2021

Psychometric Development of the Autism Trait Survey

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PSYCHOMETRIC DEVELOPMENT OF THE AUTISM TRAIT SURVEY

A Dissertation

Presented to the Faculty of

Antioch University Seattle

In partial fulfillment for the degree of

DOCTOR OF PSYCHOLOGY

by

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May 2021

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Antioch University Seattle
in partial fulfillment of requirements for the degree of

DOCTOR OF PSYCHOLOGY

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ABSTRACT

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There are limited tools for professionals who work with individuals with autism to ascertain individuals' strengths and challenges within the various facets of symptomology after diagnosis. Professionals can currently use personal interviews and psychological reports to determine individuals' strengths and challenges to determine the types of services that would benefit them following initial diagnosis. The limitations of this practice are that the levels of understanding, accuracy, and use of these measures vary in the field. Furthermore, the norms of diagnostic measures are the entire population rather than solely individuals on the autistic spectrum/autistics (IOS/A). A new measure is necessary: one that encompasses everyone on the autism spectrum and highlights the variances in strengths and challenges within this population. This dissertation encompasses the creation of such a measure. The output of this measure is data that can showcase individuals' challenges and strengths. These data can provide professionals who work with individuals with autism a better idea of where individuals' needs may lie and help to create individualized treatment goals. This study consists of two data-collection phases: an in-depth measure analysis and one-on-one interviews of professionals in the field. In this study, the researcher assessed for content validity. This dissertation is available in open access at AURA, http://aura.antioch.edu/ and OhioLINK ETD Center, https://etd.ohiolink.edu

Keywords: autism, psychometrics, strengths and challenges, neurodiversity, DSM limitations, sensory, adaptive behavior, social skills, communication, stimming

Dedication

To all those who were told that they couldn't…

Acknowledgments

Thank you to all my faculty members, mentors, my family, and support critters who helped make this process possible.

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CHAPTER I: INTRODUCTION TO THE STUDY

This dissertation was a partial fulfillment of the program requirements for the Clinical Psychology PsyD Program at Antioch University, Seattle. The primary purpose of the study was to work toward the creation and partial validation of a new psychometric measure that can help individuals on the autistic spectrum/autistics (IOS/A) to receive the assistance they need without the need for extensive psychological evaluation, which may exclude those without the education or training necessary to understand complicated reports. The potential significance of the instrument is that it can provide professionals in the field with a snapshot of their IOS/A clients' individual strengths and challenges. To enhance the reader's understanding, this chapter includes a brief literature review and a discussion of the research methods. Appendix A gives a flowchart that provides the reader with a pictorial view of the research methodology for this study.

Background

The primary reason for creating this survey was to fill a void in the array of current psychometric measures for IOS/A by creating a new measure that evaluates characteristics of autism after diagnosis. Individuals' needs may change as time passes, they may meet developmental milestones, or they receive therapy (Rutherford et al., 2016; Sappok et al., 2015; Wilkinson, 2011). The American Psychiatric Association's Diagnostical and Statistical Manual of Mental Disorders, Fifth Edition (DSM–5) diagnostic criteria are limiting in the diagnosis of autism (Dell'Osso, Dalle Luche et al., 2016). It is hoped that the creation of this survey will help to fill a current gap, as it will give professionals in the field a clearer picture of individuals' strengths and challenges that go beyond the DSM–5's tertiary model. Currently the DSM-5 attributes three levels of support needed to diagnose differences in autism symptomology (American Psychiatric Association, 2013). Autism is a vast and complex condition; with various

dimensions intertwined within each symptomological aspect; no two people with autism experience their array of symptomology in the same way (Noordhof et al., 2015). Individuals on the spectrum/autistics can manifest a number of different symptomologies, each with its own degree of severity. This new measure may capture these differences.

Schwartzman et al. (2016) analyzed IOS/A personality traits through the lens of the big five, and they compared these traits with persons without autism. In this study, the big five relates personality traits to a lexical taxonomy such as openness, conscientiousness, extraversion, agreeableness, and neuroticism, as initially postulated by McCrae and Costa (1987). Schwartzman et al. (2016) concluded that various personality traits were present in individuals with autism. Further, they worked to determine whether behavioral phenotypes were prevalent and whether they depended upon the severity of the individual's autism symptomology. They found an elevated neuroticism trait due to autism severity, while the other traits of extraversion, openness to experience, agreeableness, and conscientiousness did not correlate with autism severity. The findings of Schwartzman et al. were significant in that the five-factor model traits of personality could be used in describing some parts of IOS/A. But they also showed that the model was inadequate to determine individuals' severity of autism.

This model, the big five (McCrae & Costa, 1987), influenced the development of the Autism Trait Survey with the recognition that just like personality, autism has different characteristics that differ vastly between individuals (Azeem et al., 2016). The Autism Trait Survey may help those who work with IOS/A to ascertain the strengths and challenges of people with autism as well as their realm of ability.

Problem Statement

There are few tools for licensed psychologists who work with IOS/A to ascertain individual strengths and challenges within the various facets of symptomology after diagnosis (Sappok et al., 2015). As of September 2020, professionals can use personal interviews and psychological reports to determine individuals' strengths and challenges and to determine the type of services that would benefit them following initial diagnosis (Armstrong, 2012). The limitations of this practice are that the levels of understanding, accuracy, and use of these measures vary. Furthermore, the basis of the norms for diagnostic measures is the entirety of the population rather than solely IOS/A. This measure will encompass everyone on the autism spectrum, and it will highlight the variances in strengths and challenges within this population.

Purpose of the Study

The purpose of this study was to improve the understanding of autism by working toward the development of a new tool to help measure characteristics of autism within various facets that are not currently measured. The output of this measure is data that can showcase individuals' challenges and strengths such as those noted in Barnhart (2017). These data can provide professionals who work with IOS/A with a better idea of where individuals' needs may lie, which may help to create individualized treatment goals.

Research Question and Hypotheses

For this study, the research question is as follows:

Is it possible to create a valid measure of the strengths and challenges of an individual with autism that will add valuable information to the current treatment and support of the condition after initial diagnosis?

Theoretical Foundation

This study was quantitative in nature, as the primary goal was to work toward the creation of a new psychometric measure. A test construction model was created that incorporates a series of phases based upon an article published by Clark and Watson (1995) and on test construction best practices, as discussed by Miller and Lovler (2015). Chapter III includes a detailed version of this process.

Clark and Watson (1995) sought to highlight concerns surrounding objective scale development. They analyzed 41 scale development articles and used the aspects within to guide their suggestions. Clark and Watson did not create a model of test construction; rather they offered a set of guidelines that helped to create evidence-based practices surrounding the future of test construction. Their findings were important in that they created evidentiary guidelines that could be followed and gave a rationale as to specific steps a test developer might take. It is this reason that the work of Clark and Watson was used as part of the guiding theories used to create this measure.

Miller and Lovler (2015) served as the main guide in test construction theory for this study including, the guide by which the pilot study was created and the initial validation procedures.

Nature of the Study

This study is the culmination of the first four steps of six toward the validation of a new psychometric tool that will assist professionals in the field to pinpoint individuals' challenges and strengths. This may lead to increased accessibility of care. The output will provide the professional with knowledge of where individuals' strengths and challenges lie, and it will

produce a diagram that will assist in giving people with autism quicker and more individualized access to care.

Definitions

Activities of Daily Living: Activities of daily living (ADLs) refers to individuals' ability to care for their basic needs such as bathing, toileting, and shopping for groceries (Piccin et al., 2018).

Attention: Attention relates to individuals' ability to attend to tasks without getting distracted (Vivanti et al., 2017).

Autism: Autism is a spectrum disorder according to DSM–5 (American Psychiatric Association, 2013). The DSM–5 encompasses a tertiary model that ranks individuals according to their distinct challenges.

Cognition: Cognition relates to individuals' mental action or process (Mazza et al., 2017).

Communication: Communication refers to the sharing of ideas and the exchanging of information (Alexander & Dille, 2018).

Emotional Aspects and Adaptive Behavior: Emotional aspects and adaptive behaviors relate to individuals' ability to regulate emotionally and to behave appropriately within social contexts (Fenning et al., 2018).

Individuals on the Spectrum/Autistics (IOS/A): Individuals on the Spectrum/Autistics relate to those who identify as being on the autism spectrum. Both person-first and identity-first language is used.

Imagination and Creativity: Imagination and creativity relate to individuals' propensity to be creative, such as to play, to create art, to make music, and the like (Seymour & Wise, 2017).

Motor Skills: Motor skills refers to individuals' physical movement function (Hillus et al., 2019).

Psychometric Testing: Psychometric testing refers to the various tests and measures psychologists and others in the field use to assess an individual (Miller & Lovler, 2015).

Restrictive and Repetitive Behaviors: Restricted and repetitive behaviors refer to a set of diagnostic symptoms an individual must exhibit to meet the criteria for an autism diagnosis (American Psychiatric Association, 2013). More specifically, restricted and repetitive behaviors relate to perseverations or obsessions surrounding routines, fixated interests, and repetitive behaviors individuals often use for self-soothing (Lin & Koegel, 2018).

Self-injurious Behavior: Self-injurious behavior relates to a group of behaviors individuals engage in to inflict harm upon themselves (Handen et al., 2018).

Self-Regulation: Self-regulation refers to the ability of individuals to regulate their emotions, such as curbing explosive anger tendencies (Ros et al., 2018).

Sensory Factors: Sensory factors relate to individual aversions or seeking behaviors of sensory input like lights, textures, tastes, and different sounds (Mayer, 2017).

Social Aspects: Social aspects relate to individuals' ability to get along with others, understand social cues, and understand cultural norms (Bottema-Beutel et al., 2018).

Assumptions

It is an assumption that professionals are missing important data with the current way information is disseminated within disciplines that serve IOS/A. Another assumption is the current model of autism from which this study is based; for example, the current definition of autism, as outlined in the DSM-V (American Psychiatric Association, 2013), is a created construct. The current construct may not be all encompassing of autism symptomological

presentation. Finally, the assumption holds that persons who have experience working with IOS/A will be able to give more informed feedback than those who do not have similar experiences.

Scope and Delimitations

Participants in this study were individuals with experience working with IOS/A. Participants had at least one year of experience because persons familiar with autism were able to give more informed feedback regarding the creation of the survey. Participation in this study was open to all professionals who work with IOS/A on a therapeutic level worldwide in order to facilitate participation. Participants included licensed clinical psychologists and licensed mental health professionals. English speaking was a criterion for participation. Participants were also at least 18 years of age.

Limitations

A significant limitation of this study was that it was difficult to attain a sample size that was representative of all cultures and regions due to the enormity of the sample population. Language barriers also are a contributing factor. Furthermore, other regions of the world may not be reached due to limitations in technological advances, the availability of electricity, and the lack of access to the internet. Efforts to minimize the limitations were considered. For instance, during the fifth phase, participation will be open to those who meet the inclusion criteria globally. Furthermore, this study was conducted in English, one of the most widely used languages in the world.

Significance

A gap was identified in the way clinicians who work with IOS/A evaluate their clients' strengths. Persons on the autism spectrum, indeed, are on a spectrum, with an array of strengths

and challenges (Mazurek, 2014). To say individuals have *autism* does not give a clear picture of their unique needs (Croen et al., 2015). Some people IOS/A are verbal, while others are nonverbal (Burgess & Turkstra, 2010; White et al., 2010). Some have high levels of cognitive ability but have challenges with ADLs. There are several psychometric tests, such as the Ritvo Autism Asperger Diagnostic Scale-Revised (RAADS–R; Andersen et al., 2011), and the Autism Spectrum Quotient (ASQ; Murray et al., 2016). None currently exist that focus on measuring each trait of autism after initial diagnosis. The significance here is that those in the field do not focus on the strengths and challenges of IOS/A but only on whether they require one of three levels of support (Gökçen et al., 2016). After treatment, individuals' needs may change as their traits change (Howlin & Moss, 2012). A measure to determine individuals' strengths and challenges may be useful for treatment recommendations (Armstrong, 2012). Thus, the rationale for the development of this survey is to help clinicians to pinpoint individuals' strengths and challenges.

Summary

In summary, this chapter has provided a basic synopsis of this study. It has highlighted the background of the current psychometric measures, along with the problem under study, which focuses on the absence of a psychometric measure that examines individuals' strengths and weaknesses after receiving an autism diagnosis. It has explained the nature of the study, along with definitions, assumptions, scope, and delineations, in addition to the limitations and the significance this study can have for clinical practice.

CHAPTER II: LITERATURE REVIEW

Currently, measures exist for use in autism diagnostics, but there are no measures that focus on characteristics associated with IOS/A after initial diagnosis. Furthermore, many professionals in the field receive psychological reports that can be cumbersome to understand due to the professional jargon and the length of the report. The purpose of this study was to create a way to disseminate individuals' strengths and challenges after an initial autism diagnosis and to compare their results with those of others on the autism spectrum. This chapter consists of the literature review for this study. More specifically, it describes key concepts and variables relating to autism such as physiological basis and etiology, and it gives a basic presentation of autism, common forms of treatment, and social, cultural, and economic factors, as well as an in-depth measure analysis surrounding the proposed domains.

Literature Search Strategy

The literature search consisted of the use of EBSCOHost and ProQuest. EBSCOHost is an online research platform that was accessed through the Antioch University library. It was founded by the philanthropist Elton Bryson Stevenson (EBSCO Industries, 2020). Similarly, ProQuest (2020), formally known as University Microfilms, is another online research platform that was utilized through the Antioch University library. It was founded in 1938 by Eugene Power. To facilitate readability, the search terms are in Appendix B of this document.

Literature Review Relating to Key Concepts and Variables

This literature review encapsulates the key concepts and variables relating to this study. The main topics covered are autism and psychometric measures currently in place. The literature review follows.

Within this literature review regarding autism, many aspects of the condition will be discussed. First a discussion of physiological basis and etiology will ensue, followed by basic psychobiological findings and clinical profile of IOS/A. Next, I share findings relating to specific treatments and special accommodations and considerations in treatment settings. Next, a discussion regarding aspects relating to social, political, economic, and cultural factors will take place. Lastly, a discussion on barriers and stigmatization will ensue.

Physiological Basis and Etiology

There are several theories on the causality of the physiological bases of autism. Currently, research suggests a strong link to genetic bases (Azeem et al., 2016; Freitag et al., 2007). However, more research is necessary for more clear understanding. For example, Azeem et al. (2016) sought to determine whether there were any commonalities between IOS/A and gene variations. They determined that single-gene variations on certain chromosomes had associations with high risk.

Similarly, along with the physiological basis and etiology tone, there are a number of theories on the etiology of autism, such as vaccines (Azeem et al., 2016), chemicals in the environment (Pagalan et al., 2018; Raz et al., 2018), and biological and genetic components (Freitag et al., 2007). Another theory as to the origin of autism was postulated by Dr. Andrew Wakefield of Great Britain who published a study with misleading findings (Wakefield, 1998). This study, which only had a sample size of 12, incorrectly led people to believe that the vaccine commonly used to inoculate people against measles, mumps, and rubella caused autism. Due to this falsified claim, the rate of vaccinations plummeted, thus leaving people vulnerable to these diseases, particularly the very young and the elderly. Measles cases rose as a result (Hussain et al., 2018). Later studies concluded that vaccines do not cause autism (Azeem et al., 2016).

Another theory on the causality of autism is that there are contributing environmental factors. Popovich et al. (2018) noted the steep rise in autism diagnoses, and they suspected that there were environmental causalities due to the increase in emissions and global-warming gases. Furthermore, researchers conducting studies in neuroscience and epidemiology sought to find an association between exposure to air pollution and autism (Citroner, 2018; Pagalan et al., 2018; Raz et al., 2018). Ritz et al. (2018) addressed the influence of air pollutants on the risk of autism. Their findings included that air pollution exposure in infancy led to an increased risk of autism. The study conducted by Ritz et al. is unique because it is possibly the largest study in which researchers examined environmental factors as potential risks for autism. Similarly, it is one of the few studies to control for maternal smoking in pregnancy, to assess subtypes of ASD, and to coadjust for multiple exposure periods from preconception to infancy.

Some theorists have also thought that mothers were the cause of autism. They used the term *refrigerator mother* (Crowell et al., 2019; Sousa, 2011) to describe mothers of IOS/A. Refrigerator conveys the notion that these mothers were cold in their demeanor, especially in their interactions with their children (Crowell et al., 2019). Refrigerator mothers allegedly caused their child's autism by not offering enough love and emotional support. Sousa (2011) examined 33 accounts of mothers who each raised a child with autism. Sousa refuted the notion that refrigerator mothers are cold and uncaring and instead equated those who raise children with autism as heroes.

Basic Psychobiological Findings and Clinical Profile

According to DSM–5 criteria (American Psychiatric Association, 2013), for individuals to receive diagnoses of autism, their symptomology must have been present early in their development. The symptoms cause impairments in a variety of areas in current functioning.

Since autism is a spectrum disorder, the specific areas of deficits vary with each individual. Specific factors that contribute to a diagnosis of autism include a demonstration that individuals experience difficulties in social communication and interaction (Crowell et al., 2019). Individuals must also have demonstrated restrictive, repetitive patterns of behavior, interests, or activities (American Psychiatric Association, 2013). These impairments can significantly impact such individuals' quality of life (Murza et al., 2014).

IOS/A may have poor social skills, which can hinder their ability to notice social cues that can facilitate learning (Armstrong, 2012). When typical persons undergo their normal developmental process, they are more likely to notice various social nuances many neurotypical people take for granted. They learn these social skills, along with the details of how to get along with others. IOS/A struggle to learn these social cues, and as such, they have difficulty identifying small details such as humor and sarcasm.

One of these social cues is facial expressions, which IOS/A can find difficult to read (Mazza et al., 2017). Another issue for many people with autism is that they have difficulty working with others, such as in group projects (Toor et al., 2016). IOS/A may also have difficulties in expressing their needs. From a developmental perspective, IOS/A struggle with language, as DSM–5 noted in its diagnostic criteria (American Psychiatric Association, 2013). Some may want help, but they may be unsure how to ask for it. Some may be too shy to ask for fear of embarrassment because of perceived notions of intellectual ability or social inadequacies (Mazza et al., 2017).

Individuals' ability to express empathy is another vital concern in those with autism. Many times, IOS/A have difficulty in expressing empathy, but that does not necessarily indicate they have no empathy. These limitations of empathetic expression can lead to difficulties in

nonverbal communication (White et al., 2010). Burgess and Turkstra (2010) utilized the American Speech-Language-Hearing Association's Quality of Communication Life Scale (QCL; Paul et al., 2004) to ascertain whether QCL was a useful way of testing individuals' ability to communicate effectively. Their participants were 14 persons with ASD and 15 persons without ASD. Their findings suggested that IOS/A had more difficulty in communicating with others than their neurotypical counterparts (Burgess & Turkstra, 2010).

Executive functioning relates to individuals' ability to multitask, focus attention, plan, and self-regulate (Gökçen et al., 2016). IOS/A often have difficulties with their executive functioning. One common difficulty for persons on the autism spectrum is that planning ahead is a struggle. Many IOS/A struggle to prioritize tasks and to ascertain what resources they need when trying to accomplish these tasks.

There has been research on the adverse psychobiological effects of autism that may help professionals in the field. Ha et al. (2015) discovered that patterns of restricted and repetitive behaviors had links to differences in the striatum, which is part of the basal ganglia. They also found differences in the orbitofrontal cortex and the caudate nucleus. Furthermore, they found that deficits in social language processing and social attention originated from differences in the inferior frontal gyrus and the superior temporal sulcus within the Broca's and Wernicke's areas. Similarly, Azeem et al. (2016) found that there were enlarged ventricles and increased cerebral volume in the brains of IOS/A. They also found abnormalities in brain biochemistry and in serotonin pathways. IOS/A showed decreased metabolism in both the anterior and posterior cingulate gyri.

Treatments

There are a number of treatments with associations with autism. One popular therapeutic modality for those with autism, albeit controversial, is Applied Behavioral Analysis (ABA; Leaf et al., 2018). In ABA, the therapist relies heavily on behaviorism to shape the individual's behavior into behaviors that resemble those of their neurotypical counterparts. ABA is controversial because some believe that ABA does not promote acceptance of people as they are (Armstrong, 2012). ABA shapes the behavior of individuals into behavior that is more socially acceptable. Others have ethical issues with the frequency of ABA, as it is not unusual for children to have 3–4 one-hour-long sessions a day (Leaf et al., 2018).

Another popular modality is group therapy incorporating the notion of neurodiversity and social skills training. Groups help those on the spectrum to develop social skills, and neurodiversity helps them learn to accept themselves as they are (Barnhart, 2016). Social difficulties are perhaps the most debilitating impairments, according to Stichter et al. (2012). For IOS/A, these impairments are present throughout their life. Social skills training is often useful to teach individuals social appropriateness. Much of this social training equates with the same type of learning a neurotypical person undergoes to learn mathematical or historical concepts. For those who are neurotypical, social skills often develop throughout life, as individuals experience social interactions, from the time they are young (Howlin & Moss, 2012). There are a number of ways to teach these skills, most commonly in a therapeutic setting (Bailey et al., 2015).

Special Accommodations and Considerations

For those working with IOS/A, it is essential to be mindful of sensory triggers, and, as such, to set up offices accordingly (Shiloh & Lagasse, 2014). For instance, IOS/A often find lights too bright and overwhelming. Similarly, blinking lights from a cellphone charging, or the

traffic lights from outside a window, can be distracting. Many persons on the autism spectrum have misophonia, sensitivity to sounds (Jastreboff & Jastreboff, 2015). Even the most unassuming noise can be distracting, such as the hum of electricity, the traffic outside, or gulping noises from drinking water. In these instances, it is important to be mindful of individuals' needs (Medina-Centeno, 2014).

When working with IOS/A, careful consideration of privilege and vulnerability is necessary. From the addressing model (Hayes, 2016), people generally view persons with disabilities as a target ranking when compared with healthy people who would be in an agent ranking. IOS/A often feel isolated and alone, thus making them even more vulnerable in a therapeutic environment. Furthermore, individuals with disabilities often face discrimination, and they can be a vulnerable population (Sylvester, 2014). In the therapeutic role, in a clinical setting, the therapist would be in a place of privilege and, as such, would need to be mindful of words, spoken or written, and other aspects of clinical practice (Medina-Centeno, 2014).

Another factor to consider when treating someone in this population is that there are gender differences in autism trait expression (Dean et al., 2017; Loomes et al., 2017). Women are at a heightened risk for a delay in receiving their autism diagnoses, leading to delays in treatment and supports. This is likely due to a number of factors. In women, the behaviors are more socially appropriate, and women demonstrate greater ability at masking or camouflaging actions. Autism symptoms, such as difficulty in socialization and communication, are stereotypically strengths in women. Women on the autism spectrum are often very verbal. They are more conditioned to seek social acceptance, and thus more vulnerable to those seeking to take advantage. Women often analyze their social performance (Dean et al., 2017; Loomes et al., 2017). Furthermore, friendships are often difficult, and many women with autism are conflict

avoidant. Women are less likely to show restricted interests, or when they do, they are stereotypically normal, such as a teenager obsessing about a specific love interest, particular clothes, or a music group. Women with autism manifest as neurotypical men; however, they are not necessarily interested in math or science (Dean et al., 2017; Loomes et al., 2017).

Social, Political, Economic, and Cultural Factors

Socially, persons on the autism spectrum have difficulty (Maloret & Sumner, 2014). Social norms can be challenging for those on the spectrum to navigate, thus making it difficult to locate and maintain friendships and other sources of social support (Mazurek, 2014). IOS/A often have difficulty with receptive and expressive language, making communication difficult. Furthermore, persons on the autism spectrum have difficulty understanding jokes, sarcasm, and social nuances that can enhance social relationships. Often, these difficulties can cause instances of loneliness, isolation, depression, and social anxiety (Jordan & Caidwell-Harris, 2012).

