclusion in the consolidated findings. Participants reviewed the material and again accessed the link embedded in the electronic mail communication to provide further narrative to further clarify any areas that have not clearly demonstrated their own professional perspective in any of the areas. This round provided the opportunity for the researcher to ensure that participant responses were not misinterpreted and key points were not left out. Through the progression of data analysis, evaluation of sufficient rounds of data collection was determined based on the level of group consensus appropriate for moving forward to the final round of data collection with the Likert scale survey.

Quantitative Data Collection

Demographic data were collected for each participant at the point of confirming consent to participate in the study. Participants completed a simple demographic section incorporated into the consent form. The independent demographic variables of interest included participant gender, age, number of years in their profession, location of practice, and highest educational degree obtained. Round 3 of the Delphi process included quantitative data collection from participant response to a series of statements gleaned from the previous rounds of narrative input. Responses were collected according to a Likert scale which indicated the strength of agreement with each statement ranging from *strongly agree*, *agree*, *disagree*, and *strongly disagree*. This final review provided an opportunity to ensure group consensus among the consolidated and summarized data. Data analysis commenced with the calculation of means, frequencies, and percentages of similar and dissimilar responses to Likert responses and demographic data across participants.

Data Analysis

Data analysis has been presented first from the perspective of the primary qualitative data. A presentation of the analysis of quantitative data follows as a complement to the qualitative analysis. Confounding or deviant data were reviewed and analyzed. An integration of the qualitative and quantitative data analysis is discussed.

Analysis of Qualitative Data

Some degree of data analysis exists within each Delphi round of data collection, with thorough review of individual participant response as compared to the responses from the participant group in its entirety. Contributions from all participants were consolidated to inform the direction of subsequent rounds. More consistent data reflecting consensus resulted in progression to the next round of inquiry, while inconsistencies or stark contrasts in participant responses could have indicated lack of clarity of the questions, or the need to implement additional questioning strategies in order to reach group consensus.

Identification of initial themes throughout the group responses informed the follow up consolidation of findings for confirmation of accuracy. Such themes were identified within narrative contributions of participants through a system of manually coding similar responses, identifying conflicting statements within each participant's response, and conflicting responses among the entire participant group. The method of data analysis employed was a reflection of the constant comparative technique in which collected data were compared against emerging categories until redundancy of new information indicated a level of saturation, at which point data collection stopped, and further analysis distinguished subcategories representing multiple perspectives within each category (Creswell, 2007; Glaser & Strauss, 1967; Maykut & Morehouse, 1994). Conrad (1978) explained the process of the constant comparative method to include two additional phases including delimiting theory and developing new theory. Although theory development was not an aim of the current study, the first two phases of the process were reflected within the scope of the Delphi data collection rounds until the level of saturation of new data was reached.

A qualitative data analysis program was not used in the analysis of data. Qualitative data were organized within an excel spreadsheet with responses to each research question maintained in a separate sheet according to the unique identifier numbers assigned to each participant. All narrative data segments maintained the unique participant number assigned at the beginning of the study in order to track continued participation as well as continuity of responses across individual responses. Once data were organized according to similar and dissimilar information, more broad categories were developed as themes within the data emerged. These more broad categories began to establish the themes toward group consensus about similarities among participant experiences in the assessment of intellectual capacity of children with autistic disorder.

Analysis of Quantitative Data

Once all qualitative data were collected and clear themes emerged from the narrative responses, a forced choice survey was developed in a Likert scale format for participant selection of degree of agreement with affirmative statements gleaned from the qualitative data. SPSS statistical software was utilized to input quantitative data collected from the Likert scale survey in order to calculate the mean and standard deviation of individual survey items. This quantitative analysis further demonstrated the degree of consensus reached through the qualitative data collection strategies.

Evaluation of the degree of agreement for each item according to the Likert scale has contributed to the overall understanding of the expert perspective of (a) strategies for describing intelligence in autistic disorder; (b) process for selecting, administering, and interpreting results of intelligence tests; and (c) how the demonstration of intelligence differs in children with autistic disorder as compared to other test groups.

Further descriptive statistics were calculated to reflect demographic variables including participant gender, age, number of years in their profession, and highest educational degree obtained.

Confounding or Incomplete Data

Confounds in qualitative and quantitative data were still presented to the group in the following rounds as an opportunity for participants to clarify individual opinions of the discrepancy. A key strength of the Delphi methodology is the flexibility of the format to adapt to the direction provided by the free response of participants. The instances of discrepancy were explored and are discussed in greater detail in chapters 4 and 5.

The attrition of three participants at various stages of the study did not negatively impact the progression of the study. The process continued to build upon all subsequent responses and allowed for continued clarification and modification from remaining participants. Due to the nature of the Delphi process, early contributions remained embedded in the data and continued to contribute to the richness of the overall data. Greater detail about attrition is discussed in chapter 4.

Integration of Data

The relationship discovered between the qualitative and quantitative findings provided a final analysis of level of congruence between methods. The agreement between the two methods contributed to the validity of the findings. Disagreement in findings between the two methods resulted in further analysis of the data to explore the nuances of alternative experiences among the expert participants.

Validation of Findings

Creswell (2007) encouraged qualitative researchers to engage in at least two of eight strategies for validation of findings as a means for documenting the accuracy of a study. For the purpose of ensuring validity of findings of the current study, validation strategies included member checking and clarifying researcher bias.

In member checking, one can confirm the credibility of findings and interpretations among the focus group of key informants (Lincoln & Guba, 1985).

Member checking is a strategy inherent in the Delphi methodology, with consistent assessment of consensus throughout all rounds of the study (Cornish, 1977). Each round of the study provided an opportunity for each participant to contribute to the verification of accuracy and consistency of the proposed consensus. Suggested corrections or changes were redistributed as additional findings for further review toward final consensus.

Clarification of researcher bias also represented a significant consideration for the present study. A personal passion for serving children with a diagnosis of autistic disorder, many years of direct professional interaction with and intervention for this population, scholarly interest in better understanding the characteristics and diagnostic features of this group, and a developed sense of concern that the current measures of intelligence are not best suited for individuals with the interfering characteristics most often encountered in this population has prompted the direction of this study. With this bias in mind, the present research design pursued the input of external resources including experienced expert participants for providing an unbiased, practical perspective. Data collection and analysis were carefully performed to ensure negligible influence of researcher bias toward an anticipated end. The previously stated strategies for validation also helped to mitigate the potential influence of such bias.

Dissemination of Findings

Presentation of findings following the completion of the proposed research will be shared as a poster at an APA convention. An opportunity such as this will provide an avenue for which the discoveries made from the approach of the Delphi method can make an immediate contribution to the realm of practical, professional consideration and use. In addition, the findings and implications for professional practice will be submitted for publication in a professional journal as a contribution to the growing research in the area of study of intellectual capacity of individuals with autistic disorder. Participants of the study will be directly provided with a copy of the published journal article.

Summary

In chapter 3, I provided an in depth review of the methodology of the study, role of the researcher, research questions underlying the research inquiry, criteria for inclusion of expert participants, ethical protection considerations for anonymity, Delphi and Likert scale measures, procedures of each round of data collection, Delphi data collection from both the qualitative and quantitative perspectives, Delphi data analysis from both the qualitative and quantitative perspectives, strategies for addressing confounding data, integration of qualitative and quantitative data, validation of findings, and plans for dissemination of findings. In chapter 4, I have reported the results of the study.

Chapter 4: Results

Introduction

The problem under review through this research is the lack of availability of assessment tools which accurately determine the level of intelligence of an individual with autistic disorder. The purpose of this study was to establish group consensus regarding best practices for gaining an accurate measure of intelligence of individuals with autistic disorder and determine to what extent appropriate tools are available to professionals who administer intelligence assessments. Through a mixed methods design, this research employed the Delphi methodology including two rounds of qualitative data collection and one round with a combination of quantitative and qualitative data collection. A constant comparative process was used to continuously refine the data and draw conclusions about the factors influencing the accurate assessment of intelligence of children with autistic disorder.

The research questions prompting this study included:

1. What tools are used to assess intelligence as an accurate reflection of intellectual capacity of children with autistic disorder?
2. How do autistic disorder experts go about selecting assessment tools that are thought to accurately measure intellectual capacity of children with autistic disorder?
3. What level of certainty do autistic disorder experts hold regarding the accuracy of assessments of intellectual capacity of children with autistic disorder?

4. What degree of consensus will there be among expert participants with regard to lived experiences and professional opinions of the assessment of intelligence in children with autistic disorder?

In this chapter, I have presented a detailed account of the process data were generated, gathered, and recorded from both the qualitative and quantitative perspectives. A brief discussion of the logical integration of the qualitative and quantitative research methods leads to a review of the research results. The nuances of the data, including review of deviant cases, noteworthy consistencies, inconsistencies, themes, and relationships which emerged from the analysis are explored. A discussion of evidence of quality has demonstrated accuracy of data through proper procedures according to the methodology used.

Data Collection

The data collection process was represented by both qualitative and quantitative strategies in accordance with the Delphi methodology. Qualitative methods represent the primary strategy for exploring the research questions in a manner which provided the opportunity for participant reflection on experience and free response to several discussion prompts. The further opportunity to review the anonymous responses from peers, and the invitation to clarify or add to the data, offered an open forum to elicit the rich experiences of experts that would not be possible from quantitative strategies alone. The initial qualitative data were used to develop the quantitative data collection tool, and the quantitative data provided a lens from which the qualitative data were evaluated, confirmed, and provided additional questions for further research.

Participant Recruitment and Participation

Participant recruitment efforts spanned 5 months beginning with 29 invitations to individuals employed by the Association of Regional Center Agencies in California who were designated as autism specialists and individuals employed by the Medical Investigation of Neurodevelopmental Disorders Institute in California who were actively involved in assessment, treatment, and research of autism spectrum disorders. Invitations were sent via email to autism experts affiliated with these two groups, resulting in zero returned consent forms. A revision to participant recruitment was approved by the Institutional Review Board (IRB) which included the addition of telephone outreach as a method for initiating contact with potential participants, extended the search beyond the state of California, and offered participants the option to participate electronically or via telephone. The IRB did not approve repeated attempts to recruit individuals previously contacted in order to offer the flexibility of method for participation.

The second round of participant recruitment also included the addition of the Walden University Participant Pool as a resource for eliciting interest for participation, resulting in successful recruitment of three participants. A strategic internet search for qualified participants included keywords such as *assessment and autism, assessment and autistic disorder, intelligence assessment and autism, autism expert, autism specialist, autism professional,* and *autism assessment resources*. This search method resulted in 22 email or telephone invitations to professionals in private practice as well as those practicing within a role in an organization providing assessment of children with autistic disorder, resulting in the successful addition of three participants to the growing pool. An online provider directory called AutismLink was discovered and provided contact information for individuals in private practice as well as those practicing within an organization (AutismLink, 2010). Of the 38 individuals from this directory contacted by phone or email, five participants were confirmed for participation. The remaining nine participants were recruited by way of 12 known referrals from other participants and professional colleagues who knew of the study and shared within their professional networks.

Although it is not known what percentage of time each participant devoted to assessment of children with autism, they each indicated on the consent form that they were presently performing assessments of intelligence with children with autism at the time of this study and for at least 5 years. The pool of participants equally represented current professional practice in private practice settings (n = 10) as well as within organizations (n = 10) serving the autistic population. Additional demographic data included years of related professional experience, highest credential earned, gender, age, and geographic location of current related professional practice were collected in conjunction with the return of the completed consent form.

Upon return of the consent form, participants confirmed whether their preference for participation was for electronic response or telephone response. Data collection was primarily electronically-based through the use of email with unique electronic links to each Delphi round through the Survey Monkey online data collection website. Three participants from Round 1 and one participant from Round 2 preferred a telephone interview rather than the electronic format. One participant in Round 3 preferred for the final Likert scale survey to be delivered and returned via the postal service.

When responses from participants were not received within 2 weeks from the beginning of the current round of data collection, reminders were sent via email with a request to complete the current round of participation. One participant (005) discontinued participation during Round 2, and two participants (015 and 025) discontinued participation in Round 3. The final participant pool included 17 participants with full participation in all rounds of data collection. Due to the nature of the Delphi design, participation at the beginning of the study influenced the remaining rounds of data collection as contributions and the constant comparative method were progressive in nature. For this reason, it would not be advisable to attempt to extract contributions of participants who did not complete all rounds, as the relevance of their input to the subsequent rounds remained.

Qualitative Data Collection

Qualitative data were collected in all three rounds of data collection. The process for collection of qualitative data in each round shared similarities in process and slight differences in requirements. At some points in the study a narrative response was required in order to constitute thorough participation in a particular round, and in others a narrative response was an optional aspect of the data collection for a particular round. Data analysis was required following the first and second rounds of data collection in order to contribute to the development of subsequent rounds. The data analysis process described below was embedded in the data collection process. A sample of participant narrative responses from each round of data collection has been provided in Appendix F.

Round 1. The initiation of the first round of data collection was prompted on an individual basis as respondents returned the signed consent form. Instructions for completing the first round of participation were sent via email to 17 of the 20 participants who preferred electronic participation, and phone interviews with the three participants preferring direct, verbal response were scheduled and conducted. All aspects of the first round of data collection, including returned responses occurred within a 3 month time period.

In Round 1 participants were asked to freely respond to three open ended questions. In electronic format, participants progressed through a series of electronic pages on the Survey Monkey website to review and respond to the three open-ended survey questions (see Appendix C). Alternatively, the questions were first provided to telephone respondents via email for preliminary review, followed by a phone interview in which the questions were read verbatim to each participant to ensure consistency with the experience of the electronic responders. The three open-ended questions were:

1. What ways and means have you used to describe intellectual capacity in children (0-12 years) with autistic disorder?
2. When you have used standardized tests to measure the intelligence of children (0-12 years) with autistic disorder, what has been your experience with the follow three aspects of assessment: (a) selecting

assessment tools, (b) administering assessments, and (c) interpreting assessment results?

3. How would you describe the demonstration of intellectual capacity of children (0-12 years) with autistic disorder to be qualitatively different from other populations?

Participants were requested to provide two to four sentences of explanation for each of the three narrative prompts. An Excel spreadsheet was prepared including a separate tab for each research question in Round 1. Each tab of the spreadsheet had three columns each. The first column indicated the participant count identified with Numbers 1-20. Participant 1 was the first person to provide a response in Round 1, and so on. Participants retained the position taken in Round 1 for the duration of the study, regardless of sequence of subsequent response, in order to simplify reference to participant data throughout all rounds of data collection and analysis. The second column included the Unique Identifier number assigned to each participant at the point consent for participation was received and linked to each electronic response in a way that maintained anonymity from all other participants, and provided a system for recognizing task completion and participant dropout. The narrative responses were copied from the Survey Monkey website or transcribed verbatim from telephone interviews into the third and final column of the excel spreadsheet.

Responses to each survey question were reviewed and analyzed independently before considering the overall data collected across all three questions. Each response to the first question was reviewed thoroughly one time through without taking any notes.

During the subsequent reviews of the responses key words and repeated themes were highlighted in order to begin to establish emerging trends in responses across all participants. Repeated review of the data continued until all major patterns of responses were captured with red highlights throughout and researcher notes indicating relationships between participant responses.

Next, with reference to the highlighted responses and researcher notes outlining emerging themes, a consolidated summary of responses for the first question was developed including the most relevant and rich data, and ferreting out irrelevant or off topic commentary, such as reference to diagnostic assessment of autistic disorder as a disorder, which was not a focus of this study. Finally, a more concise summary of findings was developed to serve as the data collection tool to be used in the next round of data collection. This process was repeated for the second and third open ended questions in Round 1 of the study.

Round 2. Once all responses from Round 1 were submitted, reviewed, and organized into a summary of findings, the summaries were provided to participants both as a file attached to an email, for those who preferred to review the data and follow up with Round 2 response by telephone, and as a link to another electronic response opportunity through the Survey Monkey website (see Appendix D). Participants were asked to review the summary of responses from the entire pool of participants and add any additional information or further clarify points made as needed. If upon review of the summaries participants did not have additional information to provide, they were to simply type in *ok* to the response field provided following each summary. As such, additional narrative response was not required, however it was important to confirm that each participant had the opportunity to review the consolidated findings and confirm that additional clarification was not needed. Response to Round 2 was elicited and received within a 1 month time frame. One participant dropped out of the study in Round 2, with a total sample size of 19 for Round 2 of data collection.

The additional narrative responses provided during this round were transferred to an excel spreadsheet for further review and analysis, just as was done with data from Round 1. Novel information was incorporated into the overall findings from Round 2 and all data were evaluated to identify themes and relationships among the responses to all three research questions. The final Likert scale survey presented in the third and final round of data collection was developed directly from the data collected in the first and second rounds of the study.

Round 3. The nature of the data collection in Round 3 was primarily quantitative. The qualitative data collection in Round 3 included a final, optional opportunity for participants to provide any additional information, comments, or perspectives relevant to the study. The narrative feedback was transferred to an excel spreadsheet as indicated in Rounds 1 and 2 with relevant remarks highlighted and marked for discussion in chapter 5, however not requiring an additional round of data collection as a result of the nature of the statements made in this optional space.

Quantitative Data Collection

Although the majority of the data collected for this study were qualitative in nature, the final round of data collection included a 4-point, forced-choice, Likert scale survey that was representative of the data collected in the earlier rounds of the study. The Likert scale survey was developed according to the original areas of inquiry from Round 1 including strategies for describing intelligence of children with autism, selecting assessment tools, administering assessments, interpreting assessment results, and distinguishing the difference of intelligence in children with autism and other populations. The Likert scale survey was developed with four items per area of interest with items presented as affirmative statements to which respondents rated their level agreement as *strongly agree*, *agree*, *disagree*, and *strongly disagree*. Each rating was given a value of 1, 2, 3, or 4, respectively. A matrix of responses and related analyses has been provided in Appendix G.

Participants received the survey as a link included in an email that directed them once again to the Survey Monkey website. One participant preferred a paper copy of the survey, which was mailed directly to the participant along with a postage paid envelope in order to return the survey upon completion. The survey was organized into five categories of four questions each. The categories were derived directly from the consistent categories explored during the first two rounds of data collection and included (a) strategies for describing intelligence of children with autism, (b) selecting assessment tools, (c) administering assessments, (d) interpreting assessment results, and (e) difference between children with autism and other populations. Each item was phrased specific to the population of autism and were formatted as affirmative statements for participants to select their level of agreement or disagreement. Participants were required to complete every item of the survey and were not able to progress to subsequent pages of the online format until all items on the current page were assigned a value. All final data were elicited and received within one month. Seventeen participants responded to this final round of data collection.

The quantitative data of Round 3 were exported to an excel spreadsheet from the Survey Monkey website for greater efficiency with organization of data and the ability to code scores in order to once again identify themes and relationships among individual and group responses. From this format, data were also more efficiently entered into the Statistical Package for Social Sciences (SPSS) software.

Data Analysis

The qualitative, demographic, and quantitative data were analyzed with a process appropriate to each and has been described in detail below. The intent of the analysis procedures employed was to connect the data to the problem under study, the underlying research questions, and to provide a clear demonstration of how the research design has effectively addressed each area of interest. A description of the data analysis for each set of data has been presented below, with more detailed evaluation of the results of such analysis to follow.

Qualitative Data Analysis

The multiple rounds of data collection prescribed by the Delphi method of research incorporates the basic tenets of the constant comparative method of data analysis through the member-checking qualities inherent in the participant review of the overall data throughout the study. The use of the constant comparative method for data analysis subjects the data to repeated review and comparison within all data until a sufficient number of themes or categories emerge from the data. Sufficiency is determined when the data become redundant and no new themes are evident. From this process, seven primary themes were discovered within the first, second, and third rounds of data collection. In accordance with the constant comparative method, data were further analyzed to define subthemes as a process for distinguishing the multiple perspectives represented by the diverse experiences of the expert participants of this study.

In addition to the data analysis previously discussed as an aspect of the data collection process, further evaluation of the narrative data not contingent upon the progression of data collection was also performed post data collection. The qualitative data from Round 1 were entered into the SPSS software in terms of length in words of narrative response in order to provide some quantifiable metrics from which analysis can be gleaned in a systematic way in addition to the qualitative evaluation of the data. The optional narrative responses in Rounds 2 and 3 were also coded in this manner. A review of the number and types of assessment tools reported as used by the experts in determining the intellectual capacity of children with autism were further evaluated to discover the most widely used tools, and those used less often, but still reported by this group. An analysis of the design for each of the tools was also evaluated, with some developed for the very purpose of assessing intelligence, with others assessing adaptive, social, and developmental skills yet also used by expert responders in the overall evaluation of intelligence in the autistic population.

SPSS Software

In preparation for data analysis, all quantitative data, and numerically coded qualitative data were entered into an SPSS version 19.0 data file. In order to retain the consistency of review, participants were identified by their Unique Identifier number. Demographic data, including years of relevant professional experience, highest credential held, gender, age range, and geographic location of current professional practice, were appropriately coded and entered into the data file for all participants who began participation in Round 1. An additional field was included to distinguish the duration of participation in terms of number of rounds completed. Due to the nature of the study and the consolidation of early responses for distribution to the entire group, it was not advisable to remove the data collected from participants who did not continue through the entire study. Such data influenced the following data and so have remained an embedded part of the study, regardless of follow through.

Demographic Data Analysis

Demographic data were analyzed to provide descriptive statistics about the participants of this study. Variables included years of relevant professional experience, highest credential earned, gender, age range, and geographic location of current professional practice. Additionally, participant completion rates were calculated to reflect the continuity of participation throughout the study.

Quantitative Data Analysis

The third and final round of data collection employed a Likert scale survey to provide quantifiable metrics associated with the degree of consensus emerging from the initial qualitative rounds. The Likert scale responses from each participant were entered into the SPSS data file according to the assigned numeric value of 1, 2, 3, or 4 for each of the four rating options; *strongly agree*, *agree*, *disagree*, and *strongly disagree,* respectively. Descriptive statistics including mean, standard deviation, and frequency were calculated for each individual item.

The responses for all Likert scale items were transferred to an Excel spreadsheet with the Unique Identification number for each participant in the first column, with the next 20 columns numbered 1-20 to reflect the 20 Likert items. This created a horizontal row for entry of the numeric code associated with each participant's individual responses to the survey. The organization of the data in this way allowed for review of the frequency of response type across each individual participant, across all participants for each individual Likert item, across all responses within each of the five categories of Likert statements, and a broad view of the tendency toward response type for the overall survey.

The data were analyzed and color coded to distinguish which Likert items achieved full consensus (green), which items reflected consensus apart from one discrepancy (blue), and items reflecting consensus aside from two or three discrepancies (purple). In addition, the data cell of the discrepancies noted in each of the response items were highlighted in yellow to clearly discern the category, item, and participants reflecting the greatest degree of discrepancy in consideration of the whole.

Additional columns were also included on the Excel spreadsheet for further analysis and as a means for discovering any further emerging themes and nuances within the data. Four columns were entered next to the final Likert item column to tally individual totals of response type, labeled SA, A, D, and SD. This was included to portray the frequency of each rating per participant. The final two columns reflected the highest credential held per participant and the range of years of relevant professional experience, both derived from the initial demographic data collected in conjunction with the return of the consent form.

Integration of Data

Each of the 20 Likert scale items were directly derived from the rich, narrative data provided in the first two rounds of the study. As such, a significant aspect of analysis of the quantitative data was also directly related and compared with the narrative responses and emergent themes from the first two rounds. Although the descriptive statistics provided an interesting perspective of the data, a system of cross-reference with the nuances found in the narrative responses contributed most to the overall understanding of the expert perspective gained through the process of this Delphi inquiry.

Results of the Study

Results of the study have been approached first from the qualitative perspective, with review of the relevant themes, patterns, and relationships discovered among participant narrative responses. As the qualitative data informed the development of the quantitative data collection process, this was also true for the progression toward the final evaluation of consensus reflected by the responses of the final Likert scale survey. Simple statistical analyses were employed to demonstrate relationships of responses within the data.

The results gleaned from the three rounds of this Delphi study reflected a logical connection to the original problem of the lack of availability of appropriate assessment tools for accurately determining the level of intellectual capacity of children with autistic disorder. Each research question has been specifically addressed below through the evaluation of the data provided by expert participants who have encountered numerous opportunities to attempt assessment of intelligence in this special population. In addition, noteworthy differences of professional opinion were explored.

Relationships between and among variables of interest have provided further explanations to address the primary research questions, and has provided a foundation from which further research should continue to investigate. Interpretations of findings and recommendations for future research have been explored in detail in chapter 5.

Qualitative Results

The qualitative data have been presented from a variety of perspectives. First, a brief description of the length of responses has been presented to offer a reflection of the variation in response detail per each of the Delphi research questions in each round of data collection. Next, each of the seven emergent themes has been presented with direct excerpts from the responses from the expert informants.

Response length. Rounds 1 and 2 of data collection represented the primary qualitative segments of the overall Delphi study. Round 1 was inclusive of narrative feedback from all 20 original participants. The mean length of response for Round 1 was 78.9 words for Question 1, 182.3 words for Question 2, and 89.45 words for Question 3. In Round 2, $n = 19$ participants engaged in a review of the data with an opportunity for providing additional information or clarifying statements about the data presented. Further clarification or the addition of new information to at least one of the Delphi questions was provided by *n* = 10 participants in Round 2. The mean length of response for Round 2 was 37.25 words for Question 1, 26.33 words for Question 2, and 17.43 words for Question 3. The final opportunity for narrative response was at the end of Round 3, in which participants had the opportunity to provide any additional input or comments relevant to the study. Of the 17 participants who responded to the final round of data collection, *n* = 4 participants provided additional comments with a mean length of response of 92.5 words (see Table 1).

Table 1

Descriptive Statistics for Narrative Response Length

Response Item	*n*	Minimum Length	Maximum Length	Mean	Sum
Round 1					
Question 1	20	10	355	78.9	1578
Question 2	20	61	410	182.3	3646
Question 3	20	19	184	89.45	1789
Round 2					
Question 1	8	13	98	37.25	298
Question 2	6	7	64	26.33	158
Question 3	7	7	31	17.43	122
Round 3	4	25	129	92.50	370

Emergent themes. Through the repeated review of qualitative data, seven principal themes emerged from the narrative data including (a) multiple strategies, (b) symptom interference, (c) protocol administration, (d) limitation of resources, (e) clinical judgment, (f) unique cognitive style, and (g) assessment accuracy. Each theme is explored in detail below, including a review of subthemes which emerged within many of the primary themes. Examples from the data have been presented below with reference to Round 1 (R1), Round 2 (R2), Round 3 (R3), Question 1 (Q1), Question 2 (Q2), Question 3 (Q3), and the participant's Unique Identifier number (001, 002, 003, etc.). As an example, a reference to the response to Question 2, in Round 1, by participant number 007 have been referred to as *R1Q1-007*. Quotes have been extracted according to themes to allow the reader to gain insight into the professional opinions themselves and glean a sense of the overall tone of responses. All responses and interviews took place between October 20, 2010, and May 2, 2011.

Multiple strategies. One of the most evident findings gleaned from the data is the overwhelming number of strategies professionals report utilizing with an aim for determining the intellectual capacity of children with autistic disorder. The first open ended survey question asked respondents to identify the strategies used for describing the intellectual capacity of this population and overall a total of 27 specific assessment instruments were reported, in addition to additional nonstandard assessment strategies, such as behavior observation, review of records, play based tasks, and parent report. Of the 27 standard measures reported, only eight were designed as a tool specifically for measuring intellectual capacity. Other tools reported included developmental screeners, disorder diagnostic tests, diagnostic reference manual, and autism severity scales. See Table 2 for a complete list of instruments reportedly used to assess intellectual capacity of children with autistic disorder.

Table 2

Instruments Used to Describe Intellectual Capacity of Children with Autistic Disorder

Instrument	Frequency Reported	Intelligence Assessment
Ages and States Questionnaire	1	
Asperger Syndrome Diagnostic Scale	1	
Assessment and Evaluating Programming System	1	
Autism Diagnostic Observation Schedule	2	
Bayley Scales of Infant Development	3	
Childhood Autism Rating Scale	2	
Children's Category Test	1	*
Comprehensive Test of Nonverbal Intelligence	2	*
Developmental Profile	1	
Diagnostic and Statistical Manual	1	
Differential Ability Scales	3	
Gilliam Autism Rating Scale	1	
Kaufman Assessment Battery for Children	4	*
Kaufman Survey of Early Academic and Language Skills	1	
Leiter International Performance Scale	5	*
Mullen Scales of Early Learning	3	*
Raven Progressive Matrices	2	*
Scales of Independent Behavior	2	
Social Communication Questionnaire	1	
Southern California Ordinal Scales of Cognition	1	
Stanford Binet Intelligence Test	5	*
Test of Nonverbal Intelligence	5	*
Vineland Adaptive Behavior Scales	3	
Wechsler Intelligence Scale for Children	15	*
Wechsler Preschool and Primary Scale of Intelligence	8	*
Woodcock Johnson Achievement Battery	1	
Merrill-Palmer Scales of Development	1	

In Round 2 several participants provided further response about the number of tools utilized by their peers that were not designed for use as a measure of intellectual capacity, as delineated in the following quotations and designated by Delphi round number, question number, and participant number.

> "Most of the measures listed above are helpful for the clinical diagnosis of autism spectrum disorders, but only a few are for assessing intelligence" (R2Q1-008).
>
> "Many of the scales above are not measures of intellect but measure autism spectrum traits" (R2Q1-011).
>
> "DSM (number 10) is NOT a measure of intelligence! It describes criteria for diagnosis, but it is not a "measure to assess intelligence". Same thing for other more specific diagnostic tools (#2, 4, 6, 19 at least). They are used in the context of diagnostic evaluation, but they cannot serve to 'assess intelligence'" (R2Q1-014).
>
> "I am concerned because many of the instruments noted have nothing to do with intellectual assessment" (R2Q1-019).
>
> "The wide range of tests used by participants may result in the varied outcomes also reported" (R2Q1-007).

Others maintained the importance of using a variety of measures in order to fully understand the nature of intellectual ability for this population. With a pool of resources with various purposes and varying degrees of direct relevance to the determination of intellectual capacity, many respondents demonstrated a preference for utilizing a wide variety of strategies in order to obtain a clear picture of the abilities of the child.

> "[I] do informal or atypical assessments of intelligence. I use adaptive functioning assessment and neurological assessments. Can't use standardized IQ tests along with autism because they often have poor performance on these tests" (R1Q1-005).
>
> "Demonstration of intellectual capacity needs to be assessed differently – accessed more creatively (but scientifically!)" (R1Q3-012).
>
> "I use standardized assessment, observation of strategies and spontaneous activities, as well as reports from the parents" (R1Q1-014).
>
> "We must ensure that multiple sources of data are gathered and taken into consideration when determining the functioning ability of individuals with autism spectrum disorders, while at the same time keeping in mind that even with multiple sources of data, we may not get a clear picture of the abilities they possess" (R3-023).

The use of multiple strategies for drawing conclusions about one's intellectual capacity was demonstrated by multiple participants as an aide to the standard assessment, rather than a diversion from the use of measures specifically developed for measuring intelligence, as expressed in the following responses.

> "[I] use other measures like parent-report, adaptive scales, or teach report to check scores and make sure they are in the same ballpark" (R1Q3-026).

> "Using a variety of assessment tools across many areas; IQ, adaptive functioning, behavior scales, behavior observations, parent and teach reports, etc… and analyzing similarities to corroborate interpretation of the IQ results" (R2Q2-012).

While interpretations of the results have been more fully explored in chapter 5, it appears that professionals have gone to great lengths to attempt to determine the most beneficial combination of strategies for establishing an accurate assessment of intelligence of children with autistic disorder. A primary conflict to that end is the interference of symptoms of autistic disorder.

Symptom interference. Participants frequently reported challenges with selecting the most appropriate tool to provide the most accurate measure of intellectual capacity of children with autism. Often times this was due to the interfering symptoms of the disorder that would confound an accurate measure. The symptoms of autistic disorder most frequently referred to as a challenge included the lack of verbal skills, lack of motivation, repetitive behaviors or interests, and behavioral disruptions.