Politically, a few factors come into play here. Some factors are in the politics surrounding the school system. Many schools are having marked difficulty in delineating placement for persons on the autism spectrum (Armstrong, 2012). The usual predicament is that there are few placements for those on the autism spectrum. Another issue is that persons on the spectrum vary in terms of their challenges and strengths (Armstrong, 2012). Those placing persons into classrooms or schools must be aware that students' needs vary and that heavily individualized interventions and supports are often necessary. Often, school districts have difficulty acquiring the resources necessary to support these IOS/A (Gobbo & Shmulsky, 2016).

Economically, persons may receive limited care. Some treatments for autism receive insurance coverage, while others do not, depending on the insurance carrier (Kogan et al., 2010). ABA is a common therapeutic measure that IOS/A undergo, albeit a controversial measure (Leaf

et al., 2018). Schools, medical insurance, and state disability resource programs pay for many of these therapies. If individuals do not qualify for services by other means, then they must pay for services out of pocket. If individuals cannot afford these therapies, they will go without, thus making financial constraints a hindrance to treatment.

Culturally, therapists need to be mindful and considerate of the different beliefs and values of the individuals they serve (Sagy, 2017). Furthermore, therapists working with this population need to be cognizant of the various systems in place surrounding individuals. Some questions therapists can ask their clients are as follows. What do family members believe the causality is? What other aspects of treatment have they tried? What do they believe works and what does not work? What religious and cultural beliefs come into play here? Psychoeducation is important, and it is most effective when delivered in a respectful way. Some cultures may be embarrassed by their loved one's diagnosis, such as in the countries of India and China, while others are generally more accepting such as in the United Kingdom (Medina-Centeno, 2014).

Barriers and Stigmatization

There are a number of barriers and stigmas relating to this condition. Psychologists can advocate for this vulnerable population, as many persons on the spectrum have difficulties with communication. Research is another way that psychologists can advocate for IOS/A. Research that refutes common autism stereotypes such as the notion that persons on the spectrum do not have empathy, or that they prefer to be alone, is necessary.

Persons with high-functioning autism often face stigmatization surrounding their autism diagnosis (Banda et al., 2014; Trammell, 2013). Many people who are unfamiliar with autism believe that those with autism are not as capable as their neurotypical counterparts (Maloret & Sumner, 2014; Mazurek, 2014). For instance, when IOS/A decide to study for higher-level

degrees, there often is not much support for them (McKeon et al., 2013). People assume that because people have autism, they cannot succeed in academia, professional pursuits, or even in their personal lives (Murza et al., 2014). Psychologists can help to thwart these misperceptions by disseminating information that proves the contrary.

IOS/A are significantly more likely to have higher levels of unmet healthcare needs due to differential funding of child and adult services and differential eligibility for care (Croen et al., 2015). There is also a lack of awareness and clinical knowledge about autism among physicians. Tactile sensitivities may interfere with medical exams, which can delay the diagnosis and treatment of various medical conditions (Marco et al., 2011). Deficits in communication and social deficits are also impactful with regard to gaining access to healthcare, as the individual needs to make medical appointments. Also, many IOS/A have a high pain tolerance, which can lead to delays in care. These are contributing factors to missed or delayed diagnoses and opportunities for prevention and early treatment (Croen et al., 2015).

In-depth Measure Analysis Relating to Currently Used Psychometric Instruments Used with Individuals on the Spectrum/Autistics (IOS/A)

Sappok et al. (2015) conducted a literature review of 46 different autism measures in both English and German. They sought to gauge the availability of measures for autism across the lifespan. They discovered that there were limitations of measures available for adults and for those with intellectual disabilities. The specific aspects they reviewed were the appropriate age range, level of functioning the measure concerns, a short description, and key references. While these findings were significant in that a clearly identified lack of measures to assess adults with autism was apparent, they did not locate a measure for use after diagnosis to assess strengths and challenges in various domains. Furthermore, they did not include a breakdown of the

subdomains, which was important for this study. An in-depth measure analysis was conducted and encompassed the commonly used psychometric measures for IOS/A created from the 1980s through the year 2019. A total of 45 measures that assessed IOS/A symptomology across the lifespan (see Appendix C) were analyzed. Of these measures, none assess individuals' strengths and challenges after diagnosis. A discussion of the relevant measures follows. Domains present in each psychometric measure were analyzed, and domain themes were identified and broken down into potential categories. These categories were used to create a starting point for the creation of new domains for this measure. From there, an item pool was created with 10 items for each domain. Most of the domains fit easily into the categories of *restrictive/repetitive behaviors, social aspects, emotional regulation,* and *communication.* The infrequent categories were *cognition, developmental aspects, regression, imagination and creativity, self-injurious behaviors, adaptive behavior,* and *activities of daily living.*

Adult Autism Measures

While most measures focus on the assessment of autism in children, specific measures exist for adults as well (Baron-Cohen et al., 2001; Dell'Osso, Gesi, et al., 2016; Eriksson et al., 2013; Grodberg et al., 2012; Lord et al., 1989). Their presentations are often different, and their symptomology is not as obvious, especially since some adults were not diagnosed as children. While the Autism Diagnostic Observation Schedule (ADOS–2) is most widely known for its use in the diagnosis of children with autism, there is also an adult module (Lord et al., 1989). Inter-rater reliability was assessed within five different raters.

The Adult Subthreshold Spectrum (AdAS Spectrum; Dell'Osso, Dalle Luche, et al., 2016) consists of six domains consisting of aspects common in adult autism. Validation consisted of internal consistency and test-retest reliability. Like the ADAS, the Adult Asperger

Assessment (AAA; Baron-Cohen et al., 2001) is comprised of four subscales and takes three hours to administer. The data is collected through an interview format. The creators used inter-rater reliability as well as comparing their results with the results from other measures.

In the Autism Mental Status Examination (AMSE; Grodberg et al., 2012), there are a total of eight items, and it was created to further facilitate the assessment process across multiple settings. The ADOS was also used in the creation of this measure to determine the cut-off score. Internal consistency and inter-rater reliability was used in the procedural validation process. Similarly, the Ritvo Autism and Asperger Diagnostic Scale (RAADS–14; Eriksson et al., 2013; Ritvo et al., 2008) is a self-report screener for adults who exhibit autistic traits. The measure consists of 14 items, hence the name RAADS-14. A ROC analysis was used in the item analysis as well to assess the autism component when compared to those with other psychiatric concerns. Items with low discriminate power were removed.

The ASD in Adults Screening Questionnaire (ASDASQ; Ferriter et al., 2001; Nylander & Gillberg, 2001) was created to fill a gap, as no screeners for adults with possible autism existed. Across rater reliability was fair-moderate, within rater reliability was moderate-good, and internal consistency was noted as excellent. Similarly, the (RAADS–R; Eriksson et al., 2013; Ritvo et al., 2008) contains four domains. This measure consists of 80 items with respondents endorsing items on a four-point Likert scale. An exploratory factor analysis was used to determine construct validity. Cronbach's alpha was also used to determine internal consistencies.

The Autism Spectrum Disorder Diagnosis for Adults (ASD–DA; Matson et al., 2007, 2010) is another tool to be used to assess for autism in adults who also present with intellectual disability. Inter-rater and test-retest reliability were assessed as well as an item analysis, resulting in a 31-item scale. The Autism Symptom Self-Report for Adolescents and Adults (ASSERT;

Posserud et al., 2013) is a self-report screener which includes seven items. For validation procedures, the creators performed a descriptive analysis using Cronbach's alpha along with ROC analyses within SPSS. A bifactor analysis, incorporating both exploratory and confirmatory factor analysis, was conducted using Mplus.

The Autism Checklist (ACL; (Sappok et al., 2014) is a measure to assess autism in those with accompanying intellectual disability. Cronbach's alpha was used to determine internal consistency. Cohen's kappa and Spearman's coefficient was also used to determine inter-rater-inter-time reliability. Lastly, The Autism Quotient (AQ; Baron-Cohen et al., 2001; Freitag et al., 2007) consists of 50 items and is given to those suspected of autism with average intelligence. A factor analysis was used to determine validity.

Childhood Measures

Infant and Early Childhood Measures

As in adults, IOS/A may present with different symptomologies in their infancy or in early childhood. As such, there exists a number of measures that can be used specifically for those suspected of autism in this early age. One of the most popular measures is the Baby and Infant Screen for Children with Autism Traits (BISCUIT; Matson et al., 2007, 2010). The BISCUIT is comprised of five domains. Convergent validity was established with the Modified Checklist for Autism in Toddlers (M-CHAT) and the Battelle Developmental Inventory (BDI2).

The Checklist for Autism in Toddlers (CHAT; Baird et al., 2000) is used by professionals to evaluate for autism in children ages 18–24 months and is comprised of 14 questions. Children are given a rating as being at low, medium, or high risk for autism. The CHAT is significant because it was the first measure of autism in very young children. Similarly, the Autism Detection in Early Childhood (ADEC; (Nah, Young, & Brewer, 2014; Nah, Young, Brewer, &

Berlingeri, 2014; Young, 2006) is used to assess children for autism ages 12 to 36 months. Validation procedures consisted of determining internal consistency, which was high along with inter-rater and test-retest reliability. An exploratory factor analysis also took place to determine construct validity. Furthermore, concurrent validity was also established while comparing scores of the ADOS with the same participants.

The Quantitative Checklist for Autism in Toddlers (Q–CHAT; Allison et al., 2008, 2012) is a parent-report screener that helps with the early detection of autism in children 18–24 months of age. It is comprised of 15 Likert-scale items. Lastly, the Screening Tool for Autism in Toddlers and Young Children (STAT; Stone & Ousley, 1997; Stone et al., 2000) is used in children ages 24–36 months of age. The STAT consists of 12 items and is meant for use by service providers. Creators of this measure utilized inter-rater agreement, test-retest reliability, and compared the findings with those of the ADOS.

Childhood Measures-Provider

The Monteiro Interview Guidelines for Diagnosing Asperger's Syndrome (MIGDAS–2; Monteiro, 2008) is used by providers to help diagnose autism in school-aged children. This measure has three primary components: a pre-interview checklist, a semi-structured interview for parents and teachers, and the student diagnostic interview, which consists of a number of prompts given by the provider.

The Childhood Autism Rating Scale (CARS; Schopler et al., 1988) is a tool to be used by professionals and is comprised of four subtests. Internal consistency reliability was assessed by using Cronbach's alpha and was deemed to be excellent. In order to assist in determining cut-off scores, Kappa analyses were used and compared with the ADOS and DSM-IV.

The Autism Diagnostic Observation Schedule (ADOS–2) Toddler Modules 1-3 inter-rater reliability was assessed within five different raters. Furthermore, this measure was determined to have high discriminant validity as well as high reliability.

The Autism Diagnostic Inventory (ADI; LeCouteur et al., 1989) is a structured interview that the professional conducts with caregivers of those thought to exhibit autistic traits. This measure was tested for reliability and validity through inter-rater reliability, test-retest reliability, and internal validity tests. Given the high level of reliability and validity, the ADI is widely used in clinical practice as well as in research.

Childhood Measures – Provider/Parent/Guardian/Teacher

Autism Spectrum Rating Scales (ASRS; Camodeca, 2019) is designed to assess children ages 2–18 for autism and consists of 15–71 items (depending on the age of the child and the version of the form). Primarily this measure is to be completed by the provider, however there are forms available for teachers and caregivers to complete.

The Autism Behavior Checklist (ABC; Eaves & Milner, 1993) consists of 57 items and is meant to be completed by professionals, parents, or teachers. Reliability and construct validity were determined using alpha coefficients, and while the measure was deemed as adequate for screening, the scales were deemed as not reliable for use in formal assessment.

Asperger Syndrome Diagnostic Scale (ASDS; Campbell, 2005; Myles et al., 2001) consists of 50 yes or no questions and is meant to be a quick measure to help ascertain the likelihood of autism in a child presenting with symptomology. The ASDS is completed by a parent, teacher, or professional who knows the child.

Wing Subgroup Questionnaire (WSQ; Castelloe & Dawson, 1993) is meant to classify children with autism into one of three groups: *aloof*, *passive and friendly*, and *active-but-odd*.

Inter-rater reliability was established by intraclass correlations. Some correlations between scores, however, were weak.

The Gilliam Asperger's Disorder Scale (GADS; Gilliam, 2006a) consists of 32 items with eight additional items pertaining to the child's early development. In order to validate the measure, construct validity was determined along with inter-rater reliability.

The Autism Spectrum Disorder Diagnosis for Child (ASD–DC; Matson et al. 2009) consists of a 40-item Likert scale used to assess children ages 2–16 suspected of having autism. Creators of this measure conducted a factor analysis in order to establish validity and to make the scales, including both children on the spectrum and typical children.

Childhood Measures—Parent/Caregiver/Teacher

The Childhood Asperger Syndrome Test (CAST; Scott et al., 2002) is a 37-item measure to be completed by parents of children thought of exhibiting autistic traits. Creators determined that the measure had good test-retest reliability after using the kappa statistic for agreement and Spearman's rho to assess the correlation.

Australian Scale for Asperger's Syndrome (ASAS; Garnett & Attwood, 1995) consists of 34 items, four subscales, and is meant for someone who knows the child to complete. Norming procedures consisted of participants from 27 states, Canada, and Australia.

Gilliam Autism Rating Scale/Gilliam Autism Rating Scale–Second Edition (GARS/GARS–2; Gilliam, 1995, 2006b) consists of four subscales and was validated using both criterion-related validity and inter-rater reliability. This measure is meant for persons who know the child well to complete, such as caregivers, parents, and teachers.

Childhood Measures—Screening Tools

The Autism Spectrum Screening Questionnaire (ASSQ; Ehlers et al., 1999; Posserud et al., 2009) consists of 27 questions while using a Likert scale posed to parents and teachers. Test-retest reliability and inter-rater reliability between teachers and parents were analyzed in the validation process.

The Asperger-Syndrome-Diagnostic Interview (ASDI; Gillberg et al., 2001) is a 20-question screener to be completed by psychiatrists to screen for high-functioning autism. Cohen's Kappa coefficient was used to determine both inter-rater reliability and test-retest reliability, where 0.90 was surpassed in both.

The Early Screening for Autistic Traits (ESAT; Willemsen-Swinkels et al., 2001) is a screening measure to be used when assessing children from 0 through 36 months old and consists of 19 items. To determine test-retest reliability, the intraclass correlation coefficient was analyzed. Discriminant validity was also established.

The Diagnostic Behavioral Assessment for ASD–Revised (DiBAS–R; Sappok, Gaul, et al., 2014) is a screener consisting of 20 items meant to assess for autism in persons with intellectual disabilities. Diagnostic validity was assessed through the use of a ROC and was deemed acceptable. Item difficulties were analyzed as well as internal consistency through Cronbach's alpha.

The Pervasive Developmental Disorders Screening Test (PDDST–II) is a tool completed by parents of children aged 12–48 months and screened for pervasive development disorders such as autism. It is important to note that this measure is out of print.

The Modified Checklist for Autism in Toddlers (M–CHAT; Bilszta & Justin, 2013; Dumont-Mathieu & Fein, 2005; Robins et al., 2001) is another screening tool used to screen for autism in children ages 16 through 30 months.

The Krug Asperger's Disorder Index (KADI; Campbell, 2005; Krug, 2003) is a 32-item measure to be completed by the parent/caregiver or teachers to screen for autism. Reliability and validity were sound.

The Developmental Behaviour Checklist–Autism Screening Algorithm (DBC–ASA; Brereton et al., 2002; Steinhausen & Metzke, 2004) is a screener by which pervasive developmental disorders can be assessed in children. Validity and reliability were deemed as sufficient.

The Social Communication Questionnaire (SCQ) is a 40-item measure used to assess pervasive development disorders such as autism in children aged 4–18 years. Discriminant validity was shown between children with autism and those without and showed that the SCQ to be beneficial as a screener.

Communication and Social Skills Measures

The Communication and Symbolic Behavior Scales (CSBS; Wetherby & Prizant, 1993) is used in the assessment process of children ages 6–24 months old and suspected of communication delays. This measure had good test-retest reliability over a four-month testing interval.

The Empathy Quotient (EQ; Baron-Cohen & Wheelwright, 2004) was based on the empathizing-systemizing theory and incorporates the measurement of an individual's cognition and affect along with aspects of theory of mind. Face validity was established with the assistance of six psychologists. Inter-rater and test-retest reliability was also established. Concurrent validity was also established by assessing the correlation with another measure of empathy (Interpersonal Reactivity Test).

The Children's Social Behavior Questionnaire (CSBQ; Luteijn et al., 2000) is often used in children who present with behavioral challenges, including behaviors seen in autism. Five domains were included and reliability and validity were deemed good.

The Social and Communication Disorders Checklist (SCDC; Bölte et al., 2011; Skuse et al., 2005) is available for use in children ages 3–19. It is comprised of 12 questions and is used to assess for communication disorders, such as those often found in IOS/A.

Developmental Measures

The Vineland–3 (Sparrow et al., 1984) consists of five domains and is used to assess individuals who are suspected of having a disability, not only autism. There are forms for teachers, parents/caregivers, and the interviewer. Internal consistency was evaluated with the use of a coefficient alpha. Inter-rater reliability was assessed as well as test-retest reliability.

The Bayley Scales of Infant and Toddler Development (Bayley, 2006) is used to assess development in young children ages 1–42 months. This measure is often used in the diagnosis of autism as development is an important aspect. It is important to note, however, that early validity and reliability were poor.

Overall Themes

Most of the measures analyzed consisted of protocols to be completed by the individual, caregiver/parent, or teacher. Others consisted of protocols that were to be completed by the person conducting the assessment. Most of these measures consisted of multiple-choice and true-false answers. Very few measures consisted of subjective observation such as with the ADOS and the MIGDAS. Many more measures exist for the diagnosis of children rather than adults. Measures for children included aspects of play, regression, and development, whereas, in measures for adults, it is less common. Interestingly, protocols exist for children that measure

aspects of autism in various settings, such as home and school. This is not true for adults. For example, no measures exist for employers to complete, and few exist for significant others to complete.

Since autism is a developmental disorder, early behaviors are important for diagnosis. Again, the measures that focus on children include items that were more inclusive of severe behavior and developmental aspects rather than measures for adults. Often, those with more significant challenges receive diagnoses earlier on in life, while those with fewer challenges go undiagnosed until later in life. It is important to look at these variances and how they manifest themselves across the lifespan rather than focusing just on childhood (Begeer et al., 2013; Lai et al., 2014, 2015; Lehnhardt et al., 2016).

In-Depth Measure Analysis Relating to Potential Subdomains/Categories

Following the completion of the in-depth measure analysis discussed above, 13 initial categories emerged. These included main themes from common psychological measures often used in diagnosing IOS/A. All 13 categories are discussed below.

Survey Categories

This section encompasses 13 of the categories that emerged from the autism-focused psychometric measure analysis. The rationale for these categories is that psychologists most often use these categories in assessment procedures, as discovered as a result of the psychometric measure analysis. There are significant variances in the strengths and challenges of IOS/A (Armstrong, 2012). Furthermore, these categories can be construed as entities that are most impactful for IOS/A and those offering support.

Activities of Daily Living

IOS/A have been shown to have differences in (ADLs; Piccin et al., 2018). These differences have shown to significantly impact functioning (Hull et al., 2017). Autism

symptomology can hinder ADLs, and this has links to the three tiers of support in the DSM–5 (American Psychiatric Association, 2013). It can be beneficial to assess the extent to which IOS/A may need assistance in their activities of daily living. Differences also exist in individual perceptions of appropriate ADLs and the appropriate frequency of these activities. For example, individuals' ideas surrounding bathing may differ due to factors such as culture or sensory seeking or aversion constraints. Conversely, when individuals appear not to have difficulties surrounding ADLs, masking can have an impact, as people can hide their vulnerabilities (Hull et al., 2017). Proper assessment is necessary to decipher what assistance the individual may need, and it can assist those who care for the individual to provide adequate support (Ros et al., 2018).

While there does not appear to be much research on ADLs and autism specifically, Bleijenberg et al. (2017) looked at the risk factors for declining ADL skills in older adults, as it is important to look at how variances in ADLs can vary across the life span. Currently, many ADL measures have a developmental standpoint. Bleijenberg et al. analyzed ADLs such as bathing and dressing, and instruments of daily living such as the individual's ability to manage finances, shop for necessities, and mobility. There were 15 participants in the study, which took place in the Netherlands. Not surprisingly, Bleijenberg et al. found that individuals with chronic conditions were at a higher risk of declining ADL skills later in life. Females were more likely to decline in the area of travel, and males were more at risk of declining skills in medication management and meal preparation.

Conversely, to heighten the awareness of the variances in ADLs across the spectrum further, Otsuka et al. (2017) sought to ascertain the predicting factors in functional ability in IOS/A who exhibit minimal challenges. A total of 41 participants were included, and a

regression analysis was conducted. They discovered that poor emotion perception and low verbal generativity indicated poorer adaptive functioning skills.

Furthermore, findings from the in-depth measure analysis only identified one measure that ascertained the degree to which individuals attend to their ADLs. This measure was the BISCUIT (Matson et al., 2007, 2010). This measure is designed for diagnostics, and it only attends to the skills of infants and toddlers. The name of the subtest was *eating and sleeping problems*. One could argue that persons on the autism spectrum can exhibit varying degrees of ADL skills across the lifespan. The addition of this subtest may be helpful, in that it may help to assess individuals' strengths and challenges in this domain, as it could be impactful to measure their skill in basic living tasks.

Cognition

IOS/A have been shown to have differences in cognition (Schaller & Rauh, 2017). These differences have shown to significantly impact functioning (Golshan et al., 2019). Furthermore, individuals' cognitive function can differ greatly across the ASD spectrum. Some individuals may have heightened, even genius-level intellectual capabilities, while others can have profound limitations (Schaller & Rauh, 2017). For those who serve IOS/A, it may be helpful to know the cognitive abilities of those for whom they provide services.

Many neuropsychological tests assess for executive function, which is an aspect of intellectuality. Golshan et al. (2019) sought to ascertain whether there were variances in individuals' executive functioning ability regardless of their cognition. Researchers included 15 IOS/A but limited challenges and persons without autism. All participants had IQs greater than 80 and they ranged in age between eight and 12 years old. Golshan et al. used the NEPSY–II test, and they administered the three domains of inhibition, design fluency, and animal sorting. Similarly, they administered the CHEXI, a parent-report measure, to parents. Their results

indicated that children with autism, even with seemingly limited difficulties, still performed significantly worse than their non-ASD peers.

Lieb and Bohnert (2017) conducted another study focused on executive function and how it can inhibit individuals' abilities. Their study included 127 adolescents with autism, pervasive development disorder, or Asperger's according to the DSM–IV–TR criteria. From there, each participant and parent were matched to form a dyad. Lieb and Bohnert administered the Social Responsiveness Scale (Constantino & Gruber, 2005), the Behavior Rating Inventory of Executive Function, Parent Report (Gioia et al., 2000), the Children's Loneliness and Social Dissatisfaction Scaler (Asher & Wheeler, 1985), the Friendship Quality Questionnaire–Abbreviated Edition (Parker & Asher, 1993), and the Achenbach Child Behavior Checklist–Depression Scale (Clarke, 1992). The results indicate significant hindrances in the domains of social impairment and friendship quality as a result of deficits in executive functions.