> "Understanding that persons with autism have difficulty with social interaction, communication, and behavioral control, I have been very cautious in assessing for intelligence" (R1Q1-010).
>
> "It is not easy to select the tool that will capture the child's attention" (R1Q1-014).
>
> "Describing intellectual capacity in children with autism is usually done with caution as the children frequently do not attend to, comprehend or comply with many of the tasks" (R1Q1-017).

> "clearly, depending on the individual child, verbal skills, cooperation, motivation, etc. [standardized assessment] can sometimes be problematic" (R1Q1-026).
>
> "Administration can be difficult due to behavior including anxiety, ritualistic behaviors, aggression, etc" (R1Q2-009).
>
> "Many times low scores are due to poor imitation and lack of understanding of the task, no lack of learning ability" (R1Q2-019).

Concern was demonstrated for validity based on the test takers awareness of the purpose and meaning of the test. This lack of social awareness of the significance of the activity places children with autism at a disadvantage as compared to their typically developing peers who may recognize the importance of the testing and therefore have the motivation to perform as successfully as possible. Participants described this concern in the following ways.

> "Children with autism more often than not do not fully appreciate that they need to complete the items quickly" (R1Q2-022).
>
> "Often, collaboration and understanding of what we want them to do is more an issue than intellectual potential" (R1Q2-014).
>
> "They do not engage the examiner, and at best often merely tolerate the process. Language processing, obviously, is an issue" (R1Q3-022).

As suggested by the multiple comments by many participants, language, communication, and social deficits represented the greatest degree of concern for performance on tests of intellectual capacity.

> "[A] limitation is often language (lack thereof or inflexible use). A child can do well with labeling items but cannot describe a picture for example" (R1Q3-004).
>
> "The symptoms of autism, which vary from child to child, will necessarily interfere with their performance…since children have difficulty with social interaction, communication and behavior control, choosing assessments that are not heavily weighted in these areas will help to assure a more accurate assessment of their intelligence" (R1Q3- 010).
>
> "Those with ASDs do poorly on social tasks such as Comprehension" (R1Q3-011).
>
> "If they are nonverbal these children have much difficulty with standardized tests and they would not be able to demonstrate their knowledge through the tests" (R1Q3-018).
>
> "Their ability to follow verbal direction is poor, their ability to process verbal information is poor, and their imitation skills are poor" (R1Q3-019).
>
> "If the child is sensory seeking they will not be able to focus on the subtest without sensory stimulation, which will affect test results" (R1Q3-025).

An alternative perspective also emerged, in which it was suggested that symptoms that may appear to interfere with testing, may actually demonstrate strength and provide insight into the maturity of an individual's response to the world around them.

> "Intelligence is not measure by test but by how their brain is functioning… intuitive at times…Assess their sensory integration and sensory awareness; how sensitive they are helps assess intellectual ability" (R1Q1-020).

> “The majority of parents can identify at least one area of strength, commonly a restricted area of interest and this is where the child’s strengths can be recognized” (R1Q3-005).

The symptoms of autistic disorder often disrupt the testing process and therefore challenge the standard administration procedures established specifically for each standardized instrument. The interruption of testing with confounds such as repetitive behavioral responses, lack of attention, low motivation, and compromised language and social skills are not commonly included as an aspect of the norming process in the development of standardized assessments. As such, professionals must use clinical judgment to decide if following test protocol is of primary importance, or if modifying procedures to accommodate the interfering symptoms of autism is most important to the accuracy of the results of testing.

Protocol administration. One of the most seemingly controversial areas of discussion reflected in this data was the professional opinion about whether or not one should abide by strict testing protocol regardless of the child’s autistic symptom profile, or if diversions from protocol are acceptable as a means for accommodating the test takers uniqueness in order to increase performance. Some expert participants are adamant that strict adherence to protocol is essential to the validity of the test and that any modifications threaten the quality of the results, as can be heard in the following comments.

> “I don’t alter the administration for autistic kids because I want valid results and if you modify the test administration it can invalidate the score” (R1Q2-007).

> “Administration follows the standard protocol” (R1Q2-008).

> “Standardized testing must be done according to the established procedures. Unless modifications are allowed any modifications may invalidate the testing… it would be better to use established procedures and explain why the child performed at the level they did” (R2Q2-010).

Others are more inclined to tailor the test to the needs of the individual including the use of alternate phrasing, alternate sequence of subtest administration, insertion of breaks from testing as needed, and other efforts toward assisting the test taker to perform to their greatest potential. Participants described this in several ways.

> “The psychologist needs to recognize if the kid is overwhelmed and know when to intervene” (R1Q2-005).

> “It is difficult to adhere to the standardized mode of administration as some students with ASD are able to understand what is being asked of them if it is presented in a different way with additional modeling… better results are obtained about the student’s abilities when standardization is broken and the student has opportunity for additional practice and demonstration of the subtests’ tasks” (R1Q2-009).

> “I stop when I sense a lack of motivation and intersperse a break or fun activity, I will go back to another subtest and once I have the child on a roll again I will go back to where the child stopped responding on the previous subtest” (R1Q2-012).

> “I will allow breaks when needed so that I don’t overwhelm the child” (R1Q2-017).

> "Better results are obtained about the student's abilities when standardization is broken and the student has opportunity for additional practice and demonstration of the subtests' tasks" (R1Q3-009).

Although the significance of validity is recognized, the risk appears to be worth the potential acquisition of more rich data if the test taker has more opportunity to demonstrate their knowledge and abilities, as specifically noted by several participants.

> "I try to maintain standardization as much as possible, but will sacrifice strict adherence to standardized administration in order to make sure I am truly getting at the child's ability…I will use alternate carrier phrases if the child does not understand the ones given in the instructions…sometimes altering the administration to get the best results from a child with autism produces more meaningful results" (R1Q2-016).
>
> "All tasks should be administered via standardized directions: at least initially. Tasks can be administered in a non-standardized way, but less confidence can be placed upon those results" (R1Q2-022).

Expert respondents to this study are undecided as a group if the approach to assessment of children with autism should follow strict protocol to preserve the validity standards of the instrument, or if it is acceptable to break protocol in an effort to gain greater response from the test taker. The unavailability of resources normed specifically for this special population represents just one of several recognized limitations of resources.

Limitation of resources. Lack of available resources represented a recurring theme in participant responses from a variety of perspectives. Economic barriers, access, requirements by the funding source, and the existence of appropriate tools for measuring intellectual capacity of this population are all factors presented as challenges by several participants in this study.

Economic barriers included the clinician's ability to afford an extensive library of instrument and the family's ability to afford to pay for the assessment services.

> "I often use the same assessment tools- as they are expensive to purchase new types and varieties of assessment tools" (R1Q2-012).
>
> "My selection of tests is 1 or 2 from a possible 6 or so measures, and is often based on the ability level of the child, but also on things such as family finances, time allotted for the assessment, and/or the referral question" (R1Q2-026).

Limitations placed on the test administrator were also reported as directives toward the use of specific tools from the funding or referral source.

> "I typically use the same battery of assessment tools because they are specifically requested by the funding source" (R1Q2-004).

Limited access to a variety of testing options was also a central theme influencing one's ability to administer what may have been considered a more appropriate selection for the given population.

> "I have been somewhat limited to the WPPSI and WISC-IV as these are the instruments available at my agency" (R1Q2-006).

Finally, the lack of availability of an appropriate assessment specific to the needs of the autistic population was also discovered, as expressed by multiple participants.

> "There is a limited number of assessment tools to select from" (R1Q2-009).
>
> "The Wechsler Scales are the most inaccurate for this population- in general. I NEVER use them for children that either have autism, or have communication handicaps…The CTONI is really only one type of process addressed 6 different ways. So, if a child has difficulty with abstract reasoning, and most children with autism do, they'll bomb-out on every CTONI task" (R1Q2-022).
>
> "Selecting appropriate tools is difficult to do because of the lack of instruments designed for children with ASD" (R1Q2-015).
>
> "It may be simply a limitation of the test itself" (R1Q3-026).
>
> "Lack of [assessment tools with] appropriate norms is a real problem" (R2Q2-019).

Reflections such as these demonstrate a need for greater access to resources as well as instruments appropriate for use with the autistic population. With a degree of uncertainty about the use of tools available, professionals must rely on the support of clinical judgment based on training and experience to increase the likelihood of effective assessment of children with autistic disorder.

Clinical judgment. Respondents emphasized the importance of extensive training and experience with assessment of children with autistic disorder and in depth understanding of the disorder in general as a prerequisite for accurately assessing the intelligence of this population. Multiple responses referred to the use of caution when administering and interpreting results of intelligence assessments. Overall strong clinical judgment and experience appear to be strong indicators of how to successfully select, administer, and interpret the intelligence assessments. Several participants described the importance of clinical judgment in these ways.

> "I rely most heavily on clinical judgment and experience for final diagnosis" (R1Q2-004).
>
> "Selecting appropriate assessments is dependent on good clinical training, interview training, and the ability to review medical records" (R1Q2-005).
>
> "I use the best performances of the child to base my conclusion about his intellectual potential" (R1Q2-014).
>
> "The examiner must have great levels of experience and theoretical sophistication to interpret [results]… the examiner's task is truly even that much more of a detective with this population" (R1Q2-022).

Participants also offered examples of their own clinical discretion when making decisions about how best to approach assessment of children with autism.

> "I will select an assessment tool after first meeting the child and making a clinical judgment as to what type of test they may be able to perform somewhat well… I will always try at least 2 questions from each sub-test, I will not assume the child cannot perform" (R1Q2-012).

Experience, training, and personal beliefs and values about the most appropriate manner in which to assess the intelligence of children with autism results in a variable perspective. Central to many of the responses from experts in this study was the reference to the unique cognitive style characteristic of children with autistic disorder. Clinical judgment combined with an understanding of the attributes of cognitive processes that set assessment of individuals with autism apart from other populations has been demonstrated by the current sample to contribute to the overall process of assessment.

Unique cognitive style. The participants had much to report about the unique cognitive style demonstrated by children with autistic disorder as compared to other populations. Data indicated a more variable cognitive profile, with splintered skill areas. Children with autism consistently demonstrate strength in nonverbal tasks and are challenged by verbal tasks. This was specifically noted by several participants.

> "They often have verbal and performance spread … you don't find that normally in the MR [mental retardation] group… typically when they have this spread between verbal and performance it is indicative of a diagnosis of autism" (R1Q3-007).
>
> "Children with ASD generally have a split with higher nonverbal intelligence than verbal intelligence" (R1Q3-011).
>
> "Children with autism often display "scattered" skills so although they may perform poorly on some tasks, they excel at others" (R1Q3-017).

Children with autism also demonstrate a unique response to the world around them and experience the world in a much different manner than their non-autistic peers. Several participants suggested how this influences the ability to gain an accurate measure of intellectual abilities.

> "Children with ASD have so many complex challenges when it comes to making sense of the world around them that it makes it much more difficult to accurately measure their intellectual capacity when compare to other populations" (R1Q3-009).
>
> "Children with autism have been looking at the world differently from their normal peers for as long as they [have] lived. This means they have a different experience with the data that is typically measured on intellectual assessments" (R1Q3-010).
>
> "Children with autism approach social contingencies and learning environments very differently than any other population…demonstration of intellectual capacity needs to be assessed differently-accessed more creatively" (R1Q3-012).
>
> "[Autistic children have the] ability to see and interpret details of an object or how something works exponentially above and beyond other kids. Notice how sensory input is bringing the world in more than typical" (R1Q3-020).
>
> "Children with autism have unique abilities, strengths, and ways of looking at the world, and have a very unique 'intelligence'" (R1Q3-026).

With consideration for the unique cognitive style thought to characterize children with autistic disorder, it was interesting to note the perspective shared by the expert participants about the perceived accuracy of the results of the measures selected.

Assessment accuracy. Multiple respondents emphasized the requirement to use caution when interpreting and discussing results of intellectual assessments for this population. Further discussion has been incorporated into chapter 5 to explore the relationship between the cautious approach to evaluating the accuracy of test results and all that has been discussed about the multiple strategies for selecting tools for assessment, interference of autistic symptoms, limited resources, the role of clinical judgment, and the acknowledgement of a unique cognitive style. Participants expressed their experiences with evaluating accuracy of assessment results in many ways.

> "I have told families that their children may know more than the test measures but if they are in a typical classroom setting, their child would function as if they have mental retardation" (R1Q1-011).
>
> "Children with ASDs intellectual capacity is limited by our ability to teach. The intellectual capacity of persons with ASD is difficult to accurately assess" (R1Q1-015).
>
> "Describing intellectual capacity in children with autism is usually done with caution as the children frequently do not attend to, comprehend or comply with many of the tasks" (R1Q1-017).
>
> "A lot of intellectual abilities is not in doing the test, but in the way they [children with autism] DO the test. Intelligence is not measured by the test but by how their brain is functioning" (R1Q1-020).
>
> "If there are variables impacting validity such as cooperation, motivation, understanding of test instructions, etc. I do mention these and caution individuals as the scores or impressions may underestimate true skills of the child" (R1Q1-026).

Statements such as these provided insights about one of the primary research questions underlying this study about the level of certainty professionals believe results of intelligence assessments with this population are accurate. The cautious approach unique to the interpretation of results for this population in particular indicates some degree of uncertainty and concern for accuracy.

Demographic Results

Relevant demographic data were collected from each participant in conjunction with returning the signed consent form to initiate participation in the study. Seventy percent of participants held a doctoral degree and 30% held a masters degree. Forty-five percent were early career professionals with 5-10 years of experience, while 25% had 11-15 years experience, 15% had 16-20 years experience, and 15% had over 21 years of experience in the field of autism. Twenty-Five percent of participants reported an age range of 18-35 years, 60% were 36-50 years, and 15% were 51-65 years. Eighty percent of respondents were female, and 20% were male. Frequency and percent measures of all demographic data are presented in Table 3 to reflect the characteristics of the sample. Consideration of credential held and years of relevant experience are addressed later in this chapter as a part of the quantitative results, and has also been included in the discussion in chapter 5 with reflection on how the extent of professional training and experience have an influence on the results.

Integration of Quantitative Results

The responses to the Likert scale survey were expected to offer a quantified measure of the level of consensus of expert opinion reached among the participants

Table 3

Participant Demographics

Variable	Frequency	Percent
Highest Credential Earned		
Doctorate	14	70
Masters	6	30
Years Experience		
5-10 Years	9	45
11-15 Years	5	25
16-20 Years	3	15
21+ Years	3	15
Age Range		
18-35 Years	5	25
36-50 Years	12	60
51-65 Years	3	15
Gender		
Female	16	80
Male	4	20
Geographic Location		
California	13	65
Georgia	1	5
Kansas	2	10
Missouri	1	5
Texas	1	5
Canada	2	10

through a system of indicating agreement or disagreement among a variety of relevant statements about the assessment of intelligence in children with autistic disorder. The results present an interesting platform from which conclusions can be drawn from a variety of perspectives and layers of complexity, likely consistent with the complexity of the disorder itself. See Table 4 for a presentation of descriptive statistics including mean, standard deviation, and frequency of each the rating of each Likert item.

For the purposes of initial evaluation, consensus was determined when participant responses reflected agreement or disagreement with the statement, allowing for *strongly agree* and *agree* to be interpreted together and *disagree* and *strongly disagree* to be interpreted together. Although consensus was not reached across all items, at least 75% (n = ≥12) group consensus was reached for 75%, or 15 of 20, of the Likert items.