Within this domain, there were few current measures that incorporate cognition or intelligence into their tests. The ASAS (Garnett & Attwood, 1995) was one such test with a subtest of *cognitive skills*. Another was the GARS (Gilliam, 1995), with the subdomain of *cognitive style*. The RAADS–14 (Ritvo et al., 2008) applies the subdomain of *mentalizing deficits*. Out of 42 psychometric tests concerning autism, only three had some type of subdomain that focused on cognition or intelligence. This is surprising, since a diagnosis of autism comes either with or without an accompanying intellectual disability. However, since these tests have largely diagnostic purposes, it is understandable, as many psychologists and other diagnosing professionals may use an accompanying intelligence test during initial diagnoses such as the Wechsler Adult Intelligence Scale (Kaufman & Lichtenberger, 2006), the Wechsler Intelligence

Scale for Children (Wechsler, 2014), or the Woodcock-Johnson Tests of Cognitive Abilities (Semrud-Clikeman & Teeter-Ellison, 2009).

Social Aspects

IOS/A have been shown to have differences in social aspects (Cage & Troxell-Whitman, 2019). These differences have shown to significantly impact functioning (Hull et al., 2017). Social challenges can vary for those with ASD. Some people on the spectrum seek out others, craving acceptance and inclusion from others, and when they experience difficulties in this area, it can lead to depression and anxiety. Often, especially those with elevated FSIQs, persons on the spectrum struggle with what to say, how to say it, or how to act in differing social settings. One common factor is that many people on the autism spectrum *mask* (Cage & Troxell-Whitman, 2019). Masking refers to the practice of suppressing one's own autism traits to fit in more with others within the social context. While this works for many, it can leave them feeling exhausted and only able to attend to social functions for a minimum amount of time (Hull et al., 2017). However, others on the spectrum prefer to be alone and to do things by themselves.

Cage and Troxell-Whitman (2019) studied the effects of social masking or camouflaging. They strove to understand how masking or camouflaging affected the mental health of 262 persons on the autism spectrum/autistics. Their results showed that masking was emotionally taxing on those on the spectrum and that the task of switching back and forth between their authentic selves and their masked selves was a contributory factor in poorer mental health.

Similarly, Hong et al. (2016) conducted a study to ascertain the various factors in the subjective quality of life of adults with an autism spectrum diagnosis/autistics. This study included 60 participants and it utilized the World Health Organization Quality of Life measure. Hong et al. discovered that levels of perceived stress and bullying were factors in individuals'

quality of life. More specifically, they derived eight domains of quality of life, measuring interpersonal relations, social inclusion, personal development, physical well-being, self-determination, material well-being, and human and legal rights (Schalock, 2004). This study is impactful in that it highlights the negative effects of social exclusion for those on the spectrum. It may be important to highlight this aspect of autism symptomology in the Autism Trait Survey so that caregivers and therapists may be able to ascertain individuals' strengths or challenges in this domain.

The in-depth measure analysis of the psychometric measures currently in place revealed that the assessment of social aspects within these tests is extensive. The AAA (Baron-Cohen et al., 2001) applies a *social* domain, as does the ASDS (Campbell, 2005) and the Bayley Scale (Bayley, 2006). The ASAS (Garnett & Attwood, 1995) incorporates a *social and emotional abilities* subscale, while the ABC (Eaves & Milner, 1993) incorporates the subscale of *social and relating*. The ADI (LeCouteur et al., 1989) has a scale that measures the individual's *social development and play*.

Similarly, the ADOS–2 Adult and Adolescent (Lord et al., 1989) has domains that measure individuals' socialization through the subtest of *social affect* in Toddler Modules 1-3, and *reciprocal social interaction* in the modules for adults and adolescents. Interestingly, the AMSE (Grodberg et al., 2012) used the subtest *eye contact/interactions*, and it was one of the few that specifically incorporated an entire scale dedicated to eye contact. In the Autism Quotient (AQ; Baron-Cohen et al., 2001; Freitag et al., 2007), the subscale *social skill* became the EQ (Baron-Cohen & Wheelwright, 2004). Similarly, the ASRS (Camodeca, 2019), a measure for all ages, applies the domains of *peer socialization* and *adult socialization*. The CHAT (Baird et al., 2000) incorporates the domains of *producing a point, protodeclaractive pointing,*

following a point, and *producing a point* when assessing for the social aspects in those with autism. The CAST (Scott et al., 2002) incorporates a subscale known as *reciprocal social behavior*.

Another well-known test, the CARS (Schopler et al., 1988) utilizes the subtest, *relating to people*. Both the GADS and the GARS/GARS–2 (Gilliam, 1995, 2006a, 2006b) use the subscale of *social interaction*, as does the SCQ (Berument et al., 1999; Rutter et al., 2003). This makes sense, as the same person created these two scales. The MIGDAS–2 also assesses individuals' social skills through the subscale *social relationships and emotional responses*. The RAADS–14 (Ritvo et al., 2008) applies the subtest of *social anxiety*, while another version of the same test incorporates the subscale of *social relatedness*.

The RAADS–R (Ritvo et al., 2008) assesses for social aspects with the use of the scale *imitation.* Similarly, the Social and Communication Disorders Checklist (SCDC; Bölte et al., 2011; Skuse et al., 2005) tests for social aspects through the *reciprocal social interaction skills* subtest. The Vineland–3 (Sparrow et al., 1984) simply applies the subscale of *socialization*, while the AdAS Spectrum (Dell'Osso, Gesi, et al., 2016) utilizes the *non-verbal communication* domain.

Emotional and Adaptive Behaviors

IOS/A have been shown to have differences in emotional and adaptive behaviors (Fenning et al., 2018). These differences have shown to significantly impact functioning (Yang et al., 2017). Individuals' ability to regulate their emotions is an important factor when deciphering the amount of care an individual may need. For instance, emotional dysregulation can present in a few ways. Presentations may include emotional shutdown or aggressive forms of behavior that can seem explosive (Fenning et al., 2018). How individuals present is important for caregivers and other professionals providing services and support. Perhaps the most important

factor is safety: are the individuals threats to themselves, others, or property (Yang et al., 2017)? It is important to know how redirectable individuals are and how they respond to various forms of intervention.

Samson et al. (2015) sought to understand the nature of emotional regulation and emotional distress in IOS/A. Some participants had autism; others were typical persons. Samson et al. used questionnaires to ascertain the experiences surrounding emotion, such as regulation and maladaptive behavior. There were 31 participants on the spectrum, and 28 were typical participants. Samson et al. discovered that IOS/A used cognitive reappraisal or reframing less often than their typical counterparts. Furthermore, they opined that if support staff were to work with individuals to combat the negative emotions surrounding maladaptive behavior, then treatments might be more successful. Such treatments include Cognitive Behavioral Therapy.

Similarly, Conner and White (2018) sought to decipher an evidence-based approach for advancing emotional dysregulation treatment in persons on the spectrum. They surmised that since there is a higher incidence of psychological maladies that are often comorbid in those with autism, and there is some evidence that of mindfulness-based therapy is effective, the method ought to receive research. Nine participants contributed to the study, in which Conner and White examined both treatment fidelity and posttherapy satisfaction. The main findings were that seven out of nine participants found mindfulness-based therapy helpful in emotional regulation. Mindfulness is a part of some Cognitive Behavioral Therapy-based treatments such as Acceptance and Commitment Therapy and Dialectical Behavioral Therapy.

The ASD (Campbell, 2005; Myles et al., 2001) applies a subtest called *maladaptive [behaviors]*. Similarly, the ASAS (Garnett & Attwood, 1995) has incorporated the *social and emotional abilities* scale. Curiously, the ABC (Eaves & Milner, 1993) has a scale just for

deciphering individuals' level of potential aggression through the *aggressive* domain. While the ADI (LeCouteur et al., 1989) takes into account behaviors in general through the *general behaviors* subscale, the ASRS (Camodeca, 2019) measures individuals' *social-emotional reciprocity*, and the BISCUIT (Matson et al., 2007b, 2010) measures a number of factors relating to emotion and behavior through the *avoidance behavior/tantrum/conduct behavior/aggressive/ destructive disorder* scale.

The Bayley Scale (Bayley, 2006) incorporates the use of an *emotional/adaptive behavior* scale to parse emotional functioning. Similarly, the CARS (Schopler et al., 1988) incorporates an *emotional response* subscale, while the CAST (Scott et al., 2002) applies a similar scale by the name of *reciprocal social behavior*.

The CHAT (Baird et al., 2000) concentrates on more specific behaviors using a number of different scales known as the *producing a point, prodeclaractive pointing, following a point,* and *producing a point* domains.

The EQ (Baron-Cohen & Wheelwright, 2004) applies two domains to measure emotionality, namely the *cognitive empathy* and *emotional reactivity* domains. The GADS also rates the emotionality of others by using an *emotional responses* subscale. The MIGDAS–2, which is similar to the ADOS, incorporates two domains to measure emotions: the *social relationships* and the *emotional responses* domains.

The SCDC applies the *behavioral problems* subtest. Similarly, the AdAS Spectrum (Dell'Osso, Gesi, et al., 2016) applies an *empathy* subscale. Last, the WSQ (Castelloe & Dawson, 1993) applies the *aloof, passive and friendly,* and *active-but-odd* domains.

Communication

IOS/A have been shown to have differences in communication (Berthier et al., 2017). These differences have shown to significantly impact functioning (Alexander & Dille, 2018).

According to the DSM–5 (American Psychiatric Association, 2013), communication difficulty is one of the diagnostic criteria for autism. However, communication difficulties can become complicated as there are different types of communication. One type is nonfunctional language such as echolalia, which is actually a stim and which concerns emotional regulation rather than communication (Berthier et al., 2017). Another aspect is receptive communication, in which the individual may have difficulties understanding language (Alexander & Dille, 2018). Conversely, individuals engage in expressive communication as well. It is also important to recognize that people do not communicate solely through vocalizations. Persons communicate in a variety of other ways, such as using assistive technology, sign language, or body language. When working with people on the spectrum, it is beneficial to understand where their strengths and challenges lie regarding communication. Communication is one of the biggest facets of therapy, and without understanding the individual's capacity for language, both receptive and expressive, it would be difficult to surmise an adequate method of communication, especially if the individual exhibits challenges.

Several of the psychometric measures incorporated communicative domains such as the AAA (Baron-Cohen et al., 2001) and its *communication* domain. Likewise, the ADOS–2 Adult and Adolescent version (Lord et al., 1989) incorporates the *communication* domain, as does the AQ (Baron-Cohen et al., 2001; Freitag et al., 2007). Equally, the ASDS (Campbell, 2005; Myles et al., 2001) incorporates the *language* domain into its measure. The ASAS (Garnett & Attwood, 1995) utilizes the *communication skills* domain. The ABC (Eaves & Milner, 1993) gets more specific with its *echolalic speech and language* and *non-responsive* domains. The ADI (LeCouteur et al., 1989) incorporates the *language and communication functioning* domain. Similarly, the AMSE (Grodberg et al., 2012) applies the *language/pragmatics* domain, and the

ASRS (Camodeca, 2019) includes the domain of *atypical language*. Furthermore, the CARS (Schopler et al., 1988) includes the *verbal communication* domain to assess the client's degree of communicative capabilities. Not surprisingly, the CSBS (Wetherby & Prizant, 1993) incorporates the domains of *communication* and *expressive speech scale & symbolic scale* in its measure.

The GARS/GARS–2 (Gilliam, 1995, 2006b) applies the domain known as *communication*. The GADS utilizes a domain called *maladaptive speech*, while the MIGDAS-2 incorporates the *language and communication* domain. Similarly, the RAADS–R (Ritvo et al., 2008) applies the *language* domain, while a different version of the measure, the RAADS–R incorporates the *communication* domain. The SCDC (Bölte et al., 2011; Skuse et al., 2005) applies the *communication skills* domain, while the SCQ (Berument et al., 1999) applies the *language and communication* and *current language functioning* domains. Last, the AdAS Spectrum (Dell'Osso, Dalle Luche, et al., 2016) incorporates the *verbal communication* domain, while the Vineland–3 (Sparrow et al., 1984) applies the *communication* domain.

Motor Skills

IOS/A have been shown to have differences in motor skills (Hodges et al., 2019). These differences have shown to significantly impact functioning (Hillus et al., 2019). Motor skills refer to the ability of an individual to move independently and the quality of that movement. Some IOS/A also have comorbidity in motor disability alongside their autism diagnoses. However, the focus of motor skills in many psychometric measures is to parse out muscle rigidity, toe walking, hypotonia (low muscle tone), or difficulty with coordination (Hodges et al., 2019). These aspects of motor skills can have an impact in individuals' lives.

Hillus et al. (2019) sought to attain empirical evidence for the difficulty in motor skills in those with autism without accompanying intellectual disability. They recruited 19 participants

with autism and 22 persons without autism. The participants took the Toronto Alexithymia Scale, the Motor Skills in Everyday Situations Test, and the Purdue Pegboard Test to determine whether there were differences between the two groups and to ascertain whether there were deficits in semantic processing relating to action words. Interestingly, the results showed that the IOS/A have limitations in the semantic processing of action words. Furthermore, Hillus et al. corroborated evidence from previous studies that IOS/A exhibit deficits in motor skills.

Liu et al. (2017) conducted a study to ascertain the usefulness of four different measures of motor skills in children with autism. This was a case study where a 5-year-old child took the Bruininks–Oseretsky Test of Motor Proficiency–2, the Movement Assessment Battery for Children–2, the Peabody Developmental Motor Scales–2, and the Test of Gross Motor Development–2. They determined that one must determine the overall goal of the assessment and where the purpose lies. The Movement Assessment Battery for Children–2 and the Bruininks–Oseretsky Test of Motor Proficiency–2 are quantitative tests. The Test of Gross Motor Development–2 is qualitative. The Peabody Developmental Motor Scales–2 measure the qualitative and quantitative factors of motor skill development.

Of the 42 psychometric tests analyzed, only two incorporated domains to measure the motor skill facet of autism. The Vineland–3 (Sparrow et al., 1984) has a domain entitled *motor skills.* Similarly, the ASAS (Garnett & Attwood, 1995) uses the domain of *movement and skills*.

Restrictive/Repetitive Behaviors

IOS/A have been shown to have differences in restrictive and repetitive behaviors (Berthier et al., 2017). These differences have shown to significantly impact functioning (Jacques et al., 2018). Restrictive and repetitive behaviors are often useful in assessing for an autism diagnosis (American Psychiatric Association, 2013). Restricted and repetitive behaviors can look different in those on the autism spectrum. Repetitive behaviors may include rocking or

stereotypical hand-flapping (Jacques et al., 2018). Individuals engaging in strict adherence to routines or having intense special interests in subjects can exhibit restricted behaviors.

Jacques et al. (2018) sought to explore restrictive and repetitive behaviors in children with autism through play and items that may be interesting to them. Their participants were 49 children with autism and 43 without. Jacques et al. concluded that children with autism have a higher propensity for restrictive and repetitive behaviors for longer durations than their same-age peers. Interestingly, the researchers further noted that while some therapeutic efforts may enhance individuals' interest, the most efficient way to increase interest in other things is to offer the individual opportunities to interact with potentially preferred items of interest through object exploration.

Several psychometric measures incorporate, to some degree, a subdomain relating to restrictive and repetitive behaviors. For instance, the AAA (Baron-Cohen et al., 2001) utilizes a domain by the name of *obsessions*, while the ASAS (Garnett & Attwood, 1995) uses the *specific interests* domain. Similarly, the ABC (Eaves & Milner, 1993) incorporates a scale known as *stereotypical (behavior)*. The ADI (LeCouteur et al., 1989) incorporates the *interests and behaviors* domain, while the ADOS–2 Adult and Adolescent (Lord et al., 1989) incorporates one of two domains depending on age range and whether the client is nonverbal: *stereotyped behaviors and restricted interests* or *restricted and repetitive behavior* domains. The AMSE (Grodberg et al., 2012) includes the domain of *repetitive behaviors/preoccupations*, while the ASRS (Camodeca, 2019) uses the *stereotypy and behavioral rigidity* and *body and object use* domains to assess clients' restricted and repetitive behavior inclinations.

For very young children, the BISCUIT (Matson et al., 2007, 2010) is useful, and it incorporates the domain *anxiety/repetitive behavior/stereotypes*, while the CARS (Schopler et

al., 1988) incorporates the *body and object use* domain. The GARS–2 (Gilliam, 2006b) uses the domain *stereotyped behaviors* while the GARS and the GADS from the same author (Gilliam, 1995, 2006a) use the *restricted/repetitive behaviors* domain. The RAADS–R (Ritvo et al., 2008) utilizes the *circumscribed interest* domain. Last, the AdAS Spectrum (Dell'Osso, Dalle Luche, et al., 2016) uses the *inflexibility and adherence to routine* and *restricted interests and rumination* domains to measure clients' propensity toward restricted and repetitive behaviors.

Sensory Aspects

IOS/A have been shown to have differences in sensory aspects (Mayer, 2017). These differences have shown to significantly impact functioning (Robertson & Baron-Cohen, 2017). Sensory challenges can take on several manifestations. For instance, there are two main categories of sensory behavior, sensory seeking and sensory aversion (American Psychiatric Association, 2013). Sensory seeking behaviors relate to a set of phenomena when an individual seeks out sensory stimulation such as licking things, looking at a bright light, or watching a rapidly moving river (Mayer, 2017). IOS/A will often stim by seeking out sensory stimuli such as a glitter wand, a strobe light, or a furry cat. Aspects of sensory aversion could be manifested by the irritation of a clothing tag, aversion to bright light or sound, or difficulty in large crowds or noisy places such as amusement parks. Each sensory aversion or seeking behavior is individual to the person. IOS/A can have both sensory seeking and sensory aversion behavior (Robertson & Baron-Cohen, 2017).

Mayer (2017) examined both persons on the autism spectrum and others for traits relating to autism and sensory processing differences. The participants were 580 adults who were not on the spectrum and 42 adults on the spectrum with a confirmed diagnosis. Participants took psychometric measures, both the AQ and the Adult/Adolescent Sensory Profile. The results of the study showed that sensory differences increase with heightened levels of autism

symptomology. Within the parameters of the scope of this study, this information is important, as it highlights that there are variances in sensory processing among those on the autism spectrum.

As in Mayer's (2017) study, Robertson and Baron-Cohen (2017) sought to understand the sensory differences between IOS/A and others given that this facet is paramount in assessing for autism. They found significant evidence that in IOS/A, there are neurological differences. These differences are like the differences other studies found.

Several psychometric measures incorporate a sensory-type domain into their measures. For instance, the ASDS (Campbell, 2005; Myles et al., 2001) incorporates a domain of *sensorimotor*, while the ABC (Eaves & Milner, 1993) uses the *sensory* domain. The ASRS (Camodeca, 2019) incorporates the domain of *sensory sensitivity* to measure sensory aspects in IOS/A. Similarly, the RAADS–14 (Ritvo et al., 2008) uses the *sensory reactivity* domain, while a different version of the same measure, the RAADS–R, uses a domain called *sensory/motor*. Last, the AdAS Spectrum (Dell'Osso, Gesi, et al., 2016) incorporates the *hyper-hypo reactivity to sensory input* domain.

Development

IOS/A have been shown to have differences in development (Lin & Koegel, 2018). These differences have shown to significantly impact functioning (Zhang et al., 2018). Development can have an impact in the lives of those with ASD, as there are several factors to consider. First, some individuals have obvious constraints in their development, and as such, these constraints are easy to decipher and notate, and it is easy to create a plan of care accordingly (Lin & Koegel, 2018). Others appear to have typical growth and development patterns but then regress (Zhang et al., 2018). However, hypotonia (low muscle tone) is a common factor in those with ASD, which can impact individuals' growth and development, particularly their gross and fine motor skills, which is why many receive services from physical and occupational therapists (Gowen &

Hamilton, 2013; Gowen & Miall, 2005). Similarly, Ehlers Danlos Syndrome is common (Cederlof et al., 2016). For those providing treatment, it is important to be cognizant of these development aspects. Developmentally, this is impactful, as professionals in the field often focus on early childhood development rather than development across the lifespan.

On current measures that assess for developmental aspects, the ABC (Eaves & Milner, 1993) incorporates the *infant-like* subscale. Similarly, the ADI (LeCouteur et al., 1989) uses a similar subscale by the name of *early development*. The AdAS Spectrum (Dell'Osso, Dalle Luche, et al., 2016) uses a subscale called the *childhood/adolescence* subscale.

Regression

IOS/A have been shown to have instances of regression (Zhang et al., 2018). These instances have shown to significantly impact functioning (Hillus et al., 2019). Regression refers to individuals losing their skills after initial acquisition (Zhang et al., 2018). This often occurs in young children with speech regression, for example. Similarly, persons with ASD can exhibit regression in expressive communication while having minimal difficulty in other areas of development. Regarding the outcome after the summary and comparison of all known psychometric tests that assess persons on the autism spectrum, the *regression* subtest only occurred in the ADI (LeCouteur et al., 1989).

Imagination and Creativity

IOS/A have been shown to have differences in imagination and creativity (Hillus et al., 2019). These differences have shown to significantly impact functioning (Quirici, 2015). IOS/A with limited cognitive challenges have alternative and concrete thinking patterns. Imagination and creativity are parts of these patterns that can vary between individuals. Many tests that focus on diagnostics of young children also use the notion of play as part of this factor. However, it is difficult to parse the imagination and creativity part from the social aspect of actual play.

Quirici (2015) attributed the common belief that creativity and imagination have more to do with neurological abnormalities than true creativity and imagination. However, Quirici highlighted the notion that many artists on the spectrum are, in fact, both. Quirici sought to interview several persons on the spectrum to challenge the notion that they are void of imagination or creativity. After conducting these interviews, Quirici opined that we as a society should do more to help to thwart stereotypes.

Both the AAA (Baron-Cohen et al., 2001) and the ASAS (Garnett & Attwood, 1995) include subdomains of *imagination*. Similarly, the ADOS–2 Adult and Adolescent (Lord et al., 1989) includes a subdomain of *imagination and creativity*. The CHAT (Baird et al., 2000) also assesses for creativity and imagination by utilizing the *pretend play and pretending* subdomain. Similarly, the RAADS–R (Ritvo et al., 2008) uses the *play* subdomain.

Self-Injurious Behaviors

IOS/A have been shown to exhibit self-injurious behaviors (Soke et al., 2018). These behaviors have shown to significantly impact functioning (Richards et al., 2017). If clients have a history of self-injurious behaviors, it is important for caregivers and therapists to know so that they are aware of any potential triggers and what the purpose of the behavior might be. For instance, some self-injurious behaviors come from dysregulation, where the individual is participating in this behavior to self-regulate (Soke et al., 2018). In some other cases, individuals may be engaging in self-injurious behaviors as they are trying to communicate. This behavior may look like banging a fist onto a table at mealtime. Conversely, clients can use self-injurious behaviors to manipulate therapists or caregivers (Richards et al., 2017). Few psychometric measures focus on the domain of self-injurious behaviors. Both the BISCUIT (Matson et al., 2007, 2010) and the SCQ (Berument et al., 1999; Bölte & Poustka, 2006; Bölte et al., 2011; Rutter et al., 2003; Schanding et al., 2012) incorporate subscales entitled *self-injurious behavior*.

The Vineland–3 (Sparrow et al., 1984) incorporates a scale that may relate to self-injurious behavior known as the *maladaptive behavior* subscale.

Attention and Self-Regulation

IOS/A have been shown to have differences in attention and self-regulation (Quirici, 2015). These differences have shown to significantly impact functioning (Shephard et al., 2018). As in the earlier categories, this scale is more appropriate in the *emotional and adaptive behaviors* subtest, and as such, it was combined. Attention concerns the way the individual can attend to tasks and for how long (Boxhorn et al., 2018). ADHD is often a comorbidity of those on the autism spectrum, and as such, it is important to parse out where the person's strengths or challenges lie (Shephard et al., 2018). Self-regulation refers to the ability of individuals to regulate their emotions and actions and to adapt to external stimuli.