Categorical consensus. The five categories which organized the Likert scale items were ranked from highest rate of consensus to lowest rate of consensus among the expert participants. Some degree of consensus as well as some degree of discrepancy was recognized within each category and the following indicates the rank order beginning with the highest rate of consensus:

1. Strategies for describing intelligence of children with autism
2. Interpreting assessment results
3. Difference between children with autism and other populations
4. Administering assessments
5. Selecting assessment tools

The rank order of consensus among these categories appears to bear consistency with the

Table 4

Likert Scale Questionnaire Descriptive Statistics

Likert Scale Item	*M* (SD)	Frequency (%)			
		SA	A	D	SD
1. Multiple tools and strategies are often used in the process of assessing intelligence of a child with autism.	1.24(.44)	13(76)	4(24)	-	-
2. Tools created for purposes other than to measure intelligence are often used to help determine the level of intelligence in autism.	2.12(.93)	5(29)	6(36)	5(29)	1(6)
3. Symptoms of autism often interfere with standardized assessment procedures.	1.18(.39)	14(82)	3(18)	-	-
4. Parent and teacher report is very important to the process of assessing intelligence of children with autism.	1.53(.62)	9(53)	7(41)	1(6)	-
5. An accurate and appropriate assessment of intelligence for children with autism is not readily available.	2.82(.53)	1(6)	12(71)	4(23)	-
6. I find it difficult to select the most appropriate tool for assessing intelligence in children with autism.	2.59(.62)	-	8(47)	8(47)	1(6)
7. When selecting an assessment tool I consider the appropriateness for the child according to the severity of their autistic symptoms.	1.59(.80)	9(53)	7(41)	-	1(6)
8. I use the same intelligence assessments for all individuals whether or not they have a diagnosis of autism.	2.82(.81)	-	7(41)	6(35)	4(24)
9. It is difficult to maintain the interest and motivation of a child with autism during the assessment process.	1.76(.56)	2(12)	14(82)	1(6)	-
10. Children with autism tend to perform more successfully when the testing process includes their preferred areas of interest.	1.76(.44)	4(24)	13(76)	-	-
11. It is critical to maintain strict adherence to test protocol and avoid making modifications in order to ensure validity.	2.35(.70)	1(6)	10(59)	5(29)	1(6)
12. It is important to implement modifications to test protocol according to the needs of the child to ensure an appropriate measure.	2.24(.67)	2(12)	9(53)	6(35)	-
13. It is important to consider the function of behavior demonstrated during task completion of a test item as one interprets the scores.	1.82(.64)	5(29)	10(59)	2(12)	-
14. One must cross reference results of multiple assessment strategies rather than rely on a single measure to determine level of intelligence.	1.65(.49)	6(35)	11(65)	-	-
15. Over-reliance on standardized scores can result in an inaccurate picture of the true intellectual capacity of a child with autism.	1.59(.62)	8(47)	8(47)	1(6)	-
16. Results of intelligence assessments can only be considered an estimate for children with autism, rather than a definitive determination.	1.82(.73)	6(35)	8(47)	3(18)	-
17. Children with autism uniquely demonstrate splintered skills, as compared to other populations.	1.65(.61)	7(41)	9(53)	1(6)	-
18. Children with autism have a different view of the world and experience the world differently than other populations.	1.53(.51)	8(47)	9(53)	-	-
19. The intelligence of children with autism is often underestimated by teachers and other professionals.	1.82(.81)	7(41)	6(35)	4(26)	-
20. The scores of intelligence tests hold different meaning for children with autism as compared to other populations.	2.29(.69)	2(12)	8(47)	7(41)	-

Note. Strongly Agree (SA)- 1, Agree (A)- 2, Disagree (D)- 3, Strongly Disagree (SD)-4 qualitative findings in many respects. The degree of consensus among categories was similarly reflected in narrative responses in the first two rounds of data collection.

Consistent with Round 3 Likert scale responses, responses in Rounds 1 and 2 appeared to reveal consistencies regarding the strategies for describing intelligence in autism and interpreting the results of tests of intelligence for this population. Participant 012 suggested the “demonstration of intellectual capacity needs to be assessed differently—accessed more creatively (but scientifically!)”. The majority of participants reported barriers to testing attributed to the interference of autistic symptoms on the evaluation process, including deficits in “social interaction, communication, and behavioral control” (Participants 010). Similarly, another participant suggested that children with autism “frequently do not attend to, comprehend, or comply with many of the tasks”, providing a challenge for gaining an accurate assessment (Participant 017). In an attempt to use standardized measures to understand the intellectual capacity of a child with autism, another participant reports “depending on the individual child, verbal skills, cooperation, motivation, etc. this can sometimes be problematic” (Participant 026).

The category of items relevant to the differences between the intelligence of children with autism and other populations reflected mixed perspectives from the expert participants as evidenced by responses in the Likert survey as well as in the narrative responses in the earlier rounds of participation. Although consensus was reached in agreement with the statement suggesting that *Children with autism have a different view of the world and experience the world differently than other populations,* this unison perspective did not translate into consensus of agreement about how this could influence the potential difference in meaning of scores of intelligence tests for children with autism as compared to other groups. However, the narrative responses provided in Rounds 1 and 2 offered quite a bit of emphasis on the unique cognitive style found in autism. Narrative responses referenced differences in the “approach to social contingencies and learning environments” (Participant 012) and having a “different experience with the data that is typically measured on intellectual assessments” (Participant 010). However, multiple references to the scattered skill set and splintered areas of strength found in the narrative data are supported by near consensus of the Likert scale items suggesting that *Children with autism uniquely demonstrate splintered skills, as compared to other populations*.

Divergence in perspective among participants erupted in Rounds 1 and 2 with regard to the practice of selecting assessment tools and administering assessments to children with autism. In Round 1 a multitude of strategies were discussed, including 27 different assessment tools, and in Round 2 multiple participants expressed concern about the number and type of assessments employed for purposes of measuring intellectual capacity, especially as the majority of the tools listed were not specifically designed for assessment of intelligence. Participant 014 demonstrated great passion about his concern for the use of tools and resources used for diagnostic purposes, such as the DSM-IV-TR (APA, 2000), aside from intellectual capacity as he indicates that they are “NOT a measure of intelligence! They are used in the context of diagnostic evaluation, but they cannot serve to *assess intelligence*”. Participant 019 shared this perspective, indicating “I am concerned because many of the instruments noted have nothing to do with intellectual assessment”.

Similar lack of consensus about the administration of assessments was found in the opinion about whether or not to alter standardized protocol to accommodate the symptoms and unique needs of autism. Participant 010 suggested that “standardized testing must be done according to established procedures…any modifications may invalidate the testing”. In contrast, many participants promoted altering the protocol in order to “customize to their development, language, and other factors” (Participant 004), to “present in a different way with additional modeling and practice” (Participant 009), and “stop when I sense lack of motivation… jump around and go back to another subtest” (Participant 012) in order to elicit the highest level of performance from the child with autism. Just as many participants, who maintained that adhering to strict protocol was important, also agreed that implementing modifications to test protocol was important to consider in response to the needs of the child.

Individual Likert item consensus. Full consensus was reached for five of the 20 Likert items. In each of these scenarios, the participants either selected the rating of *agree* or *strongly agree* with the following affirmative statements:

- Multiple tools and strategies are often used in the process of assessing intelligence of a child with autism.
- Symptoms of autism often interfere with standardized assessment procedures.
- Children with autism tend to perform more successfully when the testing process includes their preferred area of interest.
- One must cross reference results of multiple assessment strategies rather than rely on a single measure to determine level of intelligence.

- Children with autism have a different view of the world and experience the world differently than other populations.

An additional five items reflected near full consensus among the group, with just one respondent demonstrating disagreement in each of the following statements:

- Parent and teacher report is very important to the process of assessing intelligence of children with autism.
- When selecting an assessment tool I consider the appropriateness for the child according to the severity of their autistic symptoms.
- It is difficult to maintain the interest and motivation of a child with autism during the assessment process.
- Over-reliance on standardized scores can result in an inaccurate picture of the true intellectual capacity of a child with autism.
- Children with autism uniquely demonstrate splintered skills, as compared to other populations.

Two additional items neared consensus with only two or three participants in disagreement with the Likert items and the majority of respondents in agreement with the following two statements about the interpretation of assessment results:

- It is important to consider the function of behavior demonstrated during task completion of a test item as one interprets the scores.
- Results of intelligence assessments can only be considered an estimate for children with autism, rather than a definitive determination.

Although distributed uniquely among all Likert scale items, it was also discovered that all 17 final respondents selected either *agree* or *strongly agree* with the majority of the items, compared to selecting *disagree* or *strongly disagree*. All but one participant responded in agreement with over 65-95% of the statements on the survey, reflected by 278 responses with some level of agreement, and 62 responses with some level of disagreement. Respondents were much more likely to *strongly agree* (110) than *strongly disagree* (8) across all responses to Likert items.

Deviant Cases

Instances of discrepancy or nonconforming data may reflect the complexity of autism and the difficulty in establishing consistent perspectives due to the nature of the disorder and the variation in severity among those diagnosed with autistic disorder. The following two Likert scale items about following administration protocol may be considered to reflect directly contrasting perspectives:

- It is critical to maintain strict adherence to test protocol and avoid making modifications in order to ensure validity
- It is important to implement modifications to test protocol according to the needs of the child to ensure an appropriate measure.

It may be expected that if a respondent agreed with one of these statements that they would disagree with the other indicating a preference for either retaining protocol standards or implementing modifications according to the individual test taker. Results indicate nearly 30% (n = 5) participants responded in agreement with both of these statements, suggesting it is important to maintain protocol just as it is important to modify protocol. Further interpretation of the implications of these response phenomena has been presented in chapter 5.

Two participants surfaced as outstanding, repeated, outlier respondents as compared to the rest of the sample. When all or most other participants held consensus either in agreement or disagreement with a particular Likert item, two individuals repeatedly held solitary, or near solitary, contrasting opinions. Participant 019 demonstrated unique response in contrast to their expert peers in three of the 20 questions, while Participant 022 demonstrated contrasting opinion in five of the 20 questions as compared to the rest of the sample. The other six participants who demonstrated divergence from their peer group did so in only one instance, rather than multiple instances. Further interpretation about the meaning of repeated outlier participation in relation to the demographic data is reviewed in chapter 5.

In review of individual responses per participant, it was discovered that 13 of the overall 20 participants demonstrated a degree of discrepancy of statements or input throughout the rounds in which they each participated. Eight participants provided incongruent information between the narrative portions of Rounds 1 and 2 and the selections made on the Likert scale survey. Five participants demonstrated a conflicting perspective within the answers of the Likert scale survey alone. The Likert scale items reflecting the greatest discrepancy among these cases was recognized between Items 5 and 6 on the survey:

- An accurate and appropriate assessment of intelligence for children with autism is not readily available.

- I find it difficult to select the most appropriate tool for assessing intelligence in children with autism.

Four participants indicated that they either *agree* or *strongly agree* with the first statement indicating an appropriate tool is not readily available and either *disagree* or *strongly disagree* with the second statement that they have difficult with selecting an appropriate tool. One might expect for an individual to have difficulty with selecting a tool if an appropriate tool is not readily available, however this was not the case for these four participants. One other participant selected *disagree* for the first statement suggesting that an appropriate tool is indeed available, yet selected and *agree* for the second statement indicating that they have a difficult time selecting a tool. One may expect that if an individual felt that an appropriate tool was readily available that they would simply select that tool for use without difficulty. Further review of such discrepancies in respondent input is further explored in chapter 5.

Evidence of Quality

Data were collected according to the Delphi methodology, with each round of data collection contributing to the next (Brown, 1968). Member checking was inherent in the Delphi process as each participant had the opportunity to respond to or challenge the data provided by a peer. The additional data provided through this member checking process resulted in the development of the final Likert scale survey, with areas of apparent contention strategically incorporated in the final forced choice response format in order to clearly identify the parameters of levels of consensus or lack of consensus. Inter-participant anonymity was maintained throughout the study in order to elicit honest and direct opinion of participants without the concern for perceptions within the professional peer group beyond the scope of this study.

Summary of Results

The problem under investigation through the course of this research was the perceived lack of availability of assessment tools for accurately determining the level of intelligence of children with autistic disorder. The purpose of this study was to establish group consensus regarding best practices for gaining an accurate measure of intelligence of individuals with autistic disorder and determine to what extent appropriate tools are available to professionals who administer intelligence assessments. The primary research questions addressed through the Delphi rounds of narrative and survey data collection included

1. What tools are used for an accurate assessment of intelligence?
2. How do experts choose the tools thought to provide an accurate assessment?
3. What level of certainty do experts believe the measures to be accurate?
4. What degree of consensus is there between experts with regard to these questions?

A series of three Delphi rounds of data collection and an extensive analysis of qualitative and related follow up quantitative data were implemented with a starting sample size of 20 expert participants, with full participation in all rounds of data collection from 17 participants. Similarities and differences of expert perspective were reflected in the emergence of seven primary themes across all Delphi rounds including (a) multiple strategies, (b) symptom interference, (c) protocol administration, (d) limitation of resources, (e) clinical judgment, (f) unique cognitive style, and (g) assessment accuracy.

Participants were more likely to *agree* or *strongly agree* than to *disagree* or *strongly disagree* and were nearly 14 times more likely to *strongly agree* than *strongly disagree.* Full or majority consensus was reached among at least 75% of respondents in 15 of the 20 final Likert scale items. The categories of Likert items were ranked in the following order of greatest to least consensus:

1. Strategies for describing intelligence of children with autism
2. Interpreting assessment results
3. Difference between children with autism and other populations
4. Administering assessments
5. Selecting assessment tools

A similar degree of consensus was also reflected in the combination of unique and similar perspectives shared through the narrative responses at each round of the study as well. The nuances found in the individual responses as compared within the group of participants provided the richness of data that has contributed to the conclusions and implications of this research presented in chapter 5.

In chapter 4, I provided a presentation of results with the integration of the primary qualitative findings with the complement of the quantitative measures found in the final Likert scale survey. In chapter 5, I have provided an interpretation of these findings, reviewed implications for social change, suggested recommendations for action, and recommended further research to be undertaken as a follow up to the current study.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

Theories of intelligence have traditionally emerged from the assumption that the representations of cognitive abilities across populations are measured along a continuum of related and comparable levels of intelligence, resulting in the determination of a standard IQ score (Wechsler, 2003). The measured IQ has commonly informed expectations for current cognitive ability as well as potential for future achievement and success. An indication of one's ability to learn or a prediction of one's intellectual potential often contribute to many opportunities in life, especially for an individual with a developmental disability such as autistic disorder. Decisions for educational or vocational placement, coordination for support services, and life opportunities in general are influenced by the assessment of intelligence (Garcia-Villamisar & Hughes, 2007; Kasa-Hendrickson, 2005). The demonstration of intelligence among those with developmental disabilities, such as autistic disorder, has presented as qualitatively different from other populations, suggesting the need for an alternative approach to assessment to match the alternative presentation of knowledge and ability (Kuschner et al., 2007).

This study sought to investigate the social problem of lack of availability of appropriate assessment tools for gaining an accurate measure of intellectual capacity of individuals with autistic disorder. The purpose of this study was to establish group consensus regarding best practices for gaining an accurate measure of intelligence of individuals with autistic disorder and determine to what extent appropriate tools are available to professionals who administer intelligence assessments. Three Delphi rounds of narrative and survey data collection contributed to the inquiry of what tools are used for assessment of intellectual capacity, how experts go about selecting an appropriate tool, how certain the professional is that an accurate measure has been achieved, and the level of agreement professionals have with one another about such inquiry.

The following chapter presents an interpretation of findings from this research and discusses implications for positive social change as a result of the findings of this study. Recommendations for action and further research have also been explored as a guide for other professionals interested in continuing the current investigation more broadly and extending inquiry into related areas of necessary research.

Interpretation of Findings

The findings of the study in terms of emergent themes, categorical ranking, group and individual outlying data, trends in agreement, and unique discrepancies provide meaningful insight into the process of assessing intellectual capacity of children with autistic disorder. Such findings reflect the conceptual frameworks underlying the foundation of this research in terms of seeking and achieving consensus according to the social constructivist (Creswell, 2009; Guba & Lincoln, 1994) and interpretative research (McQueen & Zimmerman, 2006; Orilkowski & Baroudi, 1991; Walsham, 2005) theoretical models, as well as the Lockean theory of finding truth according to the consensus among multiple individuals (Mitroff & Turoff, 1975). An evaluation of the data has been presented as an integration of the qualitative and quantitative data to link relationships relevant to the primary research questions of this study.

Interpretation of Emergent Themes

The themes that emerged from the three rounds of data collection were quite evident and consistent throughout the data collection process. The input provided by the expert participants in the first round of this Delphi study shaped the direction of the subsequent rounds of data collection according to the elements of assessment of intelligence that emerged as most significant to this practice, reflecting the traditional Delphi process (Brown, 1968). The emergent themes included (a) multiple strategies, (b) symptom interference, (c) protocol administration, (d) limitation of resources, (e) clinical judgment, (f) unique cognitive style, and (g) Assessment Accuracy. Interpretations of the findings found within each of these themes have been reviewed with an integration of the qualitative and final qualitative findings.

Multiple strategies. The first theme emerging from the data was quite evident early in the data collection process. The multiple strategies participants reported utilizing in order to reach a determination of the intellectual capacity of a child with autistic disorder was a compelling finding that appears to influence, as well as be influenced by, the remaining six emergent themes. The various ways in which experts incorporate multiple assessment tools developed for numerous purposes such as measuring intelligence, disorder diagnosis, autism severity, developmental screeners, and social assessments demonstrates attempts to collect a broad view of the overall profile of the individual with autism in order to draw conclusions regarding their intellectual capacity. The use of multiple strategies to assess intelligence mirrors similar efforts for assessing the diagnosis of autism, which suggests the complexity of the disorder and the unique strategies for assessment of this population (Akshoomoff et al., 2006; Gilliam, 2005; Le Couteur et al., 2003; Rutter et al., 2003; Schopler et al., 1998). These findings suggest that professionals do not have access to a single appropriate tool thought to provide an accurate measure of the intellectual capacity of individuals with autism. Rather, a multitude of strategies are combined in an effort to mediate the challenge faced by the unavailability of a tool that matches the needs and cognitive profile of an individual with autistic disorder.

The category of *Strategies for Describing Intelligence of Children with Autism* on the Likert survey surfaced as the category with the greatest degree of consensus among the participants. In comparison to the other four categories of the survey, 90% consensus of expert experience with strategies for describing intelligence in this population demonstrates the shared experience of the piecemeal approach to the assessment process.

An area of striking difference of opinion among strategies used for assessment was the use of multiple strategies of assessment that are not meant for the assessment of intelligence. In Round 2 the list of the 27 tools reported by participants included a high majority of tools developed for purposes other than the assessment of intelligence. Several participants responded to Round 2 with passionate concern that other professionals utilized tools outside the scope of intellectual assessment to derive such a measure. In reviewing the data, it is clear that participants reported the use of alternative tools as a supplement to the intelligence testing in an attempt to mitigate the confounds presented as a result of the symptoms of autism and the unique cognitive profile not taken into consideration through the norming process of the standard intelligence assessments.

The inclusion of social assessments, developmental assessments, and autism severity assessments are all reported to contribute to the interpretation of intelligence assessments, and provide clues and additional factors contributing to the discovery of the intellectual capacity of someone with autism. On the contrary, it appears that several of the respondents are in the practice of deferring to the intelligence assessments alone for measuring intelligence. Many participants cautioned against this practice with the concern for gaining only partial insight into the intellectual capacity of children with autism. Strict reliance on measures that are not thought to provide an accurate result, as can be expected with other populations for which the standardized assessments were normed, can lead to an inaccurate determination of intellectual capacity.

Symptom interference. The need to employ multiple strategies for assessing intelligence in children with autism is influenced by the inability to gain an accurate measure due to the common symptoms of autistic disorder; a confound supported in the research by Edelson (2005), suggesting a test structure unable to mitigate the confounds of autistic symptoms. The interference of symptoms such as lack of social skills, communication, motivation, imitation, joint attention skill s and behavioral disruptions each prevent the ability to administer an assessment in the standardized fashion intended (APA, 2000). The inability to administer the test in the manner it was developed threatens the validity of the scores and ultimate determination of level of intelligence. The item on the Likert survey indicating that symptoms of autism often interfere with standardized assessment procedures received full consensus in agreement with the statement. Since interference of symptoms results in the inability to gain an appropriate measure, it would seem that all participants are also acknowledging that the use of the available standardized intelligence assessments are not appropriate for use with this population if the goal is to achieve a score comparable to other non-autistic populations.

An alternative perspective emerged regarding the influence of autistic symptoms on the assessment process. Although disruptive to the established standards for assessing intelligence, the narrowed interests and response to the world around them can also provide insight into the strengths of an individual with autism that standardized assessments are not designed to appreciate and acknowledge as a cognitive strength. The perceived interference of over stimulation resulting in a behavioral disruption during the testing process may actually be a useful clue into cognitive process if harnessed in a strategic manner. According to the input from the expert participants, it would seem that if an area of restricted interest was incorporated into the testing process rather than factored out as a confound, an individual may have the opportunity to demonstrate skills of logic, problem solving, and higher order thinking that may have been more difficult to uncover if the subject matter did not gain the attention and motivation of the child. This notion is further supported by Gardner’s theory of multiple intelligences, suggesting that individuals demonstrate unique strengths in areas of interest (Gardner, 1983). If the strengths and interest of the child are what drives the assessment process, the interference of lack of motivation and attention reported by the experts would be ameliorated and a focus on navigating through other autistic symptoms may be less overwhelming to the assessment process overall. The difficulty of social interaction and the ability to communicate may have less of an influence if the subject matter was of interest to the individual and reflect an area of strength with which a child with autism may be better suited to demonstrate a true expression of their knowledge and abilities.

Protocol administration. The staggered consensus about the administration of standardized assessments was divided by those who emphasize the importance of maintaining strict protocol in order to maintain the validity of the test and those who were willing to sacrifice a potential loss to standardized validity in order to more fully capture the intellectual abilities of a child with autism by way of modification of the test to match the needs of the individual. The dual perspective shared by the group demonstrates a desire to maintain established administration procedures with the flexibility of administering to a population of individuals with a varied symptom profile without losing validity. The division in practice within this small sample reflects the more broad division among autism experts about administration practice, as also reflected in the literature. Adherence to protocol has been proposed as a strict standard by some, while flexibility of administration for individuals with autism is also supported by some (Coolican et al., 2008; Sams et al., 2006; Toth et al., 2006).

This in itself presents a risk to the ability to claim with any level of certainty the average level of intelligence of an individual with autistic disorder without consistent practice within the professional community. In this study, an equal number of participants agreed that maintaining protocol was essential to ensuring validity as the number of participants who agreed that modifications to protocol were important in gaining an accurate measure. In some instances participants reflected agreement with both maintaining and breaking protocol, which demonstrates the desire for a testing protocol that provides standards for administration along with standards for modification according to the needs of the child with autism.

Limitation of resources. In addition to the findings in the literature suggesting the importance of norming procedures for the population to be tested with a standardized tool (Satller & Hodge, 2006), expert informants of the current literature also suggested the lack of availability of instruments normed for the autistic population. The limitation of appropriate resources was also recognized beyond the apparent lack of an available tool created for this population. Additional barriers included financial constraints of families' abilities to afford the numerous tests recommended or the ability of the professional to afford to maintain a sufficient library of tools in order to arrive at a final determination of intellectual capacity. Others were limited by the tests available for use within the agency for which they worked, and still others were limited by the request of the referral or funding source with a narrow list of approved tests.

While the high majority of respondents indicated they took into consideration the needs of the child as they select an assessment tool, it would appear that in some cases the flexibility of making a thoughtful choice may be a luxury they do not have due to the limitation of resources from which to select. A nearly equal number of responses indicated difficulty and ease with selecting the most appropriate tool may be influenced by the sheer availability of resources. Having access to only one assessment tool would make the selection process quite easy, although not necessarily reflect the professional's preferred method or tool.

Although the high majority of individuals reported that an appropriate tool for assessing intelligence of children with autism is not readily available, nearly half of the respondents indicate that they do not have difficulty with selecting a tool. Again, although it may seem that participants would indicate a difficult time with selecting a tool because an appropriate tool is not readily available, such response may reflect default to what is available rather than what is appropriate for the population.

Clinical judgment. A central theme also emerged about the impact of clinical judgment on the successful selection, administration, and interpretation of intelligence assessments. The level of expertise of the test administrator is measured both in terms of expertise with the standardized assessments across populations, as well as expertise with autistic disorder and intimate familiarity with the symptoms and variables unique to this population as they relate to the assessment process. Much of the sample of this study represents early career autism experts in practice from 5 to 10 years (*n* = 9) with the remaining participants (*n* = 11) having experience ranging from 11 to 21 or more years. The majority of participants (*n* = 14) demonstrated clinical training at the doctoral level as compared to the masters level (*n* = 6). This study did not investigate whether the degree of clinical training or the extent of clinical experience represent more or less importance over the other, however the participants indicating the importance of training and experience represented a combination of doctoral and masters level experts with a range of experience from 5 to 21 or more years of experience.

With factors such as interference of autistic symptoms, limitation of resources, and the decision whether to maintain or break protocol, clinical judgment represents an essential element of the assessment process for this population. Research by Kasa-Hendrickson (2005) emphasized the importance of recognizing the cues from individuals in order to best adapt the testing or learning environment to promote the greatest potential for success. A professional must be able to recognize the influence that autism might have on the process and the influence that the process may have on the individual with autism. The variability of experience and training of professionals in conjunction with the variability of protocol administration practices contribute to what may be emerging as overall inconsistent practices within the realm of assessment of this population.

The threat to the validity of assessment results of this population illuminates the underlying problem leading to the current research of the lack of an appropriate tool that would allow for standard practices among all professionals regardless of experience or training. Although clinical judgment is critical to the interpretation of findings and the explanation of findings to families and others, it is not within the best interests of the consistency of assessment across this population to charge professionals with the responsibility to use their clinical judgment to decide which tools to use or how to use them on a case by case basis.

Unique cognitive style. In Round 1 of data collection, numerous participants made various references to how children with autism experience the world differently than other populations. Participants appeared to share a common affinity for reference to a unique experience with the world in terms of how an individual perceives, interacts with, and navigates their surroundings. Such assertions have also been supported in the current literature also suggestive of a unique demonstration of skill and ability in this population (Dawson et al., 2007; Edelson, 2006; Kuschner et al., 2007). Full consensus was reached in agreement with the Likert item suggesting that children with autism have a different view of and experience the world differently than other populations. This was consistently associated with a unique cognitive style characteristic of splintered skill areas with strength in nonverbal abilities and recognized weaknesses in verbal tasks. The differences noted compared to other populations supported a need for an alternative, more creative approach to capturing the unique cognitive style and experience with the world that is not considered to be possible in the intelligence assessments currently available, according to the participants of this study.

Assessment accuracy. The final emergent theme represents what may be the most important factor to consider within the scope of this study. The perceived and actual accuracy of a test is essential to the entire process of selecting, administering, and interpreting the results of an intelligence assessment. The accuracy of the final determination of level of intelligence is dependent on the most appropriate selection of a tool, the most effective and accurate administration of the protocol, and the most useful and clear interpretations of the results in order to derive the most accurate final determination of level of intelligence. The ultimate purpose of the assessment process is to arrive at an accurate measure rather than a mere result which may or may not be accurate based on a combination of confounding factors jeopardizing the potential for accuracy.

The message received from the participants of this study, whether as a result of unison or discord, is one of consensus about the goal for reaching an accurate result. This finding is consistent with the many findings in the literature emphasizing the importance of accuracy balanced with the administration procedures implemented in order to achieve a valid result (Edelson, 2006; Goldstein et al., 2008; Kasa-Hendrickson, 2005). The manner in which each participant reported his or her process for reaching this end goal, the goal does remain the same for all. Efforts toward accuracy were recognized both in maintaining protocol and breaking protocol and in using only tools meant for intelligence assessment and using those designed for alternate measures altogether. Rather than blatant disregard for the standardized process, professionals who divert from protocol do so with the ethical intentions of gaining a more accurate score rather than with malicious intent to invalidate results. With accuracy such a high priority in the assessment process, it is unfortunate that these and other professionals are limited to the use of tools not designed with accuracy in mind for the unique population of individuals with autistic disorder.

Interpretation of Categorical Consensus

Each of the seven emergent themes were in some way reflected in one or more of the categories of Likert items on the final survey. The categories were first introduced in the open-ended questions posed in Round 1 of the study and continued to shape the direction of the study as well as provide a foundation from which the themes of the study emerged. The interactive process for data collection supported by the social constructivist conceptual framework (Creswell, 2009) resulted in categories ranked according to degree of consensus with the final Likert survey. The rank order from greatest to least consensus was:

1. Strategies for describing intelligence of children with autism
2. Interpreting assessment results
3. Difference between children with autism and other populations
4. Administering assessments
5. Selecting assessment tools

The theme of multiple strategies was in part developed as a response to the initial and culminating questions about the strategies the experts use to describe the intelligence of children with autism. The expert participants had much to offer in terms of describing their process, which primarily included the selection, administration, and interpretation of various assessment tools. Consensus was established regarding the indication that the participants indeed do utilize standardized measures for assessment, however the discrepancy was found in the actual practice of selecting tools, whether meant for intelligence testing or not, and in the administration of such assessments, to follow protocol or not. However, a great deal of consensus was found with the interpretation of assessment results, suggesting that the respondents were in close agreement regarding the importance of clinical judgment and the need for caution when interpreting results. This included using clinical judgment to interpret scores in relation to other information known about the individual and being careful not to rely too heavily on the standardized scores.

The category of Likert items referring to the differences noted between children with autism and other populations reflected greater consensus than lack of consensus, however still ranked in the middle of each of the categories with overall consensus.

Agreement was found for the description of autistic traits and the difference in experience of the world as compared to other populations. However, many participants indicated a consistency among autism and other populations in the sense of retaining a range of intelligence from below average, average, and above average. Although the majority of participants indicated the scores of intelligence tests hold different meaning for children with autism as compared to other populations, a notable division was found in the basic assumptions of many of the experts in this sample about the accuracy of intelligence assessments.

Interpretation of Outliers and Deviant Cases

Noteworthy differences of professional opinion were explored and may be reflective of the complexity of autistic disorder itself, in addition to the complexity already inherent in the process of evaluating the intellectual capacity of an individual of any population. While variation in level of agreement was noted throughout the Likert survey, some examples are worth noting as outliers from typical responses with an attempt to understand the factors that potentially contributed to such response aside from individual differences irrelevant to this study. Although consensus was the ultimate goal of this Lockean style of inquiry (Mitroff & Turoff, 1975), the interactive elements found even within discrepancies contributed to the emergent themes through the interpretive research design (McQueen & Zimmerman, 2006; Walsham, 2005).

Participant outliers. Participant 022 surfaced as one of the most unique responders in the group in terms of rating the Likert items in direct disagreement with other responders. Participant 022 reflected repeated, solitary or near solitary disagreement with five of the Likert items. In two of these circumstances, this participant was the only one to reflect any level of disagreement with the Likert item, preventing what would have been full consensus among the group absent of this individual's disagreement. Participant 022 was also more likely than all other participants to respond with *strongly disagree* with a total of four instances of this response type, as compared to four other respondents making this selection once, and all other respondents never making the *strongly disagree* selection throughout the survey. Although not as frequently noted in a solitary fashion, Participant 019 also demonstrated extraordinary disagreement with the majority of participants over several of the Likert items. Participant 019 was coupled with one to two other participants, including Participant 022, in disagreement leading to otherwise consensus of two Likert items and demonstrated the only discrepancy in full consensus on one other item. While several other participants demonstrated diversion from the group, Participants 022 and 019 were the only respondents with repeated instances of such behavior. Although such discrepant behavior was not likely intentional since all participant responses were confidential from one another, the frequency of discrepant selections was striking and has warranted further review.

In consideration of the demographics describing the two individuals demonstrating the greatest degree of discrepancy within the group, both individuals held a doctoral rather than masters level degree, and Participant 019 had 16 to 20 years of experience while Participant 022 had 21 years or more experience with assessment of intelligence of children with autistic disorder. Only two other participants in this study reported 16 to 20 years experience, and only two other participants in this study reported

21 or more years of experience. While the doctoral level of training was reported by 12 other respondents in the study, Participants 019 and 022 represented two of the four most experienced participants in terms of years of relevant professional experience.