Of the 42 psychometric measures assessed, only four incorporated measures concerning attention and self-regulation. The AMSE (Grodberg et al., 2012) uses the domain of *shared attention*, while the AQ (Baron-Cohen et al., 2001; Freitag et al., 2007) uses the domains of *attention switching* and *attention to detail*. Similarly, the ASRS (Camodeca, 2019) encompasses the domain of *attention/self-regulation*, while the BISCUIT (Matson et al., 2007, 2010) incorporates the *inattention/impulsivity* domain.

Summary and Conclusions

This literature review has highlighted the basic autism symptomology, and it has explained how autism can adversely affect people. Furthermore, it has highlighted the possible variances in each category and explained why it is important to decipher them to determine whether the particular variance under analysis is a strength or a challenge. This may help those on the autism spectrum to receive care and understanding from those working with them. More specifically, it has discussed key concepts and variables relating to autism such as physiology

and etiology, the basic presentation of autism, common treatments, and social, cultural, and economic factors, as well as reviewing various domains and subdomains of autism.

CHAPTER III: RESEARCH METHODS

The goal of this study was to work toward the creation of a new psychometric measure that will assist those in the field to deliver services to those with autism. The following chapter details the first four phases of this process that will encapsulate an attempt toward the validation of this instrument. Additionally, participant selection, recruitment, procedures for data collection, and ethical considerations are discussed.

Procedure

The study involves the following four phases of a six-phase process. A diagram illustrating the phases can be found in Appendix A. Procedures for Phases 5 and 6 are discussed in the discussion section of Chapter V.

Phase 1: Test Conceptualization

The first phase entails establishing the test conceptualization, as it is important to surmise what the test measures. The test conceptualization informs the next phases in the test formulation process. Miller and Lovler (2015) emphasized the importance of writing a formal description of the measure to enhance the usefulness of the scale in the field of psychology, thus intensifying the rationale for the test. The test conceptualization is in the first chapter of this document. Further information that guided the test conceptualization is in the literature review in Chapter II.

Phase 2: Literature Review and In-Depth Measure Analysis

Phase 2 entailed conducting an in-depth measure analysis. The in-depth measure analysis consisted of an examination of the research across the dimensions of autism symptomology. A summary and comparison encompassing over 40 tests (Appendix C) was used to assess IOS/A as part of this literature review and in-depth measure analysis. It examined the measures already in use within the autism population and it collected a list of domains for each. This list of domains

was examined to ascertain commonalities to inform the formation of domains for this test. Similarly, the in-depth measure analysis helped to determine what other measures pertain to autism and what their limitations might be. Search terms are listed in Appendix B.

Phase 3: Item Pool Creation

Phase 3 consists of an item pool creation. An initial item pool was created (Item Pool A) in 2016 based upon the personal experiences of this author. As personal experience does not constitute a robust evidentiary rationale for the creation of an objective measure, it was necessary to create a second item pool (Item Pool B). This second pool is based on a more robust evidentiary basis across multiple disciplines. Item Pool B is listed in Appendix D and is based upon findings from a robust measure analysis, as described in Chapter II. Item Pool B will not be the final item pool to be included in Phases 5 and 6 of this process: rather, a third pool (Item Pool C, Appendix F) was created at the conclusion of the data collection for this study.

Phase 4: One-on-One interviews

During Phase 4, input was elicited from 15 experts in the field, who participated in one-on-one interviews consisting of clinical psychologists, and psychotherapists (see Appendix E). Content validity was estimated with the assistance of participants during these one-on-one interviews. The primary purpose of this phase was to evaluate the content validity of this measure.

A discussion of other aspects of the methodology, including the participant selection process for the one-on-one interviews follows. Additionally, there is a discussion of the instrumentation and the data-analysis plan. Finally, this chapter examines ethical considerations, including issues relating to the AU Institutional Review Board (IRB).

Recruitment

Participants were recruited for the one-on-one interviews through invitation via email. The recruitment flyer is in Appendix K of this document. The rationale was that those who come from disciplines concerning those on the autism spectrum, including licensed mental health counselors and licensed clinical psychologists, have expertise with IOS/A. This participant pool gave the study more validity, as it reached across disciplines. Similarly, the one-on-one interviews took place through the video chat modality "Zoom" (Zoom Video Communications, 2020), for ease of participant accessibility. Furthermore, the inclusion criteria are that participants must have been working with IOS/A for one year in a therapeutic capacity and be over the age of 18. Additionally, it was necessary to reach data saturation in the one-on-one interviews (Creswell, 2013).

Participation

Participation in this study was completely voluntary, and participants were free to request the deletion of their responses from the study at any time. To facilitate the ability to remove data, should participants choose to withdraw from the study, they were asked to create a four-character code that they kept to identify their data at a later time. No record of which code belonged to which participant was kept. At the conclusion of the study, participants were also invited to receive a copy of the final study.

Population Selection

The population for this study were professionals who work with people with autism in some therapeutic capacity because they will be the primary users of this measure. The specific criteria for participation in this study are (a) experience working with IOS/A in some therapeutic capacity, (b) work with IOS/A for at least 1 year, (c) over the age of 18, and (d) understand and

communicate in English. More specifically, there are no restrictions on the level of education or type of licensure due to the need for a large sample size; however, it is important to note that the majority of participants will be well educated due to the therapeutic requirements for participants, as most therapists will hold at least a Master's degree.

Procedures for Data Collection

There were two aspects of data collection: the in-depth measure analysis and one-on-one interviews. The first individuals who expressed interest and who met the study criteria participated. Convenience sampling was used for the one-on-one interviews.

Data-Collection Procedures: Phase 2

During data collection in Phase 2, an in-depth measure analysis was conducted by searching ProQuest (ProQuest, 2020) and EBSCOHost (EBSCO Industries, 2020) using several research terms, which are in Appendix B. Next, validation procedures were ascertained and domains for 42 measures were created. A table was created (Appendix C) and the domains were broken down into themes to establish a pattern of domains within current psychometric testing for autism. The results of this in-depth measure analysis drove the creation of the preliminary domains. There were no specific date range terms that were specified for the psychometric portion of the literature review, as some measures have long histories. However, care was taken to ensure that the most up to date references were utilized as references within the past three years were optimal.

As a result of the in-depth measure analysis, the following preliminary domains were identified: *restrictive and repetitive behaviors, social aspects, emotional and adaptive behavior, cognition, communication, developmental aspects, imagination and creativity, self-injurious behaviors, sensory aspects, attention and self-regulation, regression, imagination and creativity* and *activities of daily living*.

Data-Collection Procedures: Phase 4

In Phase 4, the data-collection process involved one-on-one interviews through the Zoom video conferencing platform. These one-on-one interviews consisted of those who worked with people on the autism spectrum, including psychologists and licensed mental health counselors, who were over the age of 18 and who have worked with people with autism for at least one year in a therapeutic capacity.

Participants received an email invitation. The flyer is in Appendix G. First, the participants reviewed the consent form (Appendix H) and had the opportunity to ask any questions. Next, the participants confirmed that they had read the consent form and agreed to the terms through email. Then, the participants completed a demographic questionnaire (Appendix I). As part of this questionnaire, the participants created their own four-digit code. The codes are kept only by the participants, and participants can use the codes to identify information for deletion should they decide to exclude their data. Next, participants contributed to the content validity of the measure by participating in an interview. Last, participants were able to request the results of the study once it was completed. Again, these data are kept away from other data from this phase.

Overall Design of the Autism Trait Survey

With regard to the specific design of the survey, the in-depth measure analysis performed in Phase 2 of data collection led to the creation of the initial domains. Each domain will initially include 10 S (strengths) questions to represent an individual's strengths, and 10 C (challenges) questions to represent an individual's challenges while using a 5-item Likert-type scale. This scale consists of 1–Strongly Disagree, 2–Agree, 3–Undecided, 4–Agree, and 5–Strongly Disagree. A Likert-type scale can elicit a more precise measure of individuals' inclinations than a simple yes or no would provide. The Likert-type scale enables a more sensitive test. At the end

of each domain, the numbers from the S and the C together will be added to inform the score. For instance, if an individual rated as a 23 in strengths (S) social aspects and a two in challenges (C) social aspects, then the test taker would go to the diagram (see the last page of Appendix J) and complete the wedge that is denoted as *SA-S* and its reciprocal dichotomous wedge of *SA-C*. It is important to note that the exact numbers for the final output diagram are unknown, as they will depend upon the final number of test items at the conclusion of Phases 5 and 6, however, the diagram has already been created. Everything from the midline up denotes individuals' strengths, while all wedges below the midline denote individuals' challenges. The initial Autism Trait Survey (see Appendix I) is similar in design.

Ethical Procedures

IRB Considerations and Treatment of Human Participants

Participants in this study did not come from vulnerable populations such as persons under the age of 18, those who were incarcerated, or those who were gravely disabled. All participants were experts in their field, and as such, college educated. Due to the nature of the participant selection, it was unlikely that persons from a vulnerable population were eligible to contribute. The use of human participants was the cornerstone of this study, and as such, they were treated with the utmost respect, as this study could not commence without them. Antioch University IRB's ethical procedures were abided by, and IRB approval was procured prior to recruiting participants. The IRB form is in Appendix H of this document.

Ethical considerations for participant privacy were considered. The one-on-one interviews took place online, and as such, precautions for the one-on-one interviews to preserve anonymity as far as possible was taken. Each participant was invited to offer insight and to make suggestions. All demographic and personal information of the participants are stored separately from the data and will be destroyed after eight years. Participant demographics (Appendix I)

were collected separately from the interview itself. During the study, participants were free to end their participation at any time without adverse ramifications. If participants wanted to withdraw their input from the study, their information would have been removed, again without any adverse consequences.

Ethical Concerns Relating to Data

Any data collected during the study will remain personal intellectual property, and as such, they will remain confidential. Data is stored on an encrypted hard drive and will be destroyed after eight years. Similarly, if any participant wants to withdraw from the study, any relevant data will be destroyed.

Summary

The goal of this study was to work toward the creation of a new psychometric measure that will assist those in the field to deliver services to those with autism. This chapter has given a discussion of the qualitative research design. More specifically, it has given a detailed account for each of the four phases, which encompass test conceptualization, in-depth measure analysis, item pool creation, and one-on-one interviews. Additionally, it has discussed subjects pertaining to methodology such as participant selection, recruitment, procedures for data collection, data analysis procedures, and ethical considerations.

CHAPTER IV: RESULTS

The purpose of this study was to improve the understanding of autism by working toward the development of a new tool to help measure various facets of autism phenomenology. The output of this measure is data that showcases individuals' challenges and strengths such as those noted in Barnhart (2017). These data can provide professionals who work with IOS/A a better idea of where individuals' needs may lie, which may aid in the creation of individualized treatment goals.

Setting

Interviews conducted as a part of this study were conducted through the Zoom internet-based video conferencing modality. It is unclear where the participants participated from. Interviews were conducted from the researcher's home office, behind closed doors to maintain the confidentiality of the participants.

Demographics

Participants from across the United States took part in this study (Table 4.1). However, the majority of the participants were white, female, and married licensed clinical psychologists. The age range of participants varied from the 26 to 65+ years of age. The number of years in practice varied from 1–2 years to over 15 + years in practice. Over half of the participants were from Washington State.

Table 4.1

Participant Demographics

	Age	Gender	Ethnicity	Status	Profession	Years*	State
#1	26-30	Female	Asian	Married	Psychologist	1-2	WA
#2	51-55	Female	White	Married	Therapist	5-7	WA
#3	36-40	Female	White	Married	Psychologist	3-4	WA
#4	51-55	Female	White	Married	Psychologist	15+	WA
#5	51-55	Female	White	Married	Psychologist	15+	WA
#6	26-30	Female	White	Single	Therapist	3-4	WA
#7	18-25	Female	White	Partnered	Psychologist	3-4	KY
#8	61-65	Male	White	Married	Psychologist	15+	WA
#9	30-35	Female	White	Single	Psychologist	5-7	WA
#10	51-55	Female	White	Married	Psychologist	1-2	WA
#11	46-50	Male	White	Married	Psychologist	5-7	MN
#12	46-50	Female	White	Married	Psychologist	7-10	PA
#13	30-35	Female	Black	Married	Psychologist	5-7	KS
#14	40-45	Male	White	Married	Psychologist	15+	CA
#15	61-65	Male	White	Married	Psychologist	15+	CA

Note. Denotes number of years working with IOS/A.

Data Collection

In this section, a description of how data was collected during the fourth phase of the validation process will take place. The data was collected through one-on-one interviews with experts in the field. A discussion of this ensues.

During Phase 4, input was elicited by experts in the field, who participated in one-on-one interviews consisting of clinical psychologists and psychotherapists (see Appendix E). Content validity was estimated with the assistance of participants during one-on-one interviews. A primary purpose of this phase was to measure the content validity of this measure.

Participants were invited to interview for this research after the consent form was signed and they agreed to the terms. A demographic questionnaire was included. Next, participants contributed in the content validity of the measure by participating in an interview. Last, participants were able to request the results of the study once it is completed.

During this phase of the data collection, 15 people participated. Interviews took place between May 4, 2020 and May 26, 2020. Interview times lasted between 1:32:24 to 21:52. Overall time spent conducting interviews amounted to 12 hours, 20 minutes, and 15 seconds.

Data Analysis

In order to analyze data, copious notes on each of the interviews were kept. Interview responses were broken down into different categories. The results are discussed below.

Results

The results from the one-on-one interviews during Phase 4 are discussed below. Two main categories of results emerged, general results and results related to specific domains. A discussion of these will follow.

General Comments

Within the data collection phase, there were major themes that emerged from the general overall comments and were not specific to the domains. These themes were related to the believed usefulness of the measure. These general comments are described below.

Usefulness

Overall, participants were excited at the prospect of this measure being created and validated for future use. All saw the usefulness of it and stated that it filled a gap in measures in existence for autism. They appreciated that this measure was different in that it was not geared toward diagnosis, but as a screener of an individual's current expression of symptomology. Participants (80%) also stated that they could also use this measure as part of therapy as a psychoeducation entity. All participants could see the feasibility of other versions of this measure such as forms for IOS/A by age, teachers, parents, significant others, long and short forms.

Use of Functioning Labels

A number of participants (66.6%) shared that they felt that some of the wording of the questions were problematic. Many people in the field are moving away from the use of "functioning" labels. They shared that the labels "high" and "low" functioning were arbitrary and did not provide a true measure of an individual's strengths or weaknesses. Some participants (26.6%) also shared that they felt that these labels were harmful as they were congruent with the medical and deficit models of autism, which do not encompass the notion of neurodivergence.

Use of Identity-First versus Person -First Language

Some participants (26.6%) commented on the use of person-first vs. identity-first language (i.e., person with autism vs. autistic). The thought was that person-first language was demeaning and emphasized the notion of autism as a disability. This idea renders the use of the term *autistic* as disrespectful. Many in the field, including IOS/A themselves, prefer identity-first language and view the autistic identity as a proud element of who they are (Hens et al., 2019).

Wording in General

Some participants acknowledged that the wording was too formal (33.33%). One suggested that the acronyms should be written out. All the participants had editing comments about various items throughout the measure.

Depth and Breadth

Others warned against going too in-depth with this measure as it could lose its effectiveness as the measure could become too complicated and adversely affect the ease of use. Participants (40%) cautioned not to recreate what others have done in other measures. Some (26.6%) participants believed that there were too many domains and others were concerned with titration. In contrast, a few of the participants (33.3%) shared a belief that many categories were beneficial. They believed that the inclusion of many categories helped to garner a more accurate

view of an individual's expression of autism. They stated that having many categories spoke to the complexity to the overall purpose of the measure.

Reflections on the Content

Results of the interviews are discussed and broken down into the specific domains. The domains discussed are the original 13 domains that were initially utilized as a result of the literature review. These domains are listed in Item Pool B (Appendix D).

Activities of Daily Living

Participants overwhelmingly supported the usefulness of this domain (93% of respondents), Activities of Daily Living. The general consensus among respondents was that this domain was useful because it helped to give an idea of where an individual's strengths and challenges lie. Participants shared that it was important for people providing support services for IOS/A to know what an individual's limitations are in providing for their daily needs.

Cognition

Participants varied in their opinion regarding this domain. It was opined by a few participants (20%) that perhaps this category could be broken down by processing speed, academics, intelligence, and aspects relating to specific learning disabilities. However, the general consensus of the participants was to leave this domain alone (53.33%). One rationale of changing it was that the scope of this measure is not of a neuropsychological nature. There was also concern regarding how in-depth this could become and how many different categories this domain could potentially be split into. It was also expressed that perhaps the domain name could be more specific, such as *intelligence.* As a result, this domain was renamed to *intelligence* due to the confusing connotation *cognition* was eliciting. However, during the dissertation defense, it became apparent that *intelligence* was also confusing, and the domain was changed again to

mentation. It was opined that test-takers might view the domain as an accurate measure of their intelligence, which it is not. Thus, the name *mentation* emerged.

Social Aspects

Participants had no concerns regarding this domain. Overwhelmingly, at 100%, the participants supported the usefulness of this domain as a whole. The general consensus was that this domain made sense for the measure because it was in alignment with the DSM and a core pillar of autism diagnosis.

Motor Skills

Participants largely agreed that this domain would be useful in this measure (93.33%). The consensus was that it is important to understand an individual's strengths and weaknesses when it came to motor skills while providing support services. They related that motor skills was an important aspect in deciphering what types of support an individual may need.

Sensory Aspects

Participants overwhelmingly responded (100%) in support of the sensory aspects measure due to its core pillar in autism diagnosis. They also alluded to the usefulness of this domain through their discussion of the complexities that occur when providing support for someone with sensory concerns. These concerns could be both sensory seeking attributes and sensory aversion attributes.

Emotional and Adaptive Aspects

The consensus for this domain was varied and elicited a bit of discussion from the participants. Many believed that this domain measured two separate entities as emotions are different from adaptivity. This amount equated to 73% of respondents.

Restrictive and Repetitive Behaviors

This domain also elicited much discussion from the expert participants. Some believed that this domain should be split (26% of respondents), while others believed that this domain should be left alone (60% of respondents). As a result of the interviews with expert participants, this domain was left alone and kept intact. One rationale was that this domain was in line with the DSM and diagnostic standards. Another rationale was that there was much overlap between the two aspects. Lastly, there was concern regarding the simplicity of the design of the overall measure. To break domains down into more specific smaller domains could become confusing and cumbersome for test users and the test audience.

Communication

Participants overwhelmingly supported the usefulness of this domain (80% of respondents). They shared that it was in alignment with what the measure was created to do, give a snapshot at the strengths and weaknesses of IOS/A communication skills. They also stated that it is in accordance with the current diagnostic guidelines.

Attention and Self-Regulation

Participants opined that this domain was measuring two different aspects of an IOS/A's expression of symptomology (73%). A few participants (13%) also shared that attentional aspects could also be paired with distractibility. It was also expressed that self-regulation could go together with adaptivity.

Development

Participants overwhelmingly (73.33%) shared that although some aspects of this domain could be useful, it was not aligned with the overall scope of a measure that intends to get a current snapshot of IOS/A strengths and challenges. Participants stated that while IOS/A can be delayed in some respects, they can easily "catch-up" to meet their overall developmental

milestones. Various aspects of development such as social aspects, communication, and motor skills are already captured in the other domains.

Regression

Participants in the interview portion of the data collection phase discussed that they seldom saw IOS/A with issues pertaining to regression. As such, they had difficulty ascertaining the legitimacy for such a domain in this measure (at 73%). They also shared that there were some questions throughout the overall measure that address issues of regression. Furthermore, although some participants shared that it would be useful to know instances of regression, it did not pertain to the overall scope of the measure. The measure is supposed to give a snapshot look at where an IOS/A's strengths and weaknesses lie, not look at their past.

Imagination and Creativity

Some participants opined that this domain was a good one (33%); however, others had questions as to its usefulness for the scope of the study overall (46%). Participants believed that although this domain was in line with creating a positive measure, it did not suit the purpose of the measure as a whole. They stated that strengths and weaknesses pertaining to imagination and creativity were not useful to those who provide support to IOS/A. That being said, some participants praised the positive stance this domain provided.

Self-Injurious Behaviors

Participants were mixed in their responses regarding this domain. Some found that it was useful (33%), while others believed it to be difficult to accurately assess. Some participants expressed that the underlying causality of the self-injurious behavior was more important than the behavior itself (46%). Some comments alluded to the fact that it is difficult to parse out whether the mechanism of a behavior is self-regulation due to the emotional or sensory overload, or a result of behavioral difficulties, or a form of comorbid psychopathology, or a way of

communicating that they were not getting their needs met. Participants also pointed out that various items pertaining to self-injurious behavior were sprinkled throughout the measure. There was also concern that this measure in itself was negative in its connotation and was not in line with the overall non-judgemental framework of this measure (13%).

Self-Regulation and Adaptivity

This domain was newly created and resulted from the interviews of experts in the field. Due to the split of the category of *Emotion and Adaptivity*, *Adaptivity* was left in its own domain. Expert participants also believed that *Self Regulation* is an adaptive aspect and as such, the two domains could be merged together into one domain, *Self-Regulation and Adaptivity*.

Summary

The research question was: Can a valid psychological measure be created of the strengths and challenges of an IOS/A that will add valuable information to the current treatment and support of the condition after initial diagnosis? From the interviews conducted in Phase 4, experts in the field shared how useful a measure of this sort would be. While it is possible to create a measure of this sort, the final stage of data collection would consist of an item analysis statistically based through the use of Cronbach's alpha. The number of participants needed for this to generate adequate power would be 2,000 (Anthoine et al., 2014; Colin & Hollins, 2017).

CHAPTER V: DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this study was to improve the understanding of autism by developing a new tool to help to measure autism within various spheres of symptomology. Use of this measure could produce data showcasing individuals' challenges and strengths such as those previously noted (Barnhart, 2017). These data can provide professionals who work with IOS/A a better idea of where individuals' needs may lie, which may help to create individualized treatment goals.

The main research question was: What is the feasibility to focus on the content validity of a new measure that focuses on an IOS/A presentation of autism expression. This measure, once validated, will ascertain the strengths and challenges of an individual with autism. This knowledge will aid in the creation of a measure that will add valuable information to the current treatment and support of the condition after initial diagnosis.

Interpretation of the Findings and Rationale for Changes

A discussion of the first four phases will commence to include the validation of this measure that encompassed the scope of this study within the researcher created test conceptualization model. This model incorporated a series of phases based upon an article published by Clark and Watson (1995) and on test construction best practices, as discussed by Miller and Lovler (2015).

Phase 1 consisted of the test conceptualization, which was to create a measure that disseminated individuals' strengths and challenges after an initial autism diagnosis and to compare their results with those of others on the autism spectrum. An initial item pool was created (Item Pool A, Appendix I). As a result of this study, the main conceptualization of the measure did not change; instead, it served as the main pillar of this study.

Phase 2 consisted of a literature review that encompassed 45 measures commonly used in autism assessment. As part of this review, I sought to determine which domains were used in other psychometric measures. I used this information to inform the development of the domains for this measure. Each of these domains were analyzed, compared, and grouped into categories. As a result of the creation of these categories, 13 initial domains emerged: *Activities of Daily Living* (AD), *Cognition* (CD), *Social Aspects* SA), *Motor Skills* (MS), *Sensory Aspects* (SY), *Emotional and Adaptive Aspects* (EA), *Restrictive and Repetitive Behaviors* (RB), *Communication* (CO), *Development* (DV), *Attention and Self-Regulation* (AR), *Regression* (RG), *Imagination and Creativity* (IC), and *Self-Injurious Behaviors* (SB). These 13 domains were used in the creation of Item Pool B, which can be found in the appendices.