Category and item outliers. The fourth category of the Likert survey was interpreting assessment results. A unique finding of individual responses in this category of questions was the highest number of outlier responses from individuals. This category demonstrated individual responses from other participants in three out of the four Likert items in this category by four separate respondents. The overall trend in this category was toward consensus, which is consistent with the high number of outlying responses since most of the respondents in this category were in consensus across a greater number of items than three of the other four categories.

The greatest number of outliers in individual items from the Likert scale was found in Items 13 and 16, not surprisingly both within the fourth category of questions related to interpretation of assessment results. Again, the distinction as outliers for these items and within this category is likely due to the majority of consensus within this category across most other participants. Individual differences do not appear to be significant for the participant demographics represented in this group of outliers; however it should be noted that the outlying participation from Participant 019 is reflected in responses to Items 13 and 16, in addition to one other item in the same category. In essence, without the responses from Participant 019 in these two items or the category as a whole, none would have surfaced as major outliers within the study.

Deviant cases. In addition to the noteworthy cases of outlying responses, two sets of Likert items also reflected potential discrepancy within participant responses when each item in the pair were answered in a particular manner. Items 5 and 6 were in the category of Likert items about the selection of assessment tools:

5. An accurate and appropriate assessment of intelligence for children with autism is not readily available.
6. I find it difficult to select the most appropriate tool for assessing intelligence in children with autism.

One may expect that if a participant answered with some level of agreement with the statement suggesting that an appropriate tool is not available that the same individual would have then answered with some level of agreement with the statement suggesting that it is difficult to select a tool. This manner of rating would presumably indicate that since there is not an appropriate tool available that it is difficult to select a tool from a pool of less appropriate options. On the contrary, seven of the 17 participants responding to these items indicated agreement with the first statement suggesting an appropriate tool does not exist for the autistic population, yet disagree that selecting the most appropriate tool is difficult to do. The discrepancy noted in these responses may acknowledge that an appropriate tool is not in existence, but selection among the less appropriate tools is not difficult suggesting the individuals have limited access to assessment tools in general, or that they are in the practice of using the same assessment tool with all individuals regardless of the recognized degree of appropriateness for autism.

Items #11 and #12 were found in the category about administration of assessments and the content of these questions were the central focus of discrepancy among participants in Rounds 1 and 2 of data collection about maintaining strict protocol or breaking protocol based on the characteristics of the test taker:

11. It is critical to maintain strict adherence to test protocol and avoid making modifications in order to ensure validity.
12. It is important to implement modifications to test protocol according to the needs of the child to ensure an appropriate measure.

One may expect a participant to respond in agreement with one of theses statements and disagreement with the other according to the individual's opinion of the importance of maintaining or breaking protocol. It was found that five of the 17 participants responding to this item indicated agreement with both of these statements. On the surface, it may appear that such a response would be indicative of a contrasting perspective, and therefore a discrepant case. While this may be the case, it is important to consider alternative influences aside from direct discrepancy within each participant's beliefs. Perhaps participants would prefer if both options could be simultaneously true. Although not evidently available to professionals within the current tools for assessment of intelligence, perhaps the desire would be for a testing protocol that provides standard administration procedures according to the individual needs of the test taker. This may include a progression of procedures along a continuum of items selected based on the individuals verbal skills, severity of autism, and other factors or symptoms of autism that are recognized as presenting potential confounds to standard protocol.

Interpretation of Trends in Level of Agreement

As the data were refined through each of the Delphi rounds, anticipated trends in level of agreement were discovered (Brown, 1968). The high majority of responses across participants reflected some level of agreement with the Likert items, in comparison to those items with which the participants expressed disagreement. Eighty-two percent of responses indicated either *agree* or *strongly agree* and 18% of responses indicated *disagree* or *strongly disagree*. In addition, all participants were more likely to respond in agreement rather than in disagreement with the Likert items.

The Likert items were presented in such a way that one may interpret that agreement with the each item would reflect an opinion consistent with the notion that professionals do not have the resources necessary to accurately assess the intelligence of children with autistic disorder. In contrast, disagreement with the Likert statements may be interpreted to suggest an opinion that professionals do have sufficient access to necessary resources in order to accurately assess intelligence of children with autistic disorder.

As an example, agreement with the Likert item *Tools created for purposes other than to measure intelligence are often used to help determine the level of intelligence in autism* may suggest that professionals do not have access to an appropriate measure of intelligence which requires one to pursue different types of assessment to attempt to establish a measure of intelligence. This would be considered a negative outlook on the current availability of an appropriate tool for measuring intelligence in this population. Likewise, disagreement with the Likert item *Symptoms of autism often interfere with* *standardized assessment procedures* would suggest a positive outlook on the current offering of assessment tools since the respondent would be suggesting that symptom interference does not appear to be a barrier to standardized assessment procedures.

With this logic, if the direction of responses is considered to have either a negative or positive outlook on the resources currently available to professionals, then it can be deduced from the data that the majority of participants perceive a more negative outlook as reflected in the high rate of agreement with the Likert items as compared to the lower rate of disagreement with the items.

Implications for Social Change

This study has contributed to the existing body of research of autistic disorder and intellectual functioning with a contribution to positive social change for individuals with disabilities and their families. Recent rates of autistic disorder have grown to affect 1 in 110 children, indicating approximately 500,000 affected children throughout the Unites States (CDC, 2009). The nationwide impact of this disorder has demanded the attention of clinicians and treatment teams to clearly and accurately understand the treatment and support needs of this special population. The current study explored the expert perspective on the practice of assessing the intellectual capacity of children with autistic disorder. Contributions to positive social change include findings justifying the need for the development of an appropriate tool for assessing intelligence of children with autism in order to influence enhanced life opportunities of children in which more accurate measures lead to appropriate placement in academic, vocational, and social settings.

Although a significant amount of research has reported deficient intellectual functioning in autistic disorder, empirical support for this claim has been largely unfounded (Edelson, 2006). Preliminary assumptions of clinicians about the cognitive abilities of children with autistic disorder have reflected an overestimation of impairment as compared to actual measures (Wiggins et al., 2009). A recent study reported that clinicians estimated 80% of children with autistic disorder were cognitively impaired, while only 60% revealed actual test scores ranging from mild, moderate, to severe cognitive impairment (Wiggins et al., 2009). With the consideration of autistic characteristics contributing to potential testing confounds aside, the degree of assumption of lowered cognitive functioning has represented risk of inaccurate clinical assessment and potentially decreased level of standards for success and achievement within this population.

Given the findings offered from Wiggins et al. (2009) and the current rates of diagnosis of autistic disorder as provided by the Centers for Disease Control and Prevention (CDC, 2009), it can be presumed that approximately 100,000 children who are diagnosed with autistic disorder may have been inadvertently dually diagnosed with an intellectual disability. Implications associated with the potential substantial oversight of this population may include a dramatic economic impact to society. Inappropriate educational development and treatment opportunities for individuals, who otherwise may have demonstrated the capacity for gaining skills contributing to gainful employment, may not be afforded the opportunity to contribute to society through participation as employable, productive, tax-paying citizens. Findings from this study have emphasized the need for a more accurate measure that will accommodate the confounding symptoms of autistic disorder and provide a true reflection of intelligence.

Conclusions

While other researchers have suggested the current availability of standardized measures of intellectual capacity may not provide an accurate reflection of true intellectual ability, this study was the first to employ a comprehensive Delphi study resulting in rich context provided by experts in autistic disorder with extensive experience with selecting, administering, and interpreting such assessments. Results confirm the lack of availability of an assessment tool to accurately determine the level of intelligence specifically for the autistic population. The purpose of this study was to establish group consensus regarding best practices for gaining an accurate measure of intelligence of individuals with autistic disorder and determine to what extent appropriate tools are available to professionals who administer intelligence assessments. Themes emerged through the input of 20 autism experts to demonstrate common professional experiences with using multiple strategies for assessment, recognizing the interference of symptoms of autism on the assessment process, consideration for administering protocols according to strict procedures or with modifications as needed, a variety of reasons influencing limitation of resources, the significance of clinical judgment in the assessment process, the acknowledgement of a unique cognitive style found in autism, and an emphasis on evaluating the accuracy of assessment results.

An evaluation of the emergent themes and the levels of consensus recognized during two rounds of narrative data collection were confirmed through a Likert survey in the final round of the study. Findings confirmed an overall consensus among expert participants with the key factors to consider about the availability of an accurate measure of intelligence for children with autistic disorder.

Recommendations for Action

Professionals serving the population of children with autistic disorder should consider the findings of this study and reflect on their own experiences in working with children with this unique disorder. Relevant professionals include psychologists, psychiatrists, teachers, therapists, and other related professions who influence the treatment and planning for children with autistic disorder. The findings from this study must be expanded upon to determine the key elements to include in a standardized assessment of intelligence specific to the population of individuals with autistic disorder. With the autism epidemic continuing and with no cure known at this time, it is critical to the ethical treatment and support to this population that assessment tools normed for this population are developed in order to gain a more accurate understanding of the intellectual abilities within this group.

Recommendations for Further Study

A replication of this study with a larger sample of autism experts and with research questions focused on establishing the key components of a proposed tool for assessing intelligence of children with autism would not only reinforce many of the findings of this study, but would also begin to lay the foundation for the development of what appears to be a highly needed tool. Other research should also evaluate the efficacy of other standardized measures, such as academic achievement tests and the high school exit exam, to determine if the format and procedures are effective for the autistic population or not. Additional relevant study may include the impact of assessment results on an individual's future opportunity due to social stigma, lowered expectations for success by educators and other professionals, and educational and vocational opportunities.

From the findings of the current study it is clear that an efficient and accurate process for assessing intelligence of children with autistic disorder is not in existence. With this knowledge and the foundation from which the development of a more appropriate test can begin, the future of assessment of intelligence in this population has the prospect for more positive outcomes, as do the lives of countless individuals with autistic disorder that will benefit from the development of such a tool.

Researcher Bias and Personal Learning

As a professional with interest in the accurate assessment of intellectual capacity of individuals with autistic disorder, I have developed an opinion of my own about the strategies for accurate assessment, the availability of resources, and the importance of recognition of the unique cognitive style reflected by individuals in this population. During my earlier clinical training of the administration and interpretation of intelligence assessments, I was struck by the standard protocol that would hinder the performance of an individual with autism. I recognized a conflict between the rigidity of the test and the rigidity of thinking often presented by individuals with autism. The concern of extensive miscalculation throughout this population inspired the direction of my research and also represents the bias which required regular monitoring to maintain a scientific and valid collection and analysis of results.

I found it necessary to find a balance between the personal perspective I have of the issues and an unbiased research approach, as I deferred to the expert participants of this study to better understand the experiences with administering and interpreting assessments with this population. I acknowledge the sense of excitement that surfaced when participants provided responses consistent with my own beliefs, and discontent when responses reflected disagreement with my hopeful anticipation of consensus not only with each other, but also with my own perspectives.

As I reflect on the process, I can now appreciate the initial elation or disappointment with participant responses as a reflection of the rich, complexity of professional experience and the nuances of the complexity of autistic disorder itself. I have come to appreciate the differences in professional opinion that emerged just as much as I have appreciated the similarities and established consensus. It is in this exchange of perspective and opinion that an improved approach to assessment of intellectual capacity of this population will rise from. As an example, the desire of many participants to both maintain adherence to established protocol while also having the freedom modify the testing experience to elicit the most comprehensive and accurate measure of an individual's level of intelligence gives direction to the development of a new assessment specific to the autistic population.

Final Remarks

Individuals with autistic disorder and other developmental disabilities rely on the advocacy of others for ensuring the greatest quality of life possible. With much professional attention dedicated to the diagnosis of autistic disorder, intervention for socially undesirable behaviors, and the search for a cure for the disorder, it appears that the importance of accurate assessment of all aspects of assessment of this population, such as intelligence, may not have received equal representation in the literature or in practice. Professionals have grown accustomed to accepting the inaccurate results delivered from standardized assessments as a result of the unavailability of a more appropriate method. Individuals with autistic disorder deserve to have their skills and abilities measured appropriately in order to provide greater opportunities in life while being free from the potential misconceived notion that their unconventional autistic behaviors are paired with a lack of cognitive ability rather than enjoy appreciation for their unique cognitive style.

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Appendix A: Introductory Letter to Potential Participants

Dear Respected Colleague:

I am a doctorate student at Walden University completing research toward completion of a doctoral dissertation in partial completion for a Doctor of Philosophy in General- Educational Psychology. You have been approached for participation in an exploratory study due to your esteemed experience in the field of psychology, and more specifically in assessment of intellectual capacity of children with autistic disorder. The aim of the study is to analyze and consolidate the perspective of multiple experts in the field of autistic disorder about the practice of assessing the level of intellectual ability of this population.

Your participation will include narrative response to three initial questions based on your own experiences with assessment of intelligence in autistic disorder as well as your general thoughts and opinions regarding current practice. Initial findings from each participant will be consolidated for your review and further commentary regarding the accuracy and completeness based on your understanding and experiences.

Your contributions to this study will provide valuable insight into assessment practices with this special population and contribute to further research and development of refined assessment strategies in consideration of the influences of the unique characteristics found in autistic disorder.

If you have any further questions about the study please do not hesitate to contact me directly by email at SpencerAutismStudy@hotmail.com for additional information. If you are interested and willing to participate in this study, please complete the attached consent form and return to me via email at SpencerAutismStudy@hotmail.com . The consent form requires only an electronic signature for your convenience.

Thank you for your consideration in participating in this study.

Sincerely,

Sara Spencer

Walden University

Appendix B: Consent Form

Assessment of Intellectual Capacity in Autistic Disorder: An Expert Perspective

You are invited to participate in a research study being conducted by Sara Spencer, Doctoral Candidate at Walden University. The research is regarding the assessment of intellectual capacity of children with Autistic Disorder. You were selected as a possible participant because of your knowledge and/or experience related to the topic. Please read this form and ask any questions you may have prior to consenting to participate.

Background Information:

The purpose of this study is to better understand your experience with assessment of intelligence of children with Autistic Disorder.

Procedures:

If you agree to be in this study, you will be asked to provide narrative responses to 3 open ended questions through electronic communication through a secure online link to *Survey Monkey*. You can anticipate a time commitment of approximately 15-30 minutes to respond to these three questions, with the ability to set your own pace. You will then be asked to review a consolidation of all confidential participant responses and provide any further feedback as necessary to add information or clarify meaning. You will then be sent a final brief questionnaire in which you will rank statements regarding assessment of intelligence for children with Autistic Disorder with response options ranging from Strongly Agree to Strongly Disagree.

Voluntary Nature of the Study:

Your participation in this study is strictly voluntary. Your decision to participate will not affect your current or future relations with your employer or the any other personal or professional interactions you may have within the field of psychology and assessment of individuals with Autistic Disorder. If you initially decide to participate, you are still free to withdraw at any time without affecting those relationships. Your continued participation is requested in order to ensure consistency to best support any conclusions that may be drawn at the close of the study.

Risks and Benefits of Being in the Study:

There are no known risks associated with participating in this study. Although there is no form of compensation for participation in this study, potential benefits of participating in this study may include personal fulfillment in contributing to an area of research important to you and your profession. In addition, your valuable contributions will help to better understand the perspective of experts in the field to move toward the development of more appropriate and useful strategies for assessing intellectual ability for children with Autistic Disorder. In the event you experience stress or anxiety during your participation in the study, you may terminate your participation at any time. You may refuse to answer any questions you consider invasive or stressful.

Confidentiality:

The records of this study will be kept private. In any report of this study that might be published, the researcher will not include any information that will make it possible to identify a participant. Research records will be kept on a password protected computer; only the researcher will have access to records. In the event that participant misconduct or unethical behavior is discovered through the course of the study, confidentiality of participation may be breached in order to notify appropriate authorities or licensing boards to ensure the health and safety of self or others. If the confidential nature of the study is compromised at any point during the study, each participant will be notified of the conflict and given the opportunity to withdraw from the study and/or request that previous data provided to the researcher be deleted from the electronic storage that the data will be stored on.

Conflicts of Interest

There are no known potential conflicts of interest to disclose.