Furthermore, the literature review in Phase 2 consisted of locating evidence relating to facets of individual autism expression and their associated strengths and weaknesses. This literature review was utilized to inform the content of the items. The portion of the literature review that discussed autism symptomology was divided into the respective 13 original domains.

Phase 3 consisted of the creation of Item Pool B (Appendix D). Each of the 13 domains included 10 Strengths-based items and 10 Challenge-based items for a total of 20 items per domain. Item Pool B consisted of 260 items total.

Phase 4 consisted of interviews with 15 experts in the field. These interviews were utilized to garner content validity. Participants were asked to assess the measure and to offer their insight. Responses from these interviews led to further revision of the overall measure.

Changes Incorporated from Interviews

In this section, a discussion will take place regarding the results from the interviews with experts in Phase 4 (Appendix E) and provide the interpretations that informed pertinent changes.

These results informed the rationale to make changes from Item Pool B (Appendix D) to create Item Pool C (Appendix F). The changes are described below.

General Interpretations

Several participants shared that some of the wording of the items was problematic because many in the field are moving away from the use of functioning labels (Hens et al., 2019). They shared that the labels *high* and *low* functioning were arbitrary and really did not give a true measure of an individual's strengths or weaknesses. As a result, it was ensured that the latest version of the measure included no functioning labels within it for Item Pool C.

Some participants also commented on the use of person-first vs. identity-first language (person with autism vs. autistic). Many in the field, including IOS/A themselves, prefer identity-first language and view their autistic identity as a proud element of who they are (Hens et al., 2019). As a result, I looked over the measure to ensure that there were no instances of person-first language.

Some participants stated that the wording was too formal. However, for the scope of this study and the initial audience of the measure, the formal language was left in because this measure is meant to be used by professionals. Suggestions to remedy this issue and to make this measure more accessible is commented upon in the recommendations section. With further regard to wording, some participants commented on the use of acronyms. As a result, those have been written out to enhance the overall readability of the measure. Participants also shared that the use of alpha and beta symbols within the survey was confusing. Some stated it read like a mathematical equation that they could not figure out. As a result, these too were changed to a simple S for Strengths, and C for Challenges. It was also evident that participants were confused as to the overall scope of the study. Many questioned who the test takers were and who the

measure was geared toward. As a result, a more in-depth description was included at the beginning of the survey in Item Pool C and can be viewed in Appendix F.

Domain Related Interpretations

The domains of *communication, social aspects, motor skills,* and *sensory aspects* were left alone as participants agreed that they were useful and fit into the scope of the measure. Participants had no concern regarding the *activities of daily living* domain, and it remained unchanged. The *cognition* domain had some variance in opinion. A few participants shared that there were many facets to cognition and that perhaps I should expand upon them. Others expressed that additional facets could make the measure more complicated than it needed to be. There was concern surrounding the name *intelligence* as it might be misconstrued as an accurate measure of an individual's intellectual quotient (IQ), which it is not. It was also opined that perhaps the domain name could be more specific such as *mentation*. As a result of the interviews with experts in the field, the category of *cognition* was left alone but the domain name was changed to *mentation*.

The domain of *emotional and adaptive aspects* was split into two categories because the overall consensus was that they were two different things. The *restrictive and repetitive behaviors* domain was also kept as is in spite of some debate eliciting splitting the two. The domain of *attention and self-regulation* was split because participants opined that this domain was measuring two different aspects. It was also expressed that *self-regulation* could go together with *adaptivity*. As a result of the expert interviews, *attention and self-regulation* were split. *Attention* was renamed to *attention and distractibility*. Participants shared that although some aspects of the domains of *development, imagination and creativity,* and *regression* were all helpful, they went beyond the scope of this measure and further complicated it. In the

self-injurious behavior domain, participants were mixed in their responses. Participants pointed out that various items pertaining to self-injurious behavior were sprinkled throughout the measure. There was also concern that this measure in itself was negative in its connotation and was not in line with the overall non-judgemental framework of this measure. As a result, this domain was excluded. The domain of *self-regulation and adaptivity* was created due to the split of the category of e*motion and adaptivity*. Expert participants also believed that s*elf regulation* is an adaptive aspect and as such, the two domains could be merged together into one domain, *self-regulation and adaptivity*. As a result, this domain was created.

Limitations of the Study

A significant limitation is that it was difficult to attain a sample size that was representative of all cultures and regions due to the enormity of the sample population. There were barriers of this in Phase 4 during the interviews as most of the participants were white, married, female, and from Washington state. Language barriers were also a contributing factor as non-English speakers were not eligible to participate in this study. Furthermore, other regions of the world were not reached due to limitations in technological advances, availability of electricity, and lack of access to the internet. Efforts to minimize the limitations were considered. For instance, during the third phase of data collection, participation was open to those who meet the inclusion criteria globally. Furthermore, this study was conducted in English, one of the most widely used languages in the world. However, the main limitation to the study was that Phases 1–4 were completed. Phases 5 and 6 will commence at a later time.

Recommendations

I offer two main categories of recommendations below. The first includes my recommendations for further development after this initial development stage. The second

category includes my recommendations for how to conduct Phases 5 and 6 in the test development model I have adapted for the validation of this measure.

Recommendations for Further Survey Development

The most significant recommendation is for further survey development. Due to the enormity of stage 5 of data collection, a collaborative effort may be warranted. Possible collaboration could come from persons associated with APA Division 33 (Intellectual and Developmental Disabilities), The Autism Research Institute, and assessment publication companies. The rationale being that since the next phase of survey development will take 2,000 participants, collaboration with larger entities with financial and individuals as resources could be beneficial (Anthoine et al., 2014; Colin & Hollins, 2017).

Recommendations for Specific Survey Expansion

As a result of speaking to those in the field regarding the development of this measure, there are a few areas where this survey can be further expanded once development has reached completion. One comment was that the survey is too long. One way to mitigate that is to include both long and short versions. Test takers may tire due to the length. It would be beneficial if there were different options.

I also recommend creating different versions of this measure for different audiences to include IOS/A, parents and caregivers, teachers, and psychologists. Other measures such as the BASC utilize different forms in an effort to triangulate their findings. It would also be beneficial to know an individual's autism presentation in various settings in order to acknowledge masking. This may be helpful in therapy and other forms of support services.

Furthermore, I also recommend creating different forms that would take gender identity into account. Research shows that girls and women have different autism expressions than men

and boys (Dean et al., 2017; Loomes et al., 2017). Different forms would help to highlight the true expression of autistic traits in women and girls.

Plans for Phases 5 and 6

Here, I provide a discussion for the next steps for validating this measure. Phase 5 entails an item analysis through Cronbach's alpha. Phase 6 would entail an analysis of the findings from Phase 5 and create a final item pool and the final measure.

Phase 5: Participant Recruitment

Participants will be recruited for the Phase 5 (Appendix M) portion of data collection of the study using an online convenience sampling method and a purposeful sampling method. This is because solicitation will take place via online autism professional groups. Participants are to be recruited using social media networking sites such as LinkedIn, Facebook, and Autism Professional Support Networks.

Phase 5: Data-Collection Procedures

In Phase 5, participants will be recruited through online professional networking platforms such as LinkedIn. The initial recruitment form is in Appendix M of this document. Participants will receive a link to an online questionnaire within an online survey like SurveyMonkey. First, inclusion criteria will be verified. Next, an informed consent form will be viewed and participants can give their consent. The online survey will be utilized to collect demographics (Appendix O), and participants will create a 4-letter code in case they wish to withdraw their data from the study. Only the participant will know this code and will be able to use it to identify data for deletion should they withdraw.

Ethical Considerations Relating to Outside Research Methods in Phase 5. During the data collection process for Phase 5, two outside research methods will be utilized. One being a professional networking platform such as LinkedIn through which I will be able to locate

participants. The other, will be an online survey platform, through which I will collect demographics and conduct item analysis.

Networking Platform. A professional networking platform such as LinkedIn is an online-based professional networking site. A recruitment flyer (Appendix M) will be posted to reach potential participants for data collection in Phase 5. Networking platforms often provide its users with additional security protections such as Completely Automated Public Turing Test to Tell Computers and Humans Apart (CAPTCHA), which elicits a procedure to ensure each login is from a real person and not a bot.

Online Survey. Participants will see an online survey form that gives the study procedures, such as participant requirements. Potential participants can remain anonymous, as the online survey will not collect personal information including name, address, or email. SurveyMonkey is one example of an online survey modality. An online survey tool like SurveyMonkey will be used during Phase 5.

Phase 5: Item Analysis

The fifth phase will be to conduct an item analysis on the data. Item Pool C will be distributed to participants around the globe through online social media outlets. This item analysis will consist of determining Cronbach's alpha, item difficulty, item total, and interitem consistency. An online version of the test using a survey platform will be created so that participants can respond conveniently. This mechanism will also enhance the facilitation of data collection and data analysis. The participants in this part of the study will be persons who have worked for at least one year with IOS/A in a therapeutic manner, such as speech-language pathologists, occupational therapists, psychotherapists, and clinical psychologists. Each participant will be asked whether each test item is essential to the construct, and participants will be prompted to give either a yes or no answer.

Participants for Phase 5 of the study will be recruited online through professional networking sites such as LinkedIn. The recruitment flyer is in Appendix M of this document. Criteria for participation will be similar, namely that participants must have worked with IOS/A for one year in some therapeutic capacity and be over the age of 18. Participant anonymity will be maintained through a private survey where contact information will be held. This way, no personal information other than emails will be collected, and the drawing entry will have no connection to any survey responses. Furthermore, the number of participants for the online data collection portion of the study is 2,000. Ten items are needed to validate an item (Anthoine et al., 2014; Colin & Hollins, 2017). Given that there are 200 items, 2,000 participants are needed.

Phase 5: Item Analysis Plan

After running the results of the survey from the participants in Phase 5, an item analysis will be conducted. Cronbach's alpha will be calculated using SPSS. The following items will be assessed: item difficulty, item total, inter-item consistency, and internal consistency. The following process as suggested by Miller and Lovler (2015) will be followed:

1. First, any data that originated from reversed questions will be reversed scored. For instance, if a question reads, "How independent is the individual with regard to employment endeavors on a scale of 1–5," the researcher will code all 5s (meaning very independent) as 1s (meaning poor level of independence). To clarify, all 1s as 5s, 2s as 4s, 4s as 2s, and 5s as 1s, and 3s will remain the same.
2. Next, all the responses will be coded with either a 1 or a 0. Responses 3, 4, and 5 as "yes" and a 1, while a 1 and 2 as "no" and a 0. The spreadsheet will then only consist of 1s and 0s.
3. From there, the spreadsheet will be uploaded into SPSS for further analysis.

Next, the items will be evaluated:

4. Item difficulty will be assessed by the number of participants who endorsed the items. Items that are too easy (.9 to .1) or too hard (.0 to .2) will be deleted.
5. An item total analysis will be conducted to determine whether the item is consistent with the total score. The corrected item correlation will be assessed, deleting any items with negative correlations. Furthermore, since the higher the item total, the better, this factor will be used in the selection of the final items pool. For instance, if the number of items per domain is set at 10 and a domain has 12 validated items, ultimately the 10 highest-scoring items will go into the final item pool.
6. Inter-item analysis will help to ascertain consistency. In the inter-item correlations analysis, the strength of the relationship will be assessed. Items closer to one have better relationships. Zero denotes no relationship, and as such, items with lower correlations will be deleted. Similarly, each domain will have an equal number of questions, specifically those with the greatest validity rate.
7. Internal consistency will also help to determine whether all the items are consistent with one another. For internal consistency, it is ideal when all items have a .8 or .7 rating. If an item does not, the researcher will delete it.

Phase 6: Finalization of Items

Phase 6 will consist of finalizing the items. More specifically, the results from Phases 2, 4, and 5 will be analyzed to inform the final selection of the test items, which will become Item Pool D. A deeper explanation of the specific data analysis procedures comes later in this chapter. The importance of this phase is that it is the process by which the item pool will be finalized. All unnecessary items will be eliminated (explained in Phase 5). What remains will consist of the final item pool (Item Pool D).

Discussion

Within this discussion, I will reiterate the overall research purpose along with a brief summarization of the general findings. I also provide an in-depth discussion of what the next phases would entail. The discussion ensues.

General Discussion

Within this study, I sought to ascertain whether it was feasible to to create a valid measure of the strengths and challenges of an individual with autism. It was important that this measure could also add valuable information to the current treatment and support of the condition after initial diagnosis. From working through the first four phases of the test development model previously outlined, it is apparent that yes, it is possible to create a measure of this type. However, a measure of this type would take a tremendous amount of time and resources. Overall, the participants were excited at the prospect of such a creation and gave a lot of insight with regard to Item Pool B. From this insight, I created a new, revised item pool, which can be found in Appendix F of this document. This is the item pool that will be used going into Phase 5 of this overall process.

One of the major findings from this study was the importance of the use of language. *High* and *low* functioning labels are frowned upon within the autism community. Creating a measure that focused on the strengths and challenges of IOS/A while using functioning labels did not bode well. Furthermore, there is a major debate regarding the use of person-centered language versus identity-first language. Ethically it was difficult to parse out which to use for this study. According to the American Psychological Association Publication Manual Version 7 (2018), both are correct. This stance is relatively new and challenging to navigate in a field where there is a strong preference of person-first language. Participants from this study gave a

number of useful insights about how to improve the item pool. Many changes were made as a result.

In addition to the general findings from the one-on-one interviews, the participants gave a lot of feedback regarding the domains. As a result, I decided to stay within the overall scope of this measure and not divulge too deeply into any facets. Autism is a complex condition, and I created this measure to be a screener of autism symptomology. I was tempted to go deeper into aspects of neuropsychology and expressions of creativity.

The enormity of this validation process was much more complex than initially thought. As a result, this study encompasses the first four phases in the validation process (Appendix A). Phases 5 and 6 will need more resources to be carried out.

With this in mind, it is important to note that prior to dissemination to the wider community for use, this measure needs to be fully validated and complete. To utilize this measure as it stands now would be unethical because it has not gone through all the rigors of statistical validation.

Implications

Autism is a vast and complex condition; with various dimensions intertwined within each symptom. No two people with autism experience the array of symptomology in the same way (Noordhof et al., 2015). Individuals on the autism spectrum/autistics can manifest a number of different symptomologies, each with its own degree of severity. This new measure may capture these differences. This measure also fills a void in the array of current psychometric measures by creating a new measure that evaluates the characteristics of autism after diagnosis. Similarly, individuals' needs may change as time passes, they meet developmental milestones, or they receive therapy (Rutherford et al., 2016; Sappok et al., 2015; Wilkinson, 2011). The American Psychiatric Association's DSM-5 (2013) diagnostic criteria are limiting in the diagnosis of

autism (Dell'Osso, Dalle Luche, et al., 2016). The creation of this survey will help to fill that gap as it will give professionals in the field a clearer picture of individuals' strengths and challenges that go beyond the DSM–5's tertiary model (American Psychiatric Association, 2013).

Similarly, this measure has the potential to make a difference and help work toward positive social change for those in the autism community because it focuses on the strengths and weaknesses of IOS/A. This work frames a person's symptomology through the lens of a strengths-based approach (Noordhof et al., 2015) and not through the medical and deficit models that can hinder an individual's self-esteem and self-efficacy. Prior to the undertaking of the creation of this measure, a gap was identified in the way clinicians who work with IOS/A evaluate their clients' strengths. Persons on the autism spectrum are, in fact, on a spectrum, with an array of strengths and challenges (Mazurek, 2014). To say individuals have *autism* does not give a clear picture of their unique needs (Croen et al., 2015). Although there are several psychometric tests, such as the Ritvo Autism Asperger Diagnostic Scale-Revised (RAADS–R; Andersen et al., 2011), and the Autism Spectrum Quotient (ASQ; Murray et al., 2016), none currently exists that focus on measuring each trait of autism after initial diagnosis. The significance here is that the field does not focus on the strengths and challenges of IOS/A, but only on whether they require one of three levels of support (Gökçen et al., 2016). A measure to determine individuals' strengths and challenges may be useful for treatment recommendations (Armstrong, 2012). As a result of this study, it appeared evident that a measure of this sort is needed and would be welcomed by the field once validated psychometrically. A measure of this sort could make access to care and services more efficient.

Conclusion

The purpose of this study was to improve the understanding of autism by developing a new tool to help to measure autism within various facets. The output of this measure is data that can showcase individuals' challenges and strengths such as those noted in Barnhart (2017). These data can provide professionals who work with IOS/A a better idea of where individuals' needs may lie, which may help to create individualized treatment goals. Fifteen participants took part in the data collection process. Through these participants, more insight was garnered toward the development of the autism trait survey.

Within this chapter, an interpretation of the findings and a rationale as to why changes were made from the item pool posed to participants (Item Pool B) to create Item Pool C was provided. An in-depth section regarding further recommendations for further validation of this measure and the pertinent steps that would need to follow are discussed. Lastly, a brief summarization of the possible implications of the continued validation of this measure is disseminated.

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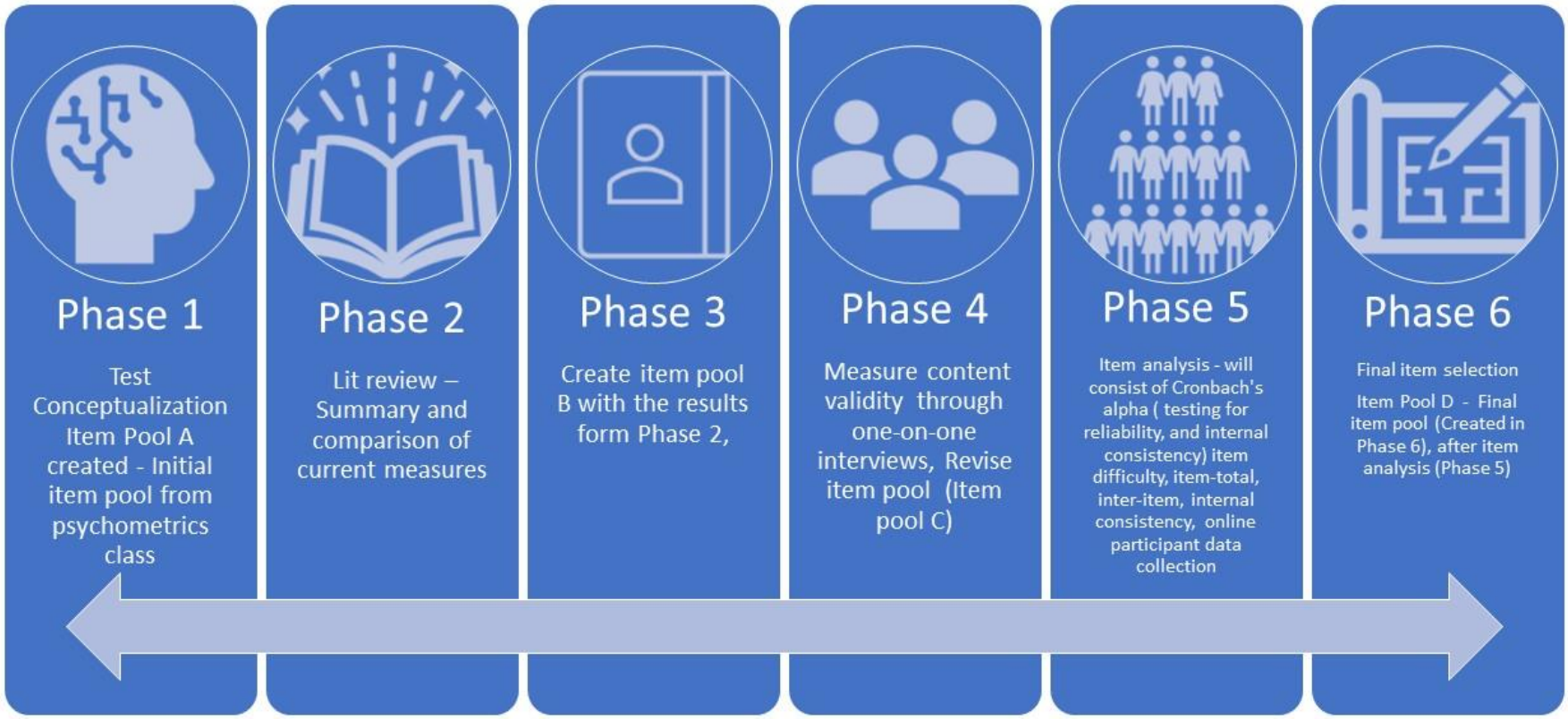
APPENDIX A

Test Construction Model

Test Construction Model



APPENDIX B

Literature Review of Search Terms

Activities of daily living and autism, ADL and autism, activities of daily living, ADL and disability, ADL and cognitive disability, activities of daily living and disability, communication and autism, restricted and repetitive behaviors and autism, cognition and autism, intelligence and autism, autism and testing, autism and psychometrics, Autism Diagnostic Observation Schedule, Adult Asperger Assessment, Autism Behavior Checklist, Autism Diagnostic Inventory, Autism Spectrum Quotient, Autism Spectrum Rating Scales, Checklist for Autism in Toddlers, Bayley, Childhood Asperger Syndrome Test, Childhood Autism Rating Scale, Communication and Symbolic Behavior Scales, Empathy Quotient, Gilliam Autism Rating Scale (GARS) Gilliam, 2006, Monteiro Interview Guidelines for Diagnosing Asperger's Syndrome, Pervasive Developmental Disorders Screening Test, Screening Tool for Autism in Toddlers and Young Children, Social Communication Questionnaire, Vineland–3, Ritvo Autism and Asperger Diagnostic Scale, Adult Subthreshold Spectrum, Autism Spectrum Disorder Diagnosis for Child, Asperger-Syndrome-Diagnostic Interview, Asperger Syndrome Diagnostic Scale, Autism Symptom Self-Report for Adolescents and Adults, Autism Spectrum Screening Questionnaire, Baby and Infant Screen for Children with Autism Traits, Children's Social Behavior Questionnaire, Developmental Behavior Checklist –Autism Screening Algorithm, Diagnostic Behavioral Assessment for ASD–Revised, Early Screening for Autistic Traits (ESAT), Krug Asperger's Disorder Index, Modified Checklist for Autism in Toddlers, Quantitative Checklist for Autism in Toddlers, Social and Communication Disorders Checklist, Social Communication Questionnaire, Wing Subgroup Questionnaire, Autism Checklist, Autism Detection in Early Childhood, Autism Mental

Status Examination, *Autism Quotient*, *Australian Scale for Asperger's Syndrome*, *ASD in Adults Screening Questionnaire*, *Autism Spectrum Disorder Diagnosis for Adults*.