Contacts and Questions:

The researcher conducting this study is Sara Spencer. The researcher's advisor is Dr. Benita Stiles-Smith. If you have questions at any point during this study with regard to the content or procedures or to clarify any point you may want to make, you may contact Sara Spencer directly at (XXX) XXX-XXXX, xxxx@hotmail.com . You may also feel free to contact Dr. Benita Stiles-Smith at (XXX) XXX-XXXX extension XXXX (ensure international connection; check phone book for instruction), xxxx.xxxx@waldenu.edu . The Research Participant Advocate at Walden University can be contacted by email at irb@waldenu.edu if you have additional questions about your participation in this study.

Criteria for Participation:

Please confirm your ability to participate in this study by checking the box indicating what best describes how criteria is met for participation in this study (to do this, left click twice on your computer mouse on the correct box and select "checked"):

1. At least 5 years experience in a professional capacity with assessment of children with Autistic Disorder:

- ☐ 5 - 10 years
- ☐ 11-15 years
- ☐ 16-20 years
- ☐ 21 + years

2. Credentials demonstrating professional training in the area of clinical assessment:
   - ☐ Masters Degree
   - ☐ Doctoral Degree

3. Current or recent practice with assessment of intelligence of children with Autistic Disorder within 5 years:
   - ☐ Yes
   - ☐ No

Please also provide the following additional demographic data:

Gender: ☐ Male ☐ Female

Age: ☐ 18-35 yrs ☐ 36-50 yrs ☐ 51-65 yrs ☐ 66-80 yrs ☐ 80+ yrs

Have you practiced professionally in any other state(s) than California? ☐ Yes ☐ No
If *Yes*, please list other state(s) in which you have practiced professionally:

____

____

Statement of Consent:

☐ I have read the above information and consent to participate in the study.

Insert Name of Participant, Email Address, and date of consent (electronic signature):

Name Email Address Date

Please email completed form to xxxx@hotmail.com and retain a copy for your records.

Thank you for your participation!

Appendix C: Round 1 Data Collection Tool

Access survey with link: http://www.surveymonkey.com/s/LXQPGB8

Welcome Remarks

Thank you for taking a few moments to participate in this research study! Your total participation time is estimated to be 30 minutes or less, depending on the length of detail you wish to respond with. The more information you provide about your professional experience with assessing intellectual capacity of children with autistic disorder, the greater the contribution to the growing research in this area. Please respond at your convenience and within 2 weeks from the date you have received this survey to ensure your perspective is captured. After all responses are in, results will be consolidated into general themes identified by all respondents and distributed for review and clarification of data as needed. Response information will be kept confidential from all other participants. Thank you!

Survey Question 1 of 3

In 2-4 sentences please answer the following:

What ways and means have you used to describe intellectual capacity in children (0-12 years) with Autistic Disorder?

Survey Question 2 of 3

In 2-4 sentences please answer the following:

When you have used standardized tests to measure the intelligence of children (0-12 years) with Autistic Disorder, what has been your experience with the following three aspects of assessment:

(a) selecting assessment tools

(b) administering assessments

(c) interpreting assessment results

Survey Question 3 of 3

In 2-4 sentences please answer the following:

How would you describe the demonstration of intellectual capacity of children (0-12 years) with Autistic Disorder to be qualitatively different from other populations?

Final Remarks

Thank you for your participation in this study!

Your contribution to expanding the research literature in this area of interest is greatly appreciated!

Sincerely,
Sara Spencer
Doctoral Candidate
Walden University

Appendix D: Round 2 Data Collection Tool

Summary of Findings - Question #1:

What ways and means have you used to describe intellectual capacity in children (0-12 years) with Autistic Disorder?

1) A wide variety of measures are utilized depending on the child and available resources.

2) It is important to recognize the child's strategy for task completion and problem solving, speed of task completion and learning, demonstration of creativity, and how the child's brain is functioning during task completion.

3) Potential interfering symptoms of Autism include motivation, attention, cooperation, language, communication, social deficits, behavior control, and sensory integration.

4) The determination of intellectual capacity is described as an estimate, rather than a definitive measure.

Respondents have used 25 specific measures to assess intelligence in children with Autism:

1) Ages and States Questionnaire
2) Asperger Syndrome Diagnostic Scale
3) Assessment and Evaluating Programming System
4) Autism Diagnostic Observation Schedule
5) Bayley Scales of Infant Development
6) Childhood Autism Rating Scale
7) Children's Category Test
8) Comprehensive Test of Nonverbal Intelligence
9) Developmental Profile
10) Diagnostic and Statistical Manual
11) Differential Ability Scales
12) Gilliam Autism Rating Scale
13) Kaufman Assessment Battery for Children
14) Kaufman Survey of Early Academic and Language Skills
15) Leiter International Performance Scale
16) Mullen Scales of Early Learning
17) Raven Progressive Matrices
18) Scales of Independent Behavior
19) Social Communication Questionnaire

20) Southern California Ordinal Scales of Cognition
21) Stanford Binet Intelligence Test
22) Test of Nonverbal Intelligence
23) Wechsler Intelligence Scale for Children
24) Wechsler Preschool and Primary Scale of Intelligence
25) Woodcock Johnson

Additional assessment strategies include:

1) Behavioral Observation
2) Parent/Teacher Report
3) Review of Records
4) Piagetian Tasks
5) Play Based Assessment
6) Sensory Integration Assessment
7) Memory Assessment

Summary of Findings - Question #2:

When you have used standardized tests to measure the intelligence of children (0-12 years) with Autistic Disorder, what has been your experience with the following three aspects of assessment: (a) selecting assessment tools, (b) administering assessments, (c) interpreting assessment results?

1) Selecting an assessment tool for a child with Autistic Disorder can be difficult, as a specific tool for assessing intellectual capacity of this population is not available.

2) Selection can be influenced by one or more factors including: economics, availability, request of funding source, the referral question, what best suits the child based on strengths and language abilities.

3) Many professionals report having a preferred set of tools that are used on a regular basis.

4) One must develop a rapport with the child and help to make the child feel comfortable in the testing environment.

5) It was critically important for 15% of respondents to follow exact protocol, while 15% reported starting with adherence to protocol with slight diversions as necessary according to the needs of the child.

6) Regularly customizing the process to accommodate the unique developmental, language, and communication needs of the child is practiced by 70% of respondents.

7) Modifications may include alternative phrasing, extended time, intermittent breaks, adapting the test environment, transition among subtests according to child's attention and interest, or completing the assessment over a period of different days.

8) Interpretation of assessment results is a careful and cautious process and must consider the potential symptom confounds to validity, such as social deficit, attention, motivation, language, communication, and behavior.

9) Children with Autism typically score higher with performance tasks and lower with verbal tasks.

10) Careful interpretation of individual subtests is preferred over the general analysis of an overall test score.

11) Caution is also given to over reliance on standardized test scores as such scores may not provide a true and accurate reflection of the child's cognitive abilities or prediction of cognitive potential.

12) The function of a child's behavior provides great insight to their cognitive ability and potential as one discovers why and how a child with Autism behaves in a particular way or completes a task in a particular manner.

Summary of Findings - Question #3:

How would you describe the demonstration of intellectual capacity of children (0-12 years) with Autistic Disorder to be qualitatively different from other populations?

1) Children with Autistic Disorder often demonstrate relative strengths in areas of interest.

2) Focused attention on narrowed interests suggests a cognitive style or intellectual capacity that is narrower in nature rather than demonstrating global skills.

3) Careful attention to skills demonstrated within the interaction of an area of interest may reveal greater complexity in skill level suggesting a more global skill set, such as when working within the complex layers of navigating a computer.

4) The variability, unevenness, and splintered skill set found in children with Autism, with demonstrated strengths in performance tasks and weakness in verbal tasks.

5) The disparity in cognitive profile is unique to the Autistic population and is not found in other populations with cognitive deficits, such as in Mental Retardation, which is typically consistently low in all areas.

6) The severity of Autistic symptoms has influence on demonstrated cognitive profile.

7) Individuals with Autism have a different view of the world and experience the world differently than others, and therefore may also experience test items differently.

8) The atypical behavior of a child with Autism during testing, such as lack of attention, lack of motivation, and increased sensory stimulation may be more so a mere difference in the way a child with Autism brings the world and their understanding of the world closer to them, rather than what is assumed as a barrier to test completion.

9) With emphasis on studying the adaptive skills and the functions of the child's behavior, such as rocking or bouncing on a ball during test completion in order to bring the world closer and experience the details of the experience in order to access the accurate response to a question or task.

10) Cognitive abilities of children with Autistic Disorder are commonly underestimated by teachers and other professionals at first glance.

11) The examiner must approach the assessment of intellectual capacity differently, work harder to determine an accurate measure, choose the most appropriate test, administer with sensitivity to Autistic symptoms, and interpret cautiously and with a more open mind to recognize and consider underlying clues leading to an accurate measure of intellectual capacity.

12) With the unique demonstration of intelligence in this population, the limitation may be found in the tools available for measuring cognitive abilities, rather than a limitation in the child with Autism.

Appendix E: Round 3 Data Collection Tool

Assessment of Intellectual Capacity of Children with Autistic Disorder

Final Survey

Please rate your level of agreement with the following statements on a scale of 1 - 4:
1) Strongly Agree, 2) Agree, 3) Disagree, 4) Strongly Disagree.
Please select only one rating per statement. Thank you!

Strategies for Describing Intelligence of Children with Autism

	SA	A	D	SD
Multiple tools and strategies are often used in the process of assessing intelligence of a child with Autism.	**1**	**2**	**3**	**4**
Tools created for purposes other than to measure intelligence are often used to help determine the level of intelligence in Autism.	**1**	**2**	**3**	**4**
Symptoms of Autism often interfere with standardized assessment procedures.	**1**	**2**	**3**	**4**
Parent and teacher report is very important to the process of assessing intelligence of children with Autism.	**1**	**2**	**3**	**4**

Selecting Assessment Tools

An accurate and appropriate assessment of intelligence for children with Autism is readily available.	**1**	**2**	**3**	**4**
I find it difficult to select the most appropriate tool for assessing intelligence in children with Autism.	**1**	**2**	**3**	**4**
When selecting an assessment tool I consider the appropriateness for the child according to the severity of their Autistic symptoms.	**1**	**2**	**3**	**4**
I use the same intelligence assessments for all individuals whether or not they have a diagnosis of Autism.	**1**	**2**	**3**	**4**

Administering Assessments	SA	A	D	SD
It is difficult to maintain the interest and motivation of a child with Autism during the assessment process.	**1**	**2**	**3**	**4**
Children with Autism tend to perform more successfully when the testing process includes their preferred areas of interest.	**1**	**2**	**3**	**4**
It is critical to maintain strict adherence to test protocol and avoid making modifications in order to ensure validity.	**1**	**2**	**3**	**4**
It is important to implement modifications to test protocol according to the needs of the child to ensure an appropriate measure.	**1**	**2**	**3**	**4**

Interpreting Assessment Results				
It is important to consider the function of behavior demonstrated during task completion of a test item as one interprets the scores.	**1**	**2**	**3**	**4**
One must cross reference results of multiple assessment strategies rather than rely on a single measure to determine level of intelligence	**1**	**2**	**3**	**4**
Over-reliance on standardized scores can result in an inaccurate picture of the true intellectual capacity of a child with Autism.	**1**	**2**	**3**	**4**
Results of intelligence assessments can only be considered an estimate for children with Autism, rather than a definitive determination.	**1**	**2**	**3**	**4**

Difference between Children with Autism and Other Populations				
Children with Autism uniquely demonstrate splintered skills, as compared to other populations.	**1**	**2**	**3**	**4**
Children with Autism have a different view of the world and experience the world differently than other populations.	**1**	**2**	**3**	**4**
The intelligence of children with Autism is often underestimated by teachers and other professionals.	**1**	**2**	**3**	**4**
The scores of intelligence tests hold different meaning for children with Autism as compared to other populations.	**1**	**2**	**3**	**4**

Please provide any additional information, comments, or perspectives below **(optional)*****:***

This concludes your participation in my study!

Thank You!!!!

Appendix F: Narrative Raw Data Sample: Rounds 1-3

The following tables present a sample of full length responses from four of the 20 participants (20%). Bold type within the body of the responses reflects the initial phase of data analysis as themes and categories emerged, as was described in chapter 4.

Round 1 Survey Question #1: In 2-4 sentences please answer the following: What ways and means have you used to describe intellectual capacity in children (0-12 years) with autistic disorder?

009	Primarily through **standardized IQ tests** like the **WISC-IV** and **CTONI-2**.
012	I have used the following tests: **K-SEALS** (Kaufman Survey of Early Academic and Language Skills) **WISC-IV** (Wechsler Intelligence Scale for Children - Fourth Edition **Mullen Scales of Early Learning - AGS Edition WPPSI-III** (Wechsler Preschool and Primary Scale of Intelligence - 3rd Edition) **TONI-3** (Test of Non-verbal Intelligence) **Stanford-Binet-4th Edition** I am trying to find new tests that can test intelligence **non-verbally without complicated topography movements required by the child.** I will at times **use the age equivalent scores** to get an estimated (but very cautious) **developmental-intellectual functioning age**. I will at times **use tests that the child may be too old for** (chronologically) but can perform somewhat developmentally in attempts to get some **estimate (but very cautious)** of intellectual functioning. Will often **emphasis the difference between receptive functioning and expressive functioning.** Will **attempt the non-verbal intelligence test - but most kids cannot understand the topography** of what they need to do. At times I will **administer intellectual sub-tests as receptive** (making materials to administer so that the child can respond receptively) - **but results are interpreted with caution**. Mostly I **use these tests as a baseline and re-test** to gauge rate of progress in intellectual capacity. Other ways to describe intellectual capacity has been to **use a list of developmental skills as listed in a curriculum (the curriculum** has no research for being a correct sequence or inclusive of skills required), but again is used as a basis for comparison on re-testing and for a starting point for teaching. Overall, the **composite scores do not mean much to me**, it is the **age equivalence scores** (that should be used with caution). Also using **percentile scores** often displays to the parent or school that given 100 same aged peers, this child is functioning at _____ percentile. Or this many percent of children are at a intellectual level higher that this child. I also **look at the raw scores more closely when doing a progress report** because just moving one raw point may have a significant result in age equivalence but when looking at the raw scores it is not a significant result (using clinical judgement).

019	Formal assessments including **Leiter Revised, Children's Category Test, C-TONI, TONI-3, Southern California Ordinal Scales of Cognition; Wechsler Scales; Kaufman ABC.** Along with **adaptive beahvior, observations, Piagetian tasks, and other cognitve processing findings including memory**
026	I often attempt a standardized measure to get at intellectual capacity – such as the **WPPSI, WISC, DAS**, etc… however clearly **depending on the individual child, verbal skills, cooperation, motivation, etc. this can sometimes be problematic**. Your question is how I describe the capacity. … I assume you mean when I interpret these results…. I simply **describe strengths and weaknesses** in their profile **as observed by parents, teachers, myself, or on standardized testing**. If there are variables impacting validity such as **cooperation, motivation, understanding** of test instructions, etc, I do mention these and **caution individuals as the scores or impressions may underestimate true skills of the child**. Sometimes **in lieu of standard scores, I may describe a child's range of skills in a chronological age format** (e.g. demonstrates skills between the 3 ½ and 5 year level)… so that others may **interpret intellectual functioning in a developmental way** – I think this helps with designing educational curriculum. I also state that **predictive assumptions** need to be made with caution due to the limitations of testing young children in general.

Round 1 Survey Question #2: In 2-4 sentences please answer the following: When you have used standardized tests to measure the intelligence of children (0-12 years) with Autistic Disorder, what has been your experience with the following three aspects of assessment: (a) selecting assessment tools, (b) administering assessments, and (c) interpreting assessment results

009	a) **There is a limited number of assessment tools to select from. Tests of nonverbal intelligence** are often easier to administer given the **communication/language deficits** associated with ASD. b) **Administration can be difficult due to behavior** including anxiety, ritualistic behaviors, aggression, etc. It is also **difficult to adhere to the standardized mode of administration** as some students with ASD are able to understand what is being asked of them if it is **presented in a different way with additional modeling and practice**. c) Interpretation can be very difficult given the above mentioned problems with behavior and standardization. It often seems like the **tests don't truly tap into the student's cognitive abilities** which then makes it a **poor predictor of future learning potential**.
012	a) I often use the **same assessment tools** - as they are **expensive** to purchase new types and varieties of assessment tools. I will select an assessment tool after first meeting the child and making a clinical judgment as to what type of test they may **be able to perform somewhat well**. b) When administering I will have a variety

	of things I am doing and will intersperse different activities throughout the testing. I will not perform the standardized testing from front to back in the order of the tests. I will **jump around**. I will also **stop when I sense lack of motivation** and **intersperse a break or fun activity**, I will **go back to another subtest** and once I have the child on a roll again I will go back to where the child stopped responding on the previous sub-test. I will **always try at least 2 questions from each sub-test, I will not assume the child cannot perform.** You never know! I once was convinced a child was non-verbal after 2 hours and all of a sudden I started a vocabulary sub-test to label pictures and showed them a picture of a car and the child suddenly said "car"! I use lots of **reinforcement for on task behaviour** (sitting up, looking at me, etc.) as much as needed. I am also **assessing many different things like functions of inappropriate behaviours, readiness skills for learning,** etc. while I am administering the standardized tests. c) I **follow all manual protocols for adding up the numbers**, getting the scores from the **chronological age charts,** etc. When interpreting the results I present the **composite, percentile and age equivalent** in a chart and under the chart I describe the **observed behaviour** for each sub-test. What the child did well (**strengths**), what the child struggled with (**weaknesses**) and end with an **overall age equivalence** and areas of **cognitive deficits** at this point. Again I find **presenting these results as a baseline** is well received as I am in the business to provide a service to improve these results. So, they are considered as an area for growth - for a child that is chronologically 0-approx 8 years of age. After 8 years of age, the recommendations turn more into what can be taught to this child as adaptive functioning given their intellectual capacity.
019	a. it is important to use tools that are or have **nonverbal aspects**. it is important to have a test with a **low enough floor and a high enough ceiling**. the **CCT** is good because the responses are limited and it **involves feedback** to the child. The **SCOSC** is good because the materials are **flexible** and children who are hard to test with standardized instruments can perform on this. b. must be **flexible and allow for children to show their abilities.** if they need to be tested **on the floor**, or with a **reduced number of alternatives** (showing one card at a time on the Leiter for example) always make sure the child is very **comfortable** and many **play tasks** have been attempted first so that he can actually respond fully. c. it is important to take their **processing issues and behavioral patterns** into account and **not overinterpret low scores.** many times low scores are due to **poor imitiation and lack of understanding of the task, not lack of learning ability. most standard IQ tests significantly underestimate cognitive function due to their reliance on language based tasks and verbal instructions, as well as imitation.**
026	I think my answer to #1 is also an answer somewhat to #2. My selection of tests is 1 or 2 from a possible 6 or so measures, and is often based on the **ability level of**

	the child, but also on things such as family finances, **time allotted for the assessment, and/or the referral question**. For example, in private practice many older children may have already had a lot of testing from the school and have an IEP but the diagnosis is unclear. I may then select more informal social/behavioral means of diagnosing PDD than the child who is 3 years old and has never been evaluated. In general, I think the biggest obstacle in assessing intellectual functioning in many children is **compliance, motivation, and the attentional demands of the tests**. Children with autism may **have behaviors** which get in the way of test administration – if the test were administered **visually by computer, for example, many of my kids may demonstrate more compliance and participation**.

Round 1 Survey Question #3: In 2-4 sentences please answer the following: How would you describe the demonstration of intellectual capacity of children (0-12 years) with Autistic Disorder to be qualitatively different from other populations?

009	I think children with ASD have so many complex **challenges when it comes to making sense of the world around them** that it makes it much more **difficult to accurately measure their intellectual capacity** when compared to other populations. Many of them demonstrate **splintered cognitive skills** showing **ability in narrowly defined areas versus global areas.** Testing itself is also inherently more **challenging given the standardized manner** in which the tests should be administered to obtain valid results. It appears, in my experience, that **better results are obtained about the student's abilities when standardization is broken** and the student has opportunity for additional **practice** and demonstration of the subtests' tasks (testing the limits).
012	Children with autism approach social contingencies and learning environments very differently than any other population. Demonstration of intellectual capacity needs to be assessed differently **- accessed more creatively** (but scientifically!) That is why it is **important to know qualitatively how the child performed, what errors were they making.** Children with autism **may have learning errors** and/or no **poor readiness to learn skills, rather than a intellectual deficit**.
019	They do have the **normal range of scores when they are tested nonverbally**. Many children test in the **high average and superior range when tested on the Leiter, CCT and TONI** tests who have tested low on verbally based tests. their ability to follow **verbal directions is poor**, their ability to **process verbal information is poor**, and their **imitation skills are poor**.

026	In short – **you don't always see what a child is capable of**. This is a given. You need to interpret with caution and do **not over-rely on test scores**. Use other measures like **parent-report adaptive scales or teacher report to check scores and make sure they are in the same ballpark.** Children with autism **have unique abilities, strengths, and ways of looking at the world**, and have a **very unique 'intelligence'**. If we can capture that on a test, then all the better, but we need to realize that **just because it cannot be captured quantitatively does not mean it does not exist. It may be simply a limitation of the test itself.**

Round 2 Review of Summary Responses for Survey Question #1:

009	ok
012	I recently have started to look into the **Merrill-Palmer** for testing intelligence with Autistic Disorder
019	I am concerned because many of the instruments noted **have nothing to do with intellectual assessment**. I would double check to see if they really use the CARS, #s 2, 3, 4, 6, 10, 12, 14 18 19 & 25. **research shows that langauge based measures are not supported by research** so people using stanford binet, wisc, wppsi, wais, woodcock johnson, DAS and entire KABC are on shaky ground. again, none of these tests has been shown to have **validity with kids with Autism.** the **only ones shown to have validity are Raven's Matrices, Leiter, CTONI, and TONI.**
026	ok

Round 2 Review of Summary Responses for Survey Question #2:

009	ok
012	using a **variety of assessment tools across many areas**: IQ, adaptive functioning (e.g. Vineland Scales), behaviour scales (e.g. Childhood Behavior Checklist), behavior observations, parent and teacher reports, etc... and analyzing similarities to **corroborate interpretation of the IQ results**
019	**Lack of appropriate norms is a real problem.**

026	ok

Round 2 Review of Summary Responses for Survey Question #3:

009	ok
012	once you find an area of interest and learning readiness has been establish, then re-testing using materials that **incorporate their area of interest** may result in a more accurate IQ result/potential
019	Using the **incorrect norm group** or using **language based tests** results in **underestimation of the skills and abilities of children with Autism.**
026	ok

Round 3 Final Remarks (Optional):

009	No Response
012	I believe it can be difficult to say that one CAN or SHOULD modify testing protocol in order to achieve more "appropriate" or "accurate" results (and thus validity), as this depends on the **skill level of the examiner**. Both **skill level in conducting the test** (interacting with the child with autism), and **skill level in interpreting results from modified testing protocols**. However, you can have the best examiner and the most accurate results and still the recommendations may not make a difference for the child when the **person receiving the results/report cannot understand**(skill level) or believe(bias) the conclusions
019	No Response
026	No Response

Appendix G: Round 3 Raw Data: Likert Scale Responses

▩ Consensus reached!

▨ All but one response in consensus

▥ All but two or three responses in consensus

▒ Outliers- only disagreement in group

▤ Repeated outlier participation

*** Confounding data

Unique ↓ ID	1=Strongly Agree 2=Agree 3=Disagree 4=Strongly Disagree																			
Item # →	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
004	2	2	1	1	3	3	2	2	3	2	1	3	2	2	2	2	2	2	3	3
005																				
006	2	3	2	2	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2
007	1	1	2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	3	2
008	2	3	1	1	3	3	1	2	2	2	2	3	2	2	2	1	1	2	3	3
009	1	1	1	1	2	2	1	4	2	2	2	2	2	2	2	2	2	2	3	2
010	1	3	1	2	2	3	1	2	2	1	2	3	3	2	2	1	1	1	1	2
011	1	2	1	2	2	2	2	2	2	2	3	2	2	2	1	3	1	1	2	3
012	1	1	1	2	2	2	1	2	2	2	3	2	1	1	1	1	1	2	1	3
014	1	3	1	1	3	2	2	3	2	1	4	1	2	2	2	2	2	1	1	3
015																				
016	1	1	1	1	2	3	2	4	2	2	3	2	2	1	1	2	1	1	1	2
017	1	2	1	2	1	3	2	3	2	2	3	2	2	2	2	2	2	1	2	2
018	1	2	2	1	2	2	1	3	1	2	3	1	1	1	1	1	3	2	2	2
019	1	2	1	2	3	3	1	4	2	2	2	2	3	2	3	3	2	1	1	3
020	1	1	1	1	2	3	1	2	2	1	2	3	1	1	1	1	1	1	1	1
022	2	4	1	3	2	4	4	4	1	2	2	3	1	1	1	3	2	2	2	3
023	1	2	1	1	2	2	1	3	2	1	2	2	1	1	1	1	1	1	1	1
025																				
026	1	3	1	1	2	2	1	3	2	2	2	3	2	1	1	2	2	2	2	2

Unique ID	Individual Totals				Cred	Yrs Exp
	SA	A	D	SD		
004	3	11	6	0	Phd	5-10
005					Phd	5-10
006	0	18	2	0	Phd	5-10
007	2	16	2	0	Phd	21+
008	5	9	6	0	Phd	16-20
009	5	13	1	1	MA	11-15
010	8	8	4	0	MA	11-15
011	5	12	3	0	Phd	5-10
012	10	8	2	0	MA	5-10
014	7	8	4	1	Phd	5-10
015					MA	11-15
016	9	8	2	1	Phd	5-10
017	4	13	3	0	Phd	11-15
018	9	8	3	0	Phd	5-10
019	5	8	6	1	Phd	16-20
020	14	4	2	0	Phd	11-15
022	5	7	4	4	Phd	21+
023	13	6	1	0	MA	16-20
025					MA	11-15
026	6	11	3	0	Phd	5-10
Group Total	110	168	54	8	MA= 6, PhD= 14	5-10y= 9, 11-15y= 5, 16-20y=3, 21+=3

Group Totals				Outlook
1= Strongly Agree	110	278	82%	Negative
2=Agree	168			
3=Disagree	54	62	18%	Positive
4= Strongly Disagree	8			

Curriculum Vitae

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OBJECTIVE

To contribute to the foundation of knowledge represented in the current literature regarding individuals with autistic disorder and the accurate diagnosis of levels of intelligence with this special population.

EDUCATION

Walden University
August 2011
General Psychology – Education, Ph.D.
Current GPA: 4.0

Dissertation Title:	"A Delphi Study Regarding Assessment of Intelligence in the Presence of Autism"
Coursework Completed:	History and Systems of Counseling and Psychology, Lifespan Development, Statistics I and II, Psychology of Personality, Interviewing and Observational Strategies, Cognitive Psychology, Biopsychology, Tests and Measurement, Ethics and Standards of Professional Practice, Advanced Psychopathology, Cognitive Assessment, Psychology and Social Change, Psychopharmacology, Social Psychology, Personality and Social-Emotional Assessment., Advanced Psychological Testing, Multicultural Counseling, Educational Psychology, Teaching of Psychology, Principles of Instructional Design, Instructional Design for Online
Assessment Proficiencies:	Wechsler Intelligence Scale for Children – IV, Wechsler Adult Intelligence Scale – III, Minnesota Multiphasic Personality Inventory – II, Minnesota Multiphasic Personality Inventory – A, Brief Symptom Inventory, Thematic Apperception Test, House – Tree – Person
Preliminary Training:	Woodcock- Johnson – III, Wechsler Individual Achievement Test - II

EDUCATION (Cont.)

California State University Sacramento May 2004
Educational Administration and Policy Study, M.A.

California State University Sacramento Dec 2000
Child Development, B.A.

PROFESSIONAL EXPERIENCE

August 2011 – Present The MENTOR Network, Project Manager
Cambridge Operating Group

- Collaborate with local and regional leadership to achieve growth goals through structured management of key projects.
-

January 2011 – July 2011 The MENTOR Network, Strategic Sourcing Manager
Corporate Acquisitions

- Identify and engage potential acquisition targets reflecting shared values and mission of The MENTOR Network
- Develop strategies for identifying growing markets with attractive funding streams and business opportunities

December 2010 – Present Walden University, Graduate Assistant for Writing Center

- Provide editorial feedback on thesis documents of Walden University students
- Conduct research in collaboration with Writing Center faculty regarding the quality and effectiveness of dissertation editorial feedback

October 2008 – December 2010 The MENTOR Network, California MENTOR
Regional Director of Northern California
Family Home Agencies & Adult Day Program

- Senior Management Team member for the state of California
- Leadership and oversight of five Family Home Agencies within Northern California serving individuals with developmental and mental health disabilities
- Collaboration with five separate funding agencies for contract development and renewal, program design review, fee schedule and service delivery plans
- Fiscal planning and budget development for Northern California programs
- Planning and development for organizational structure for Northern California
- Staff recruitment, disciplinary action, transition planning, termination as needed

February 2007 – October 2008 The MENTOR Network, California MENTOR
Program Manager
Sacramento Family Home Agency

- Leadership and oversight in the development and maintenance of a consistently growing Family Home Agency serving adults with developmental and mental health disabilities
- Collaboration with the funding agency for establishing clientele, identifying current needs of the population, and coordinating for individualized residential options
- Development and monthly monitoring of annual fiscal budget in order to support growth as well as ensure a profitable service delivery model
- Supervision and leadership for program staff to include Program Coordinators, Program Recruiter, Program Trainer, Program Evaluator, and Direct Service Employees
- Coordination and planning with senior management for growth and maintenance
- Establish and maintain independent contracts with support service providers to meet the unique needs of the individuals served
- Collaboration with the Sonoma Developmental Center and Porterville Developmental Center for transition of individuals into community living
- Provide management support to additional California Mentor Family Home Agency programs as needed within the Northern California Region

January 2006 - Feb 2007 Alta California Regional Center, Community Deflection Specialist
Community Placement Planning Unit

- Agency Liaison to the Delta Regional Project as a means of deflecting Regional Center consumers from admission to State Developmental Centers
- Forensic Consultant to Regional Center Service Coordinators including: County Court and Jail orders and procedures, Recommendations for Diversion Plans and Competency Evaluation/Training, Community Placement Planning
- Liaison to the California Mentor Family Home Agency for individualized consumer residential options. Conducted program audit with the Department of Developmental Services. Implemented Annual Review for quality assurance within the program as well as individual Mentor provider host homes
- Committee participation: Community Placement Plan Collaborative, Hard to Place Committee, Forensic Review Team, Best Practices Committee
- Multi-agency collaborative committee participation: Interagency Management Authorization Committee (IMAC), Northern California Placement Committee (NCPC), Delta Regional Project Steering Committee, Agnews Developmental Center Transition Collaborative, Community Living Options Process

PROFESSIONAL EXPERIENCE (Cont.)

January 2007 - May 2007	Los Rios Community College District, Adjunct Faculty Cosumnes River Community College,Child Development
February 2005- January 2006	Elk Grove Unified/Sacramento City Unified School Districts Guest Teacher, General and Special Education
July 2004-January 2005	Independent Work and Travel Abroad
July 2005- October 2005	International Sabbatical
October 2002 - July 2004	Alta California Regional Center, Service Coordinator Children's Services
January 2001-October 2002	Lekotek Family Resource Center Child and Family Educator

PROFESSIONAL PRESENTATIONS

March 2006 Cosumnes River Community College, Sacramento
Presentation to college class, *Children with Exceptional Needs,* about the basic characteristics and developmental needs of children with a diagnosis of Autism Spectrum Disorder

December 2005 Children's Receiving Home of Sacramento
Presentation to staff about the basic characteristics and developmental needs of children with a diagnosis of Autism Spectrum Disorder

March 2005 Multicultural Education Conference: CSU Sacramento
Presentation of findings from Master's Thesis research investigating the effectiveness of Relationship Development Intervention as a social skills intervention for students presenting with a diagnosis on the Autism Spectrum

PROFESSIONAL AFFILIATIONS

American Psychological Association for Graduate Students
Cambridge Who's Who Among Executive and Professional Women
Walden's Psi Chi Honors Society