APPENDIX C

Summary and Comparison of Psychometric Measures

Summary and Comparison of Psychometric Measures

Measure	Adult Asperger Assessment (AAA) (Baron-Cohen et al., 2006)	ASD in Adults Screening Questionnaire (ASDASQ) (Ferriter et al., 2001; Nylander & Gillberg, 2001) *Screener*	Asperger Syndrome Diagnostic Scale (ASDS) (Campbell, 2005; Myles et al., 2001)	Asperger-Syndrome-Diagnostic Interview (ASDI)	Australian Scale for Asperger's Syndrome (ASAS) (Garnett & Attwood, 1995)
Restrictive/ Repetitive Behaviors	Obsessions	n/a	n/a	Narrow Interest, Routines and Interests	Specific Interests
Social Aspects	Social	n/a	Social	Social Interactions	Social and Emotional Abilities
Emotional Aspects/ Adaptive Behavior	n/a	n/a	Maladaptive	n/a	Social and Emotional Abilities
Cognition	n/a	n/a	Cognitive	n/a	Cognitive Skills
Communication	Communication	n/a	Language	Speech and Language Problems, Non-Verbal Communicati	Communication Skills
Developmental Aspects	n/a	n/a	n/a	n/a	n/a
Regression	n/a	n/a	n/a	n/a	n/a
Imagination and Creativity	Imagination	n/a	n/a	n/a	Imagination
Self-Injurious Behaviors	n/a	n/a	n/a	n/a	n/a
Sensory	n/a	n/a	Sensorimotor	n/a	n/a
Motor Skills	n/a	n/a	n/a	Motor Clumsiness	Movement Skills
Attention–Self Regulation	n/a	n/a	n/a	n/a	n/a
Activities of Daily Living	n/a	n/a	n/a	n/a	n/a

Autism Diagnostic Observation Schedule (ADOS–2) Toddler Modules 1- 3 (Lord et al., 1989)	Autism Diagnostic Observation Schedule (ADOS–2) Adult and Adolescent (Lord et al., 1989)	Autism Diagnostic Inventory (ADI) (LeCouteur et al., 1989)	Autism Detection in Early Childhood (ADEC) (Nah, Young, & Brewer, 2014; Nah, Young, Brewer, & Berlingeri,	Autism Behavior Checklist (ABC) (Eaves & Milner, 1993)
Restricted and Repetitive Behavior	Stereotyped Behaviors and Restricted Interests	Interests and Behaviors	n/a	Stereotypical (Behavior)
Social Affect	Reciprocal Social Interaction	Social Development and Play	n/a	Social and Relating
n/a	n/a	General Behaviors	n/a	Aggressive
n/a	n/a	n/a	n/a	n/a
n/a	Communication	Language and Communication Functioning	n/a	Echolalic Speech and Language and Nonresponsive
n/a	n/a	Early Development	n/a	Infant-Like
n/a	n/a	Acquisition and Loss of Language/Other Skills	n/a	n/a
n/a	Imagination and Creativity	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	Sensory
n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a

Autism Spectrum Screening Questionnaire (ASSQ) Ehlers et al., 1999; Posserud et al.,	Autism Spectrum Rating Scales (ASRS) (Camodeca, 2019)	Autism Spectrum Disorder Diagnosis for Child (ASD–DC) Matson et al. (2009)	Autism Spectrum Disorder Diagnosis for Adults (ASD–DA) (Matson et al., 2007, 2010)	Autism Quotient (AQ) (Baron-Cohen et al., 2001; Freitag et al., 2007)	Autism Mental Status Examination (AMSE) (Grodberg et al.,
n/a	Stereotypy and Behavioral Rigidity & Body and Object Use	n/a	n/a	n/a	Repetitive Behaviors/ Preoccupations
n/a	Peer Socialization and Adult Socialization	n/a	n/a	Social Skill	Eye Contact/ Interactions
n/a	Social-Emotional Reciprocity	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a
n/a	Atypical Language	n/a	n/a	Communication	Language/ Pragmatics
n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	Unusual Sensitivities
n/a	Sensory Sensitivity	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a
n/a	Attention/Self-Regulation	n/a	n/a	Attention Switching, Attention to Detail	Shared Attention
n/a	n/a	n/a	n/a	n/a	n/a

Childhood Asperger Syndrome Test (CAST) (Scott et al., 2002)	Checklist for Autism in Toddlers (CHAT) (Baird et al., 2000)	Bayley Scale (Bayley, 2006).	Baby and Infant Screen for Children with Autism Traits (BISCUIT) (Matson et al., 2007, 2010)	Autism Checklist (ACL) (Sappok, Heinrich, &	Autism Symptom Self-Report for Adolescents and Adults (ASSERT) (Posserud et al.,
n/a	n/a	n/a	Anxiety/Repetitive Behavior/Stereotypies	n/a	n/a
Reciprocal Social Behavior	Producing a Point, Protodeclaractive Pointing, Following a Point, Producing a Point	Social	n/a	n/a	n/a
n/a	n/a	Emotional/ Adaptive Behavior	Avoidance Behavior/Tantrum/Conduct Behavior/Aggressive/Destructive	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a
n/a	Pretend Play and Pretending	n/a	n/a	n/a	n/a
n/a	n/a	n/a	Self-Injurious Behavior	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	Inattention/Impulsivity	n/a	n/a
n/a	n/a	n/a	Eating and Sleep Problems	n/a	n/a

Early Screening for Autistic Traits (ESAT) (Willemsen-Swinkels et al., 2001) *Screener*	Diagnostic Behavioral Assessment for ASD–Revised (DiBAS–R) Sappok, Gaul, et al. (2014) *Screener*	Developmental Behaviour Checklist–Autism Screening Algorithm (DBC–ASA) (Brereton et al., 2002; Steinhausen &	Communication and Symbolic Behavior Scales (CSBS) (Wetherby & Prizant, 1993)	Children's Social Behavior Questionnaire (CSBQ) (Luteijn et al., 2000)	Childhood Autism Rating Scale (CARS) (Schopler et al., 1988)
n/a	n/a	n/a	n/a	n/a	Body and Object Use
n/a	n/a	n/a	n/a	n/a	Relating to People
n/a	n/a	n/a	n/a	n/a	Emotional Response
n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	Communication and Expressive Speech Domains & Symbolic Domains	n/a	Verbal Communication
n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a

Monteiro Interview Guidelines for Diagnosing Asperger's Syndrome (MIGDAS–2) (Monteiro, YEAR)	Modified Checklist for Autism in Toddlers (M–CHAT) (Bilszta & Justin, 2013; Dumont-Mathieu & Fein, 2005; Robins et al.	Krug Asperger's Disorder Index (KADI) (Campbell, 2005; Krug, 2003) *Screener*	Gilliam Asperger's Disorder Scale (GADS) (Gilliam, 2006a)	GARS/GARS–2 Gilliam Autism Rating Scale/Gilliam Autism Rating Scale–Second Edition (Gilliam, 1995,	Empathy Quotient (EQ) (Baron-Cohen & Wheelwright, 2004)
n/a	n/a	n/a	Restricted/ Repetitive Behaviors	Stereotyped Behaviors	n/a
Social Relationships and Emotional Responses	n/a	n/a	Social Interaction	Social Interaction	Social Skills
Social Relationships and Emotional Responses	n/a	n/a	Emotional Responses	n/a	Cognitive Empathy and Emotional Reactivity
n/a	n/a	n/a	Cognitive Style	n/a	n/a
Language and Communication	n/a	n/a	Maladaptive Speech	Communication	n/a
n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a

Social and Communication Disorders Checklist (SCDC) (Bölte et al., 2011; Skuse et al.,	Screening Tool for Autism in Toddlers and Young Children (STAT) (Stone & Ousley, 1997; Stone et al., 2000, 2004)	Ritvo Autism and Asperger Diagnostic Scale (RAADS–R) (Ritvo et al., 2008)	Ritvo Autism and Asperger Diagnostic Scale (RAADS–14) (Ritvo et al., 2008)	Quantitative Checklist for Autism in Toddlers (Q–CHAT) (Allison et al., 2008, 2012) *No Domains*	Pervasive Developmental Disorders Screening Test (PDDST–II)
n/a	n/a	Circumscribed Interests	n/a	n/a	n/a
Reciprocal Social Interaction Skills	Imitation	Social Relatedness	Social Anxiety	n/a	n/a
Behavioral Problems	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	Mentalizing Deficits	n/a	n/a
Communication Skills	Communication	Language	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a
n/a	Play	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	Sensory/ Motor	Sensory Reactivity	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a	n/a	n/a

Wing Subgroup Questionnaire (WSQ) (Castelloe & Dawson, 1993)	Vineland–3 (Sparrow et al., 1984)	The Adult Subthreshold Spectrum (AdAS Spectrum) (Dell'Osso et al., 2016)	Social Communication Questionnaire (SCQ) (Berument et al., 1999; Bölte & Poustka, 2006; Bölte et al., 2011; Rutter et al., 2003;
n/a	n/a	Inflexibility and Adherence to Routine and Restricted Interests and Rumination	n/a
n/a	Socialization	Non-Verbal Communication	Social Interaction
Aloof, Passive and Friendly, Active-but-Odd	n/a	Empathy	n/a
n/a	n/a	n/a	n/a
n/a	Communication	Verbal Communication	Language and Communication and Current Language Functioning
n/a	n/a	Childhood/Adolescence	n/a
n/a	n/a	n/a	n/a
n/a	n/a	n/a	n/a
n/a	Maladaptive Behavior	n/a	Self-Injurious Behavior
n/a	n/a	Hyper-Hypo Reactivity to Sensory Input	n/a
n/a	Motor Skills	n/a	n/a
n/a	n/a	n/a	n/a
n/a	Daily Living Skills	n/a	n/a

APPENDIX D

Item Pool B

For each item, the *a* response measures the strengths of individuals' autism symptomology, while the *b* response measures the challenges of individuals' autism symptomology. I used a Likert-type scale to elicit a more precise measure of individuals' inclinations than a simple yes or no. If you are unsure of what to mark, use your intuition.

1 – Strongly Disagree
2 – Disagree
3 – Undecided
4 – Agree
5 – Strongly Agree

Social Aspects Domain (SA) - Alpha (α)

1α.) The individual appears to have no difficulty participating in group activities such as bowling or going out to eat with friends.

1 2 3 4 5

2α) The individual seeks out others.

1 2 3 4 5

3α.) The individual desires to play social games with others such as cards or board games.

1 2 3 4 5

4α.) The individual appears to have no difficulty in discussing topics of little to no interest to them.

1 2 3 4 5

5α.) The individual appears to be comfortable in either large or small social groups such as school dances or meetings.

1 2 3 4 5

6α.) The individual has no difficulty initiating conversation with unknown persons.

1 2 2 4 5

7α.) The individual adjusts their behavior to suit the social environment.

1 2 3 4 5

8α.) The individual can read social cues such as being “brushed off”.

1 2 3 4 5

9α.) The individual has no difficulty in reading others’ facial expressions.

1 2 3 4 5

10α.) The individual appears to have no difficulty respecting other people’s personal space.

1 2 3 4 5

Social Aspects Domain (SA) - Beta (β)

1β.) The individual has noticeable difficulty when engaging in group activities, may appear apprehensive or unsure of how to act.

1 2 3 4 5

2β.) The individual prefers to do things alone.

1 2 3 4 5

3β.) The individual has difficulty carrying on a reciprocal conversation about non-preferred topics.

1 2 3 4 5

4β.) The individual does not understand others' need for personal space and often needs prompting.

1 2 3 4 5

5β.) The individual has difficulty understanding and responding appropriately to emotions.

1 2 3 4 5

6β.) The individual does not care for/ understand/ or follow fads and pop culture.

1 2 3 4 5

7β.) The individual misunderstands/ misinterprets people's intentions.

1 2 3 4 5

8β.) The individual needs to be coached and taught how to act appropriately in different social settings.

1 2 3 4 5

9β.) The individual has trouble making and maintaining friendships.

1 2 3 4 5

10β.) The individual has an unusual sense of humor, may be considered juvenile or below their chronological age.

1 2 3 4 5

Please add the numbers for all α (alpha) responses and place the result here: ☐

= (SAα) Social Aspects–Alpha

Please add the numbers for all β (beta) responses and place the result here: ☐

= (SAβ) Social Aspects–Beta

Place the number of each alpha and beta aspects onto the final score sheet with the corresponding code.

Restrictive and Repetitive Behaviors Domain (RB) – Alpha (α)

1α.) The individual does not appear to get stuck on or perseverate over certain nuances of their life.

1 2 3 4 5

2α) The individual can adjust to changes in routine easily.

1 2 3 4 5

3α.) The individual has a myriad of varied interests.

1 2 3 4 5

4α.) The individual exhibits no propensity toward lining up or ordering objects.

1 2 3 4 5

5α.) The individual is able to let things go and move on from averse situations/instances easily such as getting a failing grade on a test.

1 2 3 4 5

6α.) The individual is able to proceed through their daily life without the need of ritualistic behaviors or specific routines.

1 2 2 4 5

7α.) The individual does not engage in restrictive or repetitive behaviors.

1 2 3 4 5

8α.) The individual does not engage in stimming behaviors as a means of self-regulating.

1 2 3 4 5

9α.) The individual has no draw toward shiny or spinning objects.

1 2 3 4 5

10α.) The individual does not express rigidity over various aspects of their life or others' lives in terms of rules, values, or law.

1 2 3 4 5

Restrictive and Repetitive Behaviors Domain (RB) – Beta (β)

1β.) The individual appears to have an intense focus on a single subject at any given point in time.

1 2 3 4 5

2β.) The individual appears to have significant difficulty with changes in routine.

1 2 3 4 5

3β.) The individual engages in self-stimulatory behaviors (stims) such as hand-flapping or rocking.

1 2 3 4 5

4β.) The individual appears to have significant obsessive behaviors and thoughts.

1 2 3 4 5

5β.) The individual appears to exhibit ritualistic behavior that impedes daily living.

1 2 3 4 5

6β.) The individual has perseverative thought patterns.

1 2 3 4 5

7β.) The individual appears to use objects in repetitive behaviors such as spinning a top or fidget spinners.

1 2 3 4 5

8β.) The individual lines up or orders objects.

1 2 3 4 5

9β.) The individual appears to have significant issues with insistence on sameness.
.

1 2 3 4 5

10β.) The individual appears to engage in repetitive behaviors.

1 2 3 4 5

Please add the numbers for all α (alpha) responses and place the result here:
= (RBα) Restrictive and Repetitive Behaviors –Alpha ☐

Please add the numbers for all β (beta) responses and place the result here:
= (SAβ) Restrictive and Repetitive Behaviors –Beta ☐

Place the number of each alpha and beta aspects onto the final score sheet with the corresponding code.

Activities of Daily Living (AD) - Alpha (α)

1α.) The individual can be gainfully employed by holding a job without the assistance of a job coach or other form of assistance.

1 2 3 4 5

2α) The individual can manage their own bank accounts, pay bills, and handle credit and loans responsibly.

1 2 3 4 5

3α.) The individual can plan, shop (or carry out subsistence activities), and prepare healthy meals without assistance.

1 2 3 4 5

4α.) The individual can self-administer medications as prescribed without prompting.

1 2 3 4 5

5α.) The individual attends to their own hygiene and attends to it regularly without prompting.

1 2 3 4 5

6α.) The individual takes pride in their living space and strives to keep it tidy.

1 2 2 4 5

7α.) The individual knows how to make plans and carry them out in an emergency such as fire, earthquake, pandemic.

1 2 3 4 5

8α.) The individual has no problem travelling to regular life activities such as school or work unassisted.

1 2 3 4 5

9α.) The individual has no problem attending to household tasks such as doing laundry or dishes and does not need outside assistance.

1 2 3 4 5

10α.) The individual has no problem trying new foods and enjoys a myriad of culinary options that make up their diet.

1 2 3 4 5

Activities of Daily Living (AD) - Beta (β)

1β.) The individual needs assistance in managing their bank accounts.

1 2 3 4 5

2β.) The individual needs assistance in administering medications and adhering to doctor's orders.

1 2 3 4 5

3β.) The individual needs assistance traveling to their regular daily activities. This may be in the form of travel training or depending on staff for transport.

1 2 3 4 5

4β.) In case of an emergency, the individual would need significant assistance from others.

1 2 3 4 5

5β.) The individual needs help attending to their daily hygiene such as tooth brushing and bathing.

1 2 3 4 5

6β.) The individual needs assistance toileting and may depend on continence support products.

1 2 3 4 5

7β.) The individual needs assistance to keep their living space tidy.

1 2 3 4 5

8β.) The individual has difficulty attending to household tasks and needs outside assistance.

1 2 3 4 5

9β.) The individual requires significant assistance planning and preparing meals.

1 2 3 4 5

10β.) The individual only eats a few familiar foods.

1 2 3 4 5

Please add the numbers for all α (alpha) responses and place the result here: ☐

= (ADα) Activities of Daily Living –Alpha

Please add the numbers for all β (beta) responses and place the result here: ☐

= (ADβ) Activities of Daily Living –Beta

Place the number of each alpha and beta aspects onto the final score sheet with the corresponding code.

Cognition (CD) - Alpha (α)

1α.) The individual appears to have an excellent fund of knowledge.

1 2 3 4 5

2α) The individual exhibits academic giftedness.

1 2 3 4 5

3α.) The individual understands and incorporates new knowledge without difficulty.

1 2 3 4 5

4α.) The individual has profound ability to recall facts, figures, and dates.

1 2 3 4 5

5α.) The individual has a propensity for giftedness in at least one area, may exhibit savant-like abilities.

1 2 3 4 5

6α.) The individual can process information quickly.

1 2 2 4 5

7α.) The individual has no difficulty planning large-scale events such as graduations, tournaments.

1 2 3 4 5

8α.) The individual exhibits good judgement in making complex decisions and weighs their options without difficulty.

1 2 3 4 5

9α.) The individual has profound intellectual ability when compared to same age peers.

1 2 3 4 5

10α.) The individual demonstrates abilities that are consistent with someone of high intellectual ability.

1 2 3 4 5

Cognition (CD) - Beta (β)

1β.) The individual required/s significant assistance in school such as special education programs or extra tutoring.

1 2 3 4 5

2β.) The individual has a diagnosis of an academic atypicality such as dyslexia, dysgraphia, reading or writing.

1 2 3 4 5

3β.) The individual takes longer than their same-age typical peers to process information.

1 2 3 4 5

4β.) The individual has significant cognitive limitations may be deemed as intellectually disabled.

1 2 3 4 5

5β.) The individual has difficulty thinking things through and make decisions.

1 2 3 4 5

6β.) The individual exhibits difficulty in planning or organizing activities or projects.

1 2 3 4 5

7β.) The individual has limitations in their knowledge of commonly known aspects of the world.

1 2 3 4 5

8β.) The individual needs assistance when putting together puzzles or packing things into small spaces.

1 2 3 4 5

9β.) The individual has limitations in their working memory ability such as solving simple math problems in their head or reciting a string of numbers backwards.

1 2 3 4 5

10β.) The individual has an uncanny ability to memorize facts (long term memory) that others do not.

1 2 3 4 5

Please add the numbers for all α (alpha) responses and place the result here: ☐

= (COα) Cognition –Alpha

Please add the numbers for all β (beta) responses and place the result here: ☐

= (COβ) Cognition –Beta

Place the number of each alpha and beta aspects onto the final score sheet with the corresponding code.

Motor Skills (MS) - Alpha (α)

1α.) The individual has no difficulty with their hand-eye coordination.

1 2 3 4 5

2α) The individual appears to have no difficulty ambulating and uses no adaptive equipment.

1 2 3 4 5

3α.) The individual can easily catch a ball.

1 2 3 4 5

4α.) The individual appears to have no difficulty in awareness of body position and movement (proprioception).

1 2 3 4 5

5α.) The individual is able to keep their balance while conducting daily activities .

1 2 3 4 5

6α.) The individual is not considered to be clumsy and does not drop things or bump into objects or people.

1 2 2 4 5

7α.) The individual does not have a comorbid developmental disability such as cerebral palsy.

1 2 3 4 5

8α.) The individual does not present with muscle rigidity or tiptoeing.

1 2 3 4 5

9α.) The individual appears to have a normal gait when compared with same age peers.

1 2 3 4 5

10α.) The individual did/does not have any difficulty with their gross or fine motor development.

1 2 3 4 5

Motor Skills (MS) - Beta (β)

1β.) The individual appears to have difficulty with ambulation and needs assistance.

1 2 3 4 5

2β.) The individual relies on assistive devices such as a wheelchair, walker, or braces to ambulate.

1 2 3 4 5

3β.) The individual is unable to ambulate unassisted and relies on others for assistance.

1 2 3 4 5

4β.) The individual appears to have differences in gait than their same age peers such as pigeon-toedness (intoeing).

1 2 3 4 5

5β.) The individual presents with muscle rigidity unrelated to stress or anxiety.

1 2 3 4 5

6β.) The individual exhibits difficulty with hand-eye coordination and may exhibit difficulty in sports such as baseball.

1 2 3 4 5

7β.) The individual has a comorbid condition which impedes motor function such as cerebral palsy, or Ehlos Dhanlos Syndrome.

1 2 3 4 5

8β.) The individual has limitations in their perception of their body and objects. They frequently bump into things and may be considered clumsy.

1 2 3 4 5

9β.) The individual often drops things.

1 2 3 4 5

10β.) The individual has difficulty with their balance.

1 2 3 4 5

Please add the numbers for all α (alpha) responses and place the result here: ☐

= (MSα) Motor Skills –Alpha

Please add the numbers for all β (beta) responses and place the result here: ☐

= (MSβ) Motor Skills –Beta

Place the number of each alpha and beta aspects onto the final score sheet with the corresponding code.

Sensory Aspects (SY) - Alpha (α)

1α.) The individual appears to have no difficulty wearing various articles of clothing due to sensory concerns.

1 2 3 4 5

2α) The individual does not seek out oral stimulation such as chewing or licking objects that are not food.

1 2 3 4 5

3α.) The individual does not exhibit behaviors in which they actively seek out extraneous visual stimulation such as blinking lights, shiny or spinning objects.

1 2 3 4 5

4α.) The individual appears to enjoy the sunlight and has no aversion to the sun or florescent lighting.

1 2 3 4 5

5α.) The individual does not appear to seek out extraneous tactile stimulation when compared to same age peers such as playdough, water, fur, and the like.

1 2 3 4 5

6α.) When stressed, anxious, or under duress, the individual does not utilize calming mechanisms/tools such as a weighted blanket or rocking for comfort.

1 2 2 4 5

7α.) The individual appears to have flexibility and willingness to try new things and has no food limitations due to sensory concerns.

1 2 3 4 5

8α.) The individual uses self-soothing mechanisms that do not include repetitive behaviors such as hand-flapping or rocking.

1 2 3 4 5

9α.) The individual has no unusual aversion to foods due to texture or consistency.

1 2 3 4 5

10α.) The individual has no discomfort hearing sounds such as music, chewing, or sirens.

1 2 3 4 5

Sensory Skills (SY) - Beta (β)

1β.) The individual appears to have limitations with their diet due to sensory concerns.

1 2 3 4 5

2β.) The individual suffers from exhaustion, headaches, or irritation from prolonged exposure to bright light.

1 2 3 4 5

3β.) The individual seeks comfort and uses self-stimulatory behavior as a mechanism for calming.

1 2 3 4 5

4β.) The individual appears to have difficulty with overstimulation from noise and/or sound (misophonia).

1 2 3 4 5

5β.) The individual engages in frequent behaviors related to oral stimulation such as sucking on objects that are not food

1 2 3 4 5

6β.) The individual is limited in their wardrobe options due to specific aspects related to comfort such as an intolerance toward tags or seams.

1 2 3 4 5

7β.) The individual is attracted and may appear mesmerized by unusual external visual stimulus such as flashing lights or spinning fans.

1 2 3 4 5

8β.) The individual has a propensity to bang their head (not as a SIB), touch a certain type of object as if by either compulsion or strong desire.

1 2 3 4 5

9β.) The individual appears to have difficulty with visual overstimulation.

1 2 3 4 5

10β.) The individual has strong aversion to certain smells and/or has a heightened sense of smell.

1 2 3 4 5

Please add the numbers for all α (alpha) responses and place the result here: ☐

= (SAα) Sensory Aspects–Alpha

Please add the numbers for all β (beta) responses and place the result here: ☐

= (SAβ) Sensory Aspects–Beta

Place the number of each alpha and beta aspects onto the final score sheet with the corresponding code.

Emotional and Adaptive Aspects (EA) - Alpha (α)

1α.) The individual can accept the word "no."

1 2 3 4 5

2α) The individual has no inclination toward, nor has exhibited episodes of explosive anger.

1 2 3 4 5

3α.) The individual has learned and utilizes coping skills when they become emotionally dysregulated.

1 2 3 4 5

4α.) The individual can identify and understand their own emotions.

1 2 3 4 5

5α.) The individual can pick up on and can empathize with the emotions of others.

1 2 3 4 5

6α.) The individual appears to have an uncanny ability to perceive others' emotions.

1 2 2 4 5

7α.) The individual does not engage in self-injurious behaviors to regulate emotions.

1 2 3 4 5

8α.) The individual can regulate their emotions when deemed appropriate for the social setting.

1 2 3 4 5

9α.) The individual can self-soothe when agitated or when they are feeling dysregulated.

1 2 3 4 5

10α.) The individual is aware of and acts accordingly to different social rules across multiple settings.

1 2 3 4 5

Emotional and Adaptive Aspects (EA) - Beta (β)

1β.) When the individual becomes dysregulated, they have a propensity to exhibit rage.

1 2 3 4 5

2β.) The individual engages in self-injurious behaviors (SIB).

1 2 3 4 5

3β.) The individual has significant behavioral difficulties across multiple settings
.

1 2 3 4 5

4β.) The individual lacks understanding and insight into what drives their emotions.

1 2 3 4 5

5β.) The individual appears to have significant difficulty in understanding their emotions.

1 2 3 4 5

6β.) The individual engages in self-injurious behaviors to regulate emotions.

1 2 3 4 5

7β.) The individual appears to have significant difficulties being told things they do not want to hear.

1 2 3 4 5

8β.) The individual is inclined toward explosive anger and exhibits this behavior on a regular basis.

1 2 3 4 5

9β.) The individual has difficulty behaving appropriately for the social setting such as laughing at a funeral or running around yelling in a library.

1 2 3 4 5

10β.) The individual appears to have significant behavioral difficulties when in varying social settings.

1 2 3 4 5

Please add the numbers for all α (alpha) responses and place the result here: ☐
= (EAα) Emotional and Adaptive Aspects–Alpha

Please add the numbers for all β (beta) responses and place the result here: ☐
= (EAβ) Emotional and Adaptive Aspects–Beta

Place the number of each alpha and beta aspects onto the final score sheet with the corresponding code.

Communication (CO) - Alpha (α)

1α.) The individual can communicate effectively verbally.

1 2 3 4 5

2α) The individual engages in reciprocal conversation.

1 2 3 4 5

3α.) The individual speaks with vocal inflection.

1 2 3 4 5

4α.) The individual's volume when speaking is appropriate for the setting.

1 2 3 4 5

5α.) The individual uses vocal intonation when speaking.

1 2 3 4 5

6α.) The individual understands jokes and euphemisms easily.

1 2 2 4 5

7α.) The individual uses and understands sarcasm.

1 2 3 4 5

8α.) The individual can engage in small talk.

1 2 3 4 5

9α.) The individual can hold a conversation when the topic of discussion is of no or limited interest to them.

1 2 3 4 5

10α.) The individual can communicate effectively either verbally, or through the use of assistive technology.

1 2 3 4 5

Communication (CO) - Beta (β)

1β.) The individual has difficulty modulating for the social context.

1 2 3 4 5

2β.) The individual's speech can be described as monotone or flat.

1 2 3 4 5

3β.) The individual appears to talk at rather than with people.

1 2 3 4 5

4β.) The individual has difficulty in understanding sarcasm.

1 2 3 4 5

5β.) The individual has difficulty understanding and telling jokes.

1 2 3 4 5

6β.) The individual uses neologisms (made up words) to convey their thoughts.

1 2 3 4 5

7β.) The individual has limitations in communication when compared to same-age peers.

1 2 3 4 5

8β.) The individual relies on assistive technology to communicate such as an iPad or a pictorial system.

1 2 3 4 5

9β.) The individual speaks only about their specific special interest or preferred topic.

1 2 3 4 5

10β.) The individual engages in echolalia.

1 2 3 4 5

Please add the numbers for all α (alpha) responses and place the result here: ☐

= (COα) Communication–Alpha

Please add the numbers for all β (beta) responses and place the result here: ☐

= (COβ) Communication –Beta

Place the number of each alpha and beta aspects onto the final score sheet with the corresponding code.

Development (DV) - Alpha (α)

1α.) The individual had no delay in their cognitive development.

1 2 3 4 5

2α) The individual did not need specialized services such as those offered through governmental agencies.

1 2 3 4 5

3α.) The individual met their developmental milestones related to speech.

1 2 3 4 5

4α.) The individual was toilet trained at a typical age and does not experience instances of enuresis (bed-wetting).

1 2 3 4 5

5α.) The individual had/has no difficulty grasping a pencil as is typical as same-age peers.

1 2 3 4 5

6α.) During well-baby and well child visits, the doctor had no concerns about the individual's development.

1 2 2 4 5

7α.) Teachers or schools reported no concerns with the individual being "behind" their same-age peers.

1 2 3 4 5

8α.) Socially, the individual had typical friendships and communication skills as same aged peers.

1 2 3 4 5

9α.) The individual appeared and acted "normal" during childhood.

1 2 3 4 5

10α.) The individual was/is able to compete with same age peers in academics and athletics.

1 2 3 4 5

Development (DV) - Beta (β)

1β.) The individual had delays in their motor skills.

1 2 3 4 5

2β.) The individual had significant difficulties acquiring language and may have needed the support of a speech language pathologist.

1 2 3 4 5

3β.) The individual received supports from an occupational therapist at some point in their life.

1 2 3 4 5

4β.) The individual participated in group therapy in an effort to further develop social skills and communication.

1 2 3 4 5

5β.) The individual appeared to be "behind" their same-aged peers in school.

1 2 3 4 5

6β.) The individual was on an IEP (individualized education plan) or 504 or equivalent in school in order to address limitations.

1 2 3 4 5

7β.) The individual was labeled as "failure to thrive" at some point in their childhood.

1 2 3 4 5

8β.) The individual piqued doctor(s) concern at some point in time regarding their development.

1 2 3 4 5

9β.) The individual has some sort of disability related to their development such as blindness, deafness, cognitive delay, or hypotonia (low muscle tone).

1 2 3 4 5

10β.) The individual experienced a delay in toilet training.

1 2 3 4 5

Please add the numbers for all α (alpha) responses and place the result here: ☐

= (DVα) Development –Alpha

Please add the numbers for all β (beta) responses and place the result here: ☐

= (DVβ) Development –Beta

Place the number of each alpha and beta aspects onto the final score sheet with the corresponding code.

Attention and Self-Regulation (AR) - Alpha (α)

1α.) The individual does not have a comorbid diagnosis of ADHD.

1 2 3 4 5

2α) The individual takes what others have to say to them into account, even if they do not like it.

1 2 3 4 5

3α.) The individual is known to be thick-skinned.

1 2 3 4 5

4α.) The individual can focus on a single subject for prolonged periods of time.

1 2 3 4 5

5α.) The individual is known to find fidget spinners helpful.

1 2 3 4 5

6α.) The individual's behavior is manageable and predictable.

1 2 2 4 5

7α.) The individual takes adversity in stride.

1 2 3 4 5

8α.) The individual can quelch their own negative thought patterns.

1 2 3 4 5

9α.) The individual can focus their attention to calming practices such as mindfulness.

1 2 3 4 5

10α.) The individual can control their emotional responses to external stimuli.

1 2 3 4 5

Attention and Self-Regulation (AR) - Beta (β)

1β.) The individual is easily distracted.	1	2	3	4	5
2β.) The individual has difficulty sitting still.	1	2	3	4	5
3β.) The individual is very active.	1	2	3	4	5
4β.) The individual is easily dysregulated.	1	2	3	4	5
5β.) The individual has difficulty understanding their own emotions.	1	2	3	4	5
6β.) The individual appears to have mood swings.	1	2	3	4	5
7β.) The individual has behavior that is unpredictable.	1	2	3	4	5
8β.) The individual causes significant strain on their family and loved ones due to their volatile behavior.	1	2	3	4	5
9β.) The individual has trouble concentrating and needs constant redirection.	1	2	3	4	5
10β.) The individual exhibits flight of ideas.	1	2	3	4	5

Please add the numbers for all α (alpha) responses and place the result here: ☐
= (ARα) Attention and Self-Regulation –Alpha

Please add the numbers for all β (beta) responses and place the result here: ☐
= (ARβ) Attention and Self-Regulation –Beta

Place the number of each alpha and beta aspects onto the final score sheet with the corresponding code.

Regression (RG) - Alpha (α)

1α.) The individual did not lose any skills in receptive communication. For example, they could listen and understand what was said to them.

1 2 3 4 5

2α) The individual did not lose any expressive verbal communication skills once they were acquired.

1 2 3 4 5

3α.) The individual followed a normal developmental trajectory in childhood.

1 2 3 4 5

4α.) The individual did not regress in their ability to play socially early in their childhood.

1 2 3 4 5

5α.) The individual does not have an accompanying intellectual disability.

1 2 3 4 5

6α.) The individual had no instances of regression in their fine motor skills.

1 2 2 4 5

7α.) The individual had no instances of regression in their gross motor skills.

1 2 3 4 5

8α.) The individual exhibited a normal growth and developmental trajectory that always followed a progressive pattern.

1 2 3 4 5

9α.) The individual never lost interest in social or imitative games.

1 2 3 4 5

10α.) The individual did not lose previously acquired self-care tasks such as the ability to toilet and feed themselves.

1 2 3 4 5

Regression (RG) - Beta (β)

1β.) The individual regressed in aspects of their speech after first acquiring them.

1 2 3 4 5

2β.) The individual lost previously acquired social skills.

1 2 3 4 5

3β.) The individual has a diagnosis of early-onset regressive autism.

1 2 3 4 5

4β.) The individual exhibited a regression of language and cannot be otherwise explained by echolalia.

1 2 3 4 5

5β.) The individual has difficulty with social perception and has regressed in previously acquired skills.

1 2 3 4 5

6β.) The individual regressed in their motor skill development such as not being able to climb stairs after once being able to climb them before.

1 2 3 4 5

7β.) The individual regressed in their fine motor skill development such as being able to hold a pencil or crayon.

1 2 3 4 5

8β.) The individual experienced regression in their social skills such as no longer being able to mimic facial expressions.

1 2 3 4 5

9β.) The individual has regressed in emotional adaptivity.

1 2 3 4 5

10β.) The individual has lost skills they once had quickly or suddenly.

1 2 3 4 5

Please add the numbers for all α (alpha) responses and place the result here: ☐
= (RGα) Regression –Alpha

Please add the numbers for all β (beta) responses and place the result here: ☐
= (RGβ) Regression –Beta

Place the number of each alpha and beta aspects onto the final score sheet with the corresponding code.

Imagination and Creativity (IC) - Alpha (α)

1α.) The individual has similar viewpoints of their same-aged peers.

1 2 3 4 5

2α) The individual speaks using vocabulary commonly used by others within their social circle.

1 2 3 4 5

3α.) The individual plays with and engages in made up games, typical of their same-aged peers.

1 2 3 4 5

4α.) The individual appears to have an imagination, typical of same aged peers.

1 2 3 4 5

5α.) The individual created/s works of art in school or other places that were/are similar to those created by same aged peers.

1 2 3 4 5

6α.) The individual actively engages in social games that are appropriate for their social development.

1 2 2 4 5

7α.) The individual tends to go with the status quo and does not come up with creative political ideas.

1 2 3 4 5

8α.) The individual does not demonstrate any particular extraneous talent in the creative or imaginative arts.

1 2 3 4 5

9α.) The individual has musical talent typical of same aged peers.

1 2 3 4 5

10α.) The individual is not considered to be brilliant in their novel ideas or conventions.

1 2 3 4 5

Imagination and Creativity (IC) - Beta (β)

1β.) The individual has a propensity to view things differently.

1 2 3 4 5

2β.) The individual often has different perspectives on various issues.

1 2 3 4 5

3β.) The individual's vocabulary is enhanced with several neologisms (made up words).

1 2 3 4 5

4β.) The individual easily develops novel solutions to everyday problems.

1 2 3 4 5

5β.) The individual has/had differences in playing with toys as their same-aged typical peers. May have lined up dolls rather than make them have a conversation.

1 2 3 4 5

6β.) The individual has difficulties in social imagination such as playing house or with figurines.

1 2 3 4 5

7β.) The individual takes great pride in creating new things and has a need to do it.

1 2 3 4 5

8β.) The individual is creative in that they notice and utilize patterns that others do not.

1 2 3 4 5

9β.) The individual has profound ability to make connections to thoughts or ideas others cannot.

1 2 3 4 5

10β.) The individual is known for their creativity such as making up stories or languages.

1 2 3 4 5

Please add the numbers for all α (alpha) responses and place the result here:
= (ICα) Imagination and Creativity –Alpha ☐

Please add the numbers for all β (beta) responses and place the result here:
= (ICβ) Imagination and Creativity - Beta ☐

Place the number of each alpha and beta aspects onto the final score sheet with the corresponding code.

Self-Injurious Behaviors (SB) - Alpha (α)

1α.) The individual is aware of and utilizes coping strategies in order to quelch instances of emotional pain or turmoil.

1 2 3 4 5

2α) The individual has never engaged in cutting themselves intentionally.

1 2 3 4 5

3α.) The individual has never hit themselves intentionally and was not a stimm.

1 2 3 4 5

4α.) The individual has never bitten themselves in a fit or emotional dysregulation.

1 2 3 4 5

5α.) The individual does not engage in self-injurious behavior as a means to manipulate caregivers or mental health professionals.

1 2 3 4 5

6α.) In the past, the individual engaged in self-injurious behaviors, but these behaviors did not elicit the desire effect.

1 2 3 4 5

7α.) The individual has never intentionally tried to hang or suffocate themselves.

1 2 3 4 5

8α.) The individual has never intentionally overdosed on substances, prescribed or not.

1 2 3 4 5

9α.) The individual does not engage in skin picking.

1 2 3 4 5

10α.) The individual has no suicide attempts.

1 2 3 4 5

Self-Injurious Behaviors (SB) - Beta (β)

1β.) The individual has cut, hit, or inflicted harm upon themselves on purpose at least one point in their life.

1 2 3 4 5

2β.) The individual inflicts bodily harm on themselves.

1 2 3 4 5

3β.) The individual has inflicted bodily harm upon themselves in an effort to regulate their emotions. 1 2 3 4 5

4β.) The individual engages in self-injurious behavior and the behavior has either increased in frequency or intensity over time.

1 2 3 4 5

5β.) The individual has had treatment in the emergency room or hospital for their self-injurious behavior.

1 2 3 4 5

6β.) The individual finds that their self-injurious behavior to be compulsive.

1 2 3 4 5

7β.) The individual has sought out treatment by a mental health provider for their self-injurious behaviors.

1 2 3 4 5

8β.) The individual finds that as a result of their self-injurious behavior, their negative moods subside.

1 2 3 4 5

9β.) The individual has engaged in self-injurious behavior and the behavior was not intended to lead to suicide.

1 2 3 4 5

10β.) The individual engaged in self-injurious behavior to escape from internal emotional pain.

1 2 3 4 5

Please add the numbers for all α (alpha) responses and place the result here: ☐

= (SAα) Self-Injurious Behaviors –Alpha

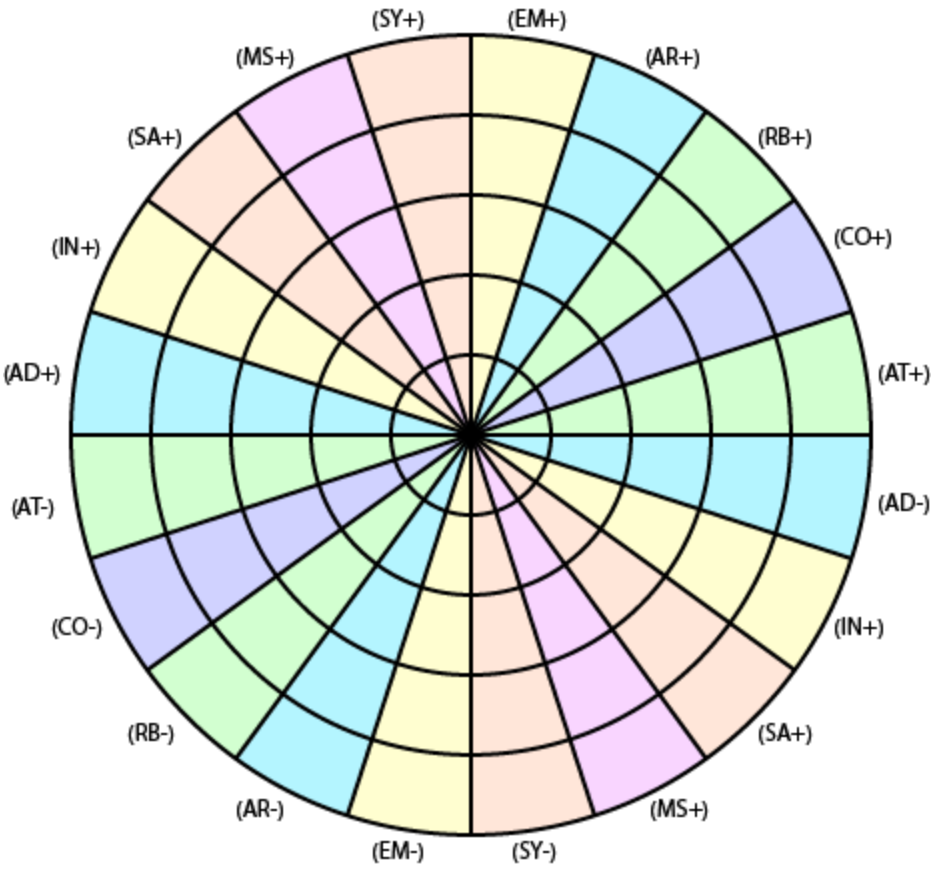
Please add the numbers for all β (beta) responses and place the result here: ☐

= (SAβ) Self-Injurious Behaviors –Beta

Place the number of each alpha and beta aspects onto the final score sheet with the corresponding code.

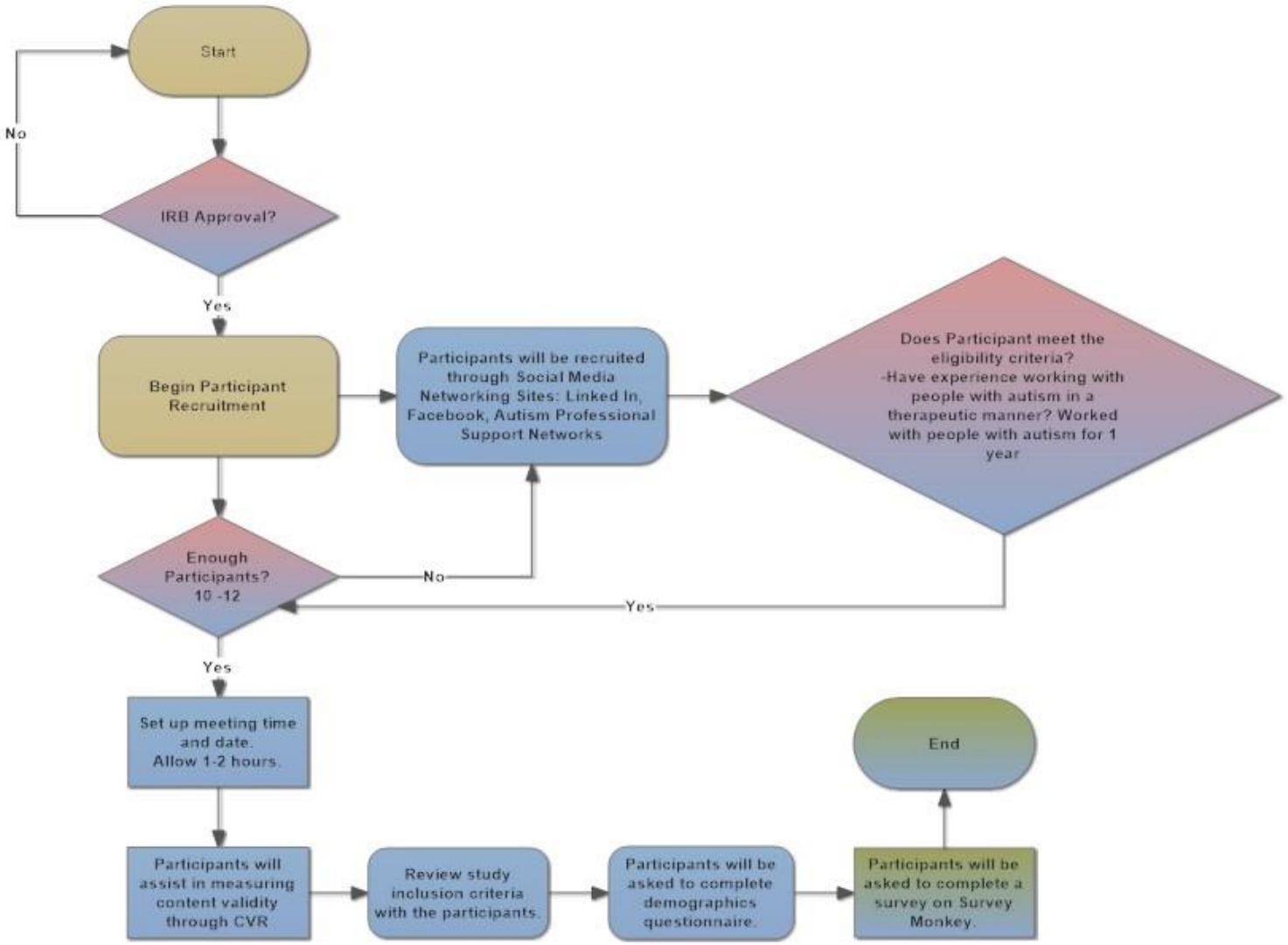
- Transfer the scores from the survey into this table, then use the table to complete the diagram o the corresponding page.

Domain	Alpha (α)	Beta (β)
Activities of Daily Living (AD)		
Cognition (CD)		
Social Aspects (SA)		
Motor Skills MS (MS)		
Sensory Aspects (SY)		
Emotional and Adaptive Aspects (EA)		
Restrictive and Repetitive Behaviors (RB)		
Communication (CO)		
Development (DV)		
Attention and Self-Regulation (AR)		
Regression (RG)		
Imagination and Creativity (IC)		
Self-Injurious Behaviors (SB)		


(SY+)
(EM+)
(MS+)
(AR+)
(SA+)
(RB+)
(IN+)
(CO+)
(AD+)
(AT+)
(AT-)
(AD-)
(CO-)
(IN+)
(RB-)
(SA+)
(AR-)
(MS+)
(EM-)
(SY-)

APPENDIX E

Flowchart of Phase 4


Start
No
IRB Approval?
Yes
Begin Participant Recruitment
Participants will be recruited through Social Media Networking Sites: Linked In, Facebook, Autism Professional Support Networks
Does Participant meet the eligibility criteria?
-Have experience working with people with autism in a therapeutic manner? Worked with people with autism for 1 year
Enough Participants? 10 -12
No
Yes
Yes
Set up meeting time and date. Allow 1-2 hours.
End
Participants will assist in measuring content validity through CVR
Review study inclusion criteria with the participants.
Participants will be asked to complete demographics questionnaire.
Participants will be asked to complete a survey on Survey Monkey.

APPENDIX F

Item Pool C

This measure is to ascertain the strengths and weaknesses of those on the autism spectrum. It is important to note that this is not meant to be diagnostic. This measure is more a screener that will help caregivers and those who work with the individual. The purpose is to give a pictorial view of where the individual may need assistance. For this version of the measure, this is meant to be completed by mental health providers.

The basic structure of the measure is that there are a total of 10 domains, each domain is broken down into two parts, strengths and challenges, each with 10 items. The number of items is 20 per domain, for a total of 200 items in the measure overall.

For each item, the *S* response measures the strengths of individuals' autism symptomology, while the C response measures the challenges of individuals' autism symptomology. I used a Likert-type scale to elicit a more precise measure of individuals' inclinations than a simple yes or no. If you are unsure of what to mark, use your intuition.

1 – Strongly Disagree
2 – Disagree
3 – Undecided
4 – Agree
5 – Strongly Agree

At the end of each domain, you will be asked to add up the responses and place them in the corresponding boxes. At the end, you can transfer the results into a table and then graph it in the spaces provided.

Social Aspects Domain (SA) - Strengths (S)

1 S.) The individual appears to have no difficulty participating in group activities such as bowling or going out to eat with friends.

1 2 3 4 5

2 S) The individual seeks out others.

1 2 3 4 5

3 S.) The individual desires to play social games with others such as cards or board games.

1 2 3 4 5

4 S.) The individual appears to have no difficulty in discussing topics of little to no interest to them.

1 2 3 4 5

5 S.) The individual appears to be comfortable in either large or small social groups such as school dances or meetings.

1 2 3 4 5

6 S.) The individual has no difficulty initiating conversation with unknown persons.

1 2 2 4 5

7 S.) The individual adjusts their behavior to suit the social environment.

1 2 3 4 5

8 S.) The individual can read social cues such as being “brushed off”.

1 2 3 4 5

9 S.) The individual has no difficulty in reading others’ facial expressions.

1 2 3 4 5

10 S.) The individual appears to have no difficulty respecting other people’s personal space.

1 2 3 4 5

Social Aspects Domain (SA) - Challenges (C)

1 C.) The individual has noticeable difficulty when engaging in group activities, may appear apprehensive or unsure of how to act.

1 2 3 4 5

2 C.) The individual prefers to do things alone.

1 2 3 4 5

3 C.) The individual has difficulty carrying on a reciprocal conversation about non-preferred topics.

1 2 3 4 5

4 C.) The individual does not understand others' need for personal space and often needs prompting.

1 2 3 4 5

5 C.) The individual has difficulty understanding and responding appropriately to emotions.

1 2 3 4 5

6 C.) The individual does not care for/ understand/ or follow fads and pop culture.

1 2 3 4 5

7 C.) The individual misunderstands/ misinterprets people's intentions.

1 2 3 4 5

8 C.) The individual needs to be coached and taught how to act appropriately in different social settings.

1 2 3 4 5

9 C.) The individual has trouble making and maintaining friendships.

1 2 3 4 5

10 C.) The individual has an unusual sense of humor, may be considered juvenile or below their chronological age.

1 2 3 4 5

Please add the numbers for all *S* (Strengths) responses and place the result here: ☐
= (SA S) Social Aspects–Strengths

Please add the numbers for all *C* (Challenges) responses and place the result here: ☐
= (SA C) Social Aspects–Challenges

Place the number of each Strengths and Challenges aspects onto the final score sheet with the corresponding code.

Restrictive and Repetitive Behaviors Domain (RB) – Strengths (S)

1 S.) The individual does not appear to get stuck on or perseverate over certain nuances of their life.

1 2 3 4 5

2 S) The individual can adjust to changes in routine easily.

1 2 3 4 5

3 S.) The individual has a myriad of varied interests.

1 2 3 4 5

4 S.) The individual exhibits no propensity toward lining up or ordering objects.

1 2 3 4 5

5 S.) The individual is able to let things go and move on from adverse situations/instances easily such as getting a failing grade on a test.

1 2 3 4 5

6 S.) The individual is able to proceed through their daily life without the need of ritualistic behaviors or specific routines.

1 2 2 4 5

7 S.) The individual does not engage in restrictive or repetitive behaviors.

1 2 3 4 5

8 S.) The individual does not engage in stimming behaviors as a means of self-regulating.

1 2 3 4 5

9 S.) The individual has no draw toward shiny or spinning objects.

1 2 3 4 5

10 S.) The individual does not express rigidity over various aspects of their life or others' lives in terms of rules, values, or law.

1 2 3 4 5

Restrictive and Repetitive Behaviors Domain (RB) – Challenges (C)

1 C.) The individual appears to have an intense focus on a single subject at any given point in time.

1 2 3 4 5

2 C.) The individual appears to have significant difficulty with changes in routine.

1 2 3 4 5

3 C.) The individual engages in self-stimulatory behaviors (stims) such as hand-flapping or rocking.

1 2 3 4 5

4 C.) The individual appears to have significant obsessive behaviors and thoughts.

1 2 3 4 5

5 C.) The individual appears to exhibit ritualistic behavior that impedes daily living.

1 2 3 4 5

6 C.) The individual has perseverative thought patterns.

1 2 3 4 5

7 C.) The individual appears to use objects in repetitive behaviors such as spinning a top or fidget spinners.

1 2 3 4 5

8 C.) The individual lines up or orders objects.

1 2 3 4 5

9 C.) The individual appears to have significant issues with insistence on sameness.
.

1 2 3 4 5

10 C.) The individual appears to engage in repetitive behaviors.

1 2 3 4 5

Please add the numbers for all *S* (Strengths) responses and place the result here: ☐
= (RB S) Restrictive and Repetitive Behaviors –Strengths

Please add the numbers for all *C* (Challenges) responses and place the result here: ☐
= (SA C) Restrictive and Repetitive Behaviors –Challenges

Place the number of each Strengths and Challenges aspects onto the final score sheet with the corresponding code.

Activities of Daily Living (AD) - Strengths (S)

1 S.) The individual can be gainfully employed by holding a job without the assistance of a job coach or other form of assistance.

1 2 3 4 5

2 S) The individual can manage their own bank accounts, pay bills, and handle credit and loans responsibly.

1 2 3 4 5

3 S.) The individual can plan, shop (or carry out subsistence activities), and prepare healthy meals without assistance.

1 2 3 4 5

4 S.) The individual can self-administer medications as prescribed without prompting.

1 2 3 4 5

5 S.) The individual attends to their own hygiene and attends to it regularly without prompting.

1 2 3 4 5

6 S.) The individual takes pride in their living space and strives to keep it tidy.

1 2 2 4 5

7 S.) The individual knows how to make plans and carry them out in an emergency such as fire, earthquake, pandemic.

1 2 3 4 5

8 S.) The individual has no problem travelling to regular life activities such as school or work unassisted.

1 2 3 4 5

9 S.) The individual has no problem attending to household tasks such as doing laundry or dishes and does not need outside assistance.

1 2 3 4 5

10 S.) The individual has no problem trying new foods and enjoys a myriad of culinary options that make up their diet.

1 2 3 4 5

Activities of Daily Living (AD) - Challenges (C)

1 C.) The individual needs assistance in managing their bank accounts.

1 2 3 4 5

2 C.) The individual needs assistance in administering medications and adhering to doctor's orders.

1 2 3 4 5

3 C.) The individual needs assistance traveling to their regular daily activities. This may be in the form of travel training or depending on staff for transport.

1 2 3 4 5

4 C.) In case of an emergency, the individual would need significant assistance from others.

1 2 3 4 5

5 C.) The individual needs help attending to their daily hygiene such as tooth brushing and bathing.

1 2 3 4 5

6 C.) The individual needs assistance toileting and may depend on continence support products.

1 2 3 4 5

7 C.) The individual needs assistance to keep their living space tidy.

1 2 3 4 5

8 C.) The individual has difficulty attending to household tasks and needs outside assistance.

1 2 3 4 5

9 C.) The individual requires significant assistance planning and preparing meals.

1 2 3 4 5

10 C.) The individual only eats a few familiar foods.

1 2 3 4 5

Please add the numbers for all *S* (Strengths) responses and place the result here: ☐
= (AD S) Activities of Daily Living –Strengths

Please add the numbers for all *C* (Challenges) responses and place the result here: ☐
= (AD C) Activities of Daily Living –Challenges

Place the number of each Strengths and Challenges aspects onto the final score sheet with the corresponding code.

Mentation (CD) - Strengths (S)

1 S.) The individual appears to have an excellent fund of knowledge.

1 2 3 4 5

2 S) The individual exhibits academic giftedness.

1 2 3 4 5

3 S.) The individual understands and incorporates new knowledge without difficulty.

1 2 3 4 5

4 S.) The individual has profound ability to recall facts, figures, and dates.

1 2 3 4 5

5 S.) The individual has a propensity for giftedness in at least one area, may exhibit savant-like abilities.

1 2 3 4 5

6 S.) The individual can process information quickly.

1 2 2 4 5

7 S.) The individual has no difficulty planning large-scale events such as graduations, tournaments.

1 2 3 4 5

8 S.) The individual exhibits good judgement in making complex decisions and weighs their options without difficulty.

1 2 3 4 5

9 S.) The individual has profound intellectual ability when compared to same age peers.

1 2 3 4 5

10 S.) The individual demonstrates abilities that are consistent with someone of high intellectual ability.

1 2 3 4 5

Mendation (CD) - Challenges (C)

1 C.) The individual required/s significant assistance in school such as special education programs or extra tutoring.

1 2 3 4 5

2 C.) The individual has a diagnosis of an academic atypicality such as dyslexia, dysgraphia, reading or writing.

1 2 3 4 5

3 C.) The individual takes longer than their same-age typical peers to process information.

1 2 3 4 5

4 C.) The individual has significant cognitive limitations may be deemed as intellectually disabled.

1 2 3 4 5

5 C.) The individual has difficulty thinking things through and make decisions.

1 2 3 4 5

6 C.) The individual exhibits difficulty in planning or organizing activities or projects.

1 2 3 4 5

7 C.) The individual has limitations in their knowledge of commonly known aspects of the world.

1 2 3 4 5

8 C.) The individual needs assistance when putting together puzzles or packing things into small spaces.

1 2 3 4 5

9 C.) The individual has limitations in their working memory ability such as solving simple math problems in their head or reciting a string of numbers backwards.

1 2 3 4 5

10 C.) The individual has an uncanny ability to memorize facts (long term memory) that others do not.

1 2 3 4 5

Please add the numbers for all *S* (Strengths) responses and place the result here: ☐
= (CO S) Mentation –Strengths

Please add the numbers for all *C* (Challenges) responses and place the result here: ☐
= (CO C) Mentation –Challenges

Place the number of each Strengths and Challenges aspects onto the final score sheet with the corresponding code.

Motor Skills (MS) - Strengths (S)

1 S.) The individual has no difficulty with their hand-eye coordination.

1 2 3 4 5

2 S) The individual appears to have no difficulty ambulating and uses no adaptive equipment.

1 2 3 4 5

3 S.) The individual can easily catch a ball.

1 2 3 4 5

4 S.) The individual appears to have no difficulty in awareness of body position and movement (proprioception).

1 2 3 4 5

5 S.) The individual is able to keep their balance while conducting daily activities .

1 2 3 4 5

6 S.) The individual is not considered to be clumsy and does not drop things or bump into objects or people.

1 2 2 4 5

7 S.) The individual does not have a comorbid developmental disability such as cerebral palsy.

1 2 3 4 5

8 S.) The individual does not present with muscle rigidity or tiptoeing.

1 2 3 4 5

9 S.) The individual appears to have a typical gait when compared with same-age peers.

1 2 3 4 5

10 S.) The individual did/does not have any difficulty with their gross or fine motor development.

1 2 3 4 5

Motor Skills (MS) - Challenges (C)

1 C.) The individual appears to have difficulty with ambulation and needs assistance.

1 2 3 4 5

2 C.) The individual relies on assistive devices such as a wheelchair, walker, or braces to ambulate.

1 2 3 4 5

3 C.) The individual is unable to ambulate unassisted and relies on others for assistance.

1 2 3 4 5

4 C.) The individual appears to have differences in gait than their same-age peers such as pigeon-toedness (intoeing).

1 2 3 4 5

5 C.) The individual presents with muscle rigidity unrelated to stress or anxiety.

1 2 3 4 5

6 C.) The individual exhibits difficulty with hand-eye coordination and may exhibit difficulty in sports such as baseball.

1 2 3 4 5

7 C.) The individual has a comorbid condition which impedes motor function such as cerebral palsy, or Ehlos Dhanlos Syndrome.

1 2 3 4 5

8 C.) The individual has limitations in their perception of their body and objects. They frequently bump into things and may be considered clumsy.

1 2 3 4 5

9 C.) The individual often drops things.

1 2 3 4 5

10 C.) The individual has difficulty with their balance.

1 2 3 4 5

Please add the numbers for all *S* (Strengths) responses and place the result here: ☐
= (MS S) Motor Skills –Strengths

Please add the numbers for all *C* (Challenges) responses and place the result here: ☐
= (MS C) Motor Skills –Challenges

Place the number of each Strengths and Challenges aspects onto the final score sheet with the corresponding code.

Sensory Aspects (SY) - Strengths (S)

1 S.) The individual appears to have no difficulty wearing various articles of clothing due to sensory concerns.

1 2 3 4 5

2 S) The individual does not seek out oral stimulation such as chewing or licking objects that are not food.

1 2 3 4 5

3 S.) The individual does not exhibit behaviors in which they actively seek out extraneous visual stimulation such as blinking lights, shiny or spinning objects.

1 2 3 4 5

4 S.) The individual appears to enjoy the sunlight and has no aversion to the sun or florescent lighting.

1 2 3 4 5

5 S.) The individual does not appear to seek out extraneous tactile stimulation when compared to same age peers such as playdough, water, fur, and the like.

1 2 3 4 5

6 S.) When stressed, anxious, or under duress, the individual does not utilize calming mechanisms/tools such as a weighted blanket or rocking for comfort.

1 2 2 4 5

7 S.) The individual appears to have flexibility and willingness to try new things and has no food limitations due to sensory concerns.

1 2 3 4 5

8 S.) The individual uses self-soothing mechanisms that do not include repetitive behaviors such as hand-flapping or rocking.

1 2 3 4 5

9 S.) The individual has no unusual aversion to foods due to texture or consistency.

1 2 3 4 5

10 S.) The individual has no discomfort hearing sounds such as music, chewing, or sirens.

1 2 3 4 5

Sensory Skills (SY) - Challenges (C)

1 C.) The individual appears to have limitations with their diet due to sensory concerns.

1 2 3 4 5

2 C.) The individual suffers from exhaustion, headaches, or irritation from prolonged exposure to bright light.

1 2 3 4 5

3 C.) The individual seeks comfort and uses self-stimulatory behavior as a mechanism for calming.

1 2 3 4 5

4 C.) The individual appears to have difficulty with overstimulation from noise and/or sound (misophonia).

1 2 3 4 5

5 C.) The individual engages in frequent behaviors related to oral stimulation such as sucking on objects that are not food

1 2 3 4 5

6 C.) The individual is limited in their wardrobe options due to specific aspects related to comfort such as an intolerance toward tags or seams.

1 2 3 4 5

7 C.) The individual is attracted and may appear mesmerized by unusual external visual stimulus such as flashing lights or spinning fans.

1 2 3 4 5

8 C.) The individual has a propensity to bang their head (not as a SIB), touch a certain type of object as if by either compulsion or strong desire.

1 2 3 4 5

9 C.) The individual appears to have difficulty with visual overstimulation.

1 2 3 4 5

10 C.) The individual has strong aversion to certain smells and/or has a heightened sense of smell.

1 2 3 4 5

Please add the numbers for all *S* (Strengths) responses and place the result here: ☐

= (SA S) Sensory Aspects–Strengths

Please add the numbers for all *C* (Challenges) responses and place the result here: ☐

= (SA C) Sensory Aspects–Challenges

Place the number of each Strengths and Challenges aspects onto the final score sheet with the corresponding code.

Emotional Aspects (EA) - Strengths (S)

1 S.) The individual can accept the word "no."

1 2 3 4 5

2 S) The individual has no inclination toward, episodes of explosive anger or rage.

1 2 3 4 5

3 S.) The individual appears to exhibit appropriate emotions for the setting, such as laughing at a dog playing.

1 2 3 4 5

4 S.) The individual can identify and understand their own emotions.

1 2 3 4 5

5 S.) The individual does not exhibit periods of excessive crying.

1 2 3 4 5

6 S.) The individual appears to have an uncanny ability to perceive others' emotions.

1 2 2 4 5

7 S.) The individual allows themself to exhibit emotions such as crying.

1 2 3 4 5

8 S.) The individual goes to others for emotional support.

1 2 3 4 5

9 S.) The individual does not exhibit anxious tendencies.

1 2 3 4 5

10 S.) The individual can empathize with others and/or animals.

1 2 3 4 5

Emotional Aspects (EA) - Challenges (C)

1 C.) The individual experiences

1 2 3 4 5

2 C.) The individual engages in property destruction when angry or upset.

1 2 3 4 5

3 C.) The individual has significant behavioral difficulties across multiple settings
.

1 2 3 4 5

4 C.) The individual lacks understanding and insight into what drives their emotions.

1 2 3 4 5

5 C.) The individual appears to have significant difficulty in understanding their emotions.

1 2 3 4 5

6 C.) The individual engages in self-injurious behaviors to regulate emotions.

1 2 3 4 5

7 C.) The individual appears to have significant difficulties being told things they do not want to hear.

1 2 3 4 5

8 C.) The individual is inclined toward explosive anger and exhibits this behavior on a regular basis.

1 2 3 4 5

9 C.) The individual has difficulty sharing their emotions with others when asking for help.

1 2 3 4 5

10 C.) The individual keeps their emotions "bottled up" until they "explode".

1 2 3 4 5

Please add the numbers for all *S* (Strengths) responses and place the result here: ☐
= (EA-S) Emotional – Strengths

Please add the numbers for all *C* (Challenges) responses and place the result here: ☐
= (EA-C) Emotional – Challenges

Place the number of each Strengths and Challenges aspects onto the final score sheet with the corresponding code.

Communication (CO) - Strengths (S)

1 S.) The individual can communicate effectively verbally.

1 2 3 4 5

2 S) The individual engages in reciprocal conversation.

1 2 3 4 5

3 S.) The individual speaks with vocal inflection.

1 2 3 4 5

4 S.) The individual's volume when speaking is appropriate for the setting.

1 2 3 4 5

5 S.) The individual uses vocal intonation when speaking.

1 2 3 4 5

6 S.) The individual understands jokes and euphemisms easily.

1 2 2 4 5

7 S.) The individual uses and understands sarcasm.

1 2 3 4 5

8 S.) The individual can engage in small talk.

1 2 3 4 5

9 S.) The individual can hold a conversation when the topic of discussion is of no or limited interest to them.

1 2 3 4 5

10 S.) The individual can communicate effectively either verbally, or through the use of assistive technology.

1 2 3 4 5

Communication (CO) - Challenges (C)

1 C.) The individual has difficulty modulating for the social context.

1 2 3 4 5

2 C.) The individual's speech can be described as monotone or flat.

1 2 3 4 5

3 C.) The individual appears to talk at rather than with people.

1 2 3 4 5

4 C.) The individual has difficulty in understanding sarcasm.

1 2 3 4 5

5 C.) The individual has difficulty understanding and telling jokes.

1 2 3 4 5

6 C.) The individual uses neologisms (made up words) to convey their thoughts.

1 2 3 4 5

7 C.) The individual has limitations in communication when compared to same-age peers.

1 2 3 4 5

8 C.) The individual relies on assistive technology to communicate such as an iPad or a pictorial system.

1 2 3 4 5

9 C.) The individual speaks only about their specific special interest or preferred topic.

1 2 3 4 5

10 C.) The individual engages in echolalia.

1 2 3 4 5

Please add the numbers for all *S* (Strengths) responses and place the result here: ☐
= (CO S) Communication–Strengths

Please add the numbers for all *C* (Challenges) responses and place the result here: ☐
= (CO C) Communication –Challenges

Place the number of each Strengths and Challenges aspects onto the final score sheet with the corresponding code.

Attention and Distractibility (AT) - Strengths (S)

1 S.) The individual does not have a comorbid diagnosis of ADHD (Attention Deficit Hyperactivity Disorder).

1 2 3 4 5

2 S) The individual has never been prescribed medication such as Ritalin.

1 2 3 4 5

3 S.) There has never been a concern regarding the individual's ability to sit still.

1 2 3 4 5

4 S.) The individual can focus on a single subject for prolonged periods of time when compared to same-aged peers.

1 2 3 4 5

5 S.) The individual is known to find fidget spinners helpful.

1 2 3 4 5

6 S.) The individual is not easily distracted.

1 2 2 4 5

7 S.) The individual has no trouble being quiet.

1 2 3 4 5

8 S.) The individual is patient.

1 2 3 4 5

9 S.) The individual does not exhibit mannerisms related to restlessness.

1 2 3 4 5

10 S.) The individual exhibits activity typical of same-aged peers.

1 2 3 4 5

Attention and Distractibility (AT) - Challenges (C)

1 C.) The individual is easily distracted.	1	2	3	4	5
2 C.) The individual has difficulty sitting still.	1	2	3	4	5
3 C.) The individual is very active.	1	2	3	4	5
4 C.) The individual appears impatient.	1	2	3	4	5
5 C.) The individual interrupts others either verbally or by other means.	1	2	3	4	5
6 C.) The individual has shortened attention span when compared to same-aged peers.	1	2	3	4	5
7 C.) The individual has behavior that is unpredictable.	1	2	3	4	5
8 C.) The individual requires frequent breaks from activities.	1	2	3	4	5
9 C.) The individual has trouble concentrating and needs constant redirection.	1	2	3	4	5
10 C.) The individual exhibits flight of ideas.	1	2	3	4	5

Please add the numbers for all *S* (Strengths) responses and place the result here: ☐
= (AR S) Attention and Self-Regulation –Strengths

Please add the numbers for all *C* (Challenges) responses and place the result here: ☐
= (AR C) Attention and Self-Regulation –Challenges

Place the number of each Strengths and Challenges aspects onto the final score sheet with the corresponding code.

Adaptivity and Self-Regulation (EA) - Strengths (S)

1 S.) The individual takes what others have to say to them into account, even if they do not like it.

1 2 3 4 5

2 S*)* The individual is known to be thick-skinned.

1 2 3 4 5

3 S.) The individual utilizes coping skills when they become emotionally dysregulated.

1 2 3 4 5

4 S.) The individual can utilize coping skills appropriate for the setting.

1 2 3 4 5

5 S.) The individual seeks out others or an animal for consolation when sad.

1 2 3 4 5

6 S.) The individual takes adversity in stride.

1 2 2 4 5

7 S.) The individual does not engage in self-injurious behaviors to regulate emotions.

1 2 3 4 5

8 S.) The individual can squelch their own negative thought patterns.

1 2 3 4 5

9 S.) The individual can focus their attention to calming practices such as mindfulness.

1 2 3 4 5

10 S.) The individual can control their responses to external stimuli.

1 2 3 4 5

Adaptivity and Self-Regulation (EA) - Challenges (C)

1 C.) The individual has difficulty behaving appropriately for the social setting such as laughing at a funeral or running around yelling in a library.

1 2 3 4 5

2 C.) The individual engages in self-injurious behaviors (SIB).

1 2 3 4 5

3 C.) The individual has significant behavioral difficulties across multiple settings .

1 2 3 4 5

4 C.) The individual engages in nonproductive or maladaptive behaviors to get needs met.

1 2 3 4 5

5 C.) The individual had difficulty accepting disappointment such as not getting a cookie after dinner as expected.

1 2 3 4 5

6 C.) The individual is easily dysregulated.

1 2 3 4 5

7 C.) The individual has difficulty coping in challenging situations.

1 2 3 4 5

8 C.) The individual has difficulty calming themselves down when experiencing heightened emotional responses to stimuli.

1 2 3 4 5

9 C.) The individual has difficulty behaving appropriately for the social setting such as laughing at a funeral or running around yelling in a library.

1 2 3 4 5

10 C.) The individual appears to have significant behavioral difficulties when in varying social settings.

1 2 3 4 5

Please add the numbers for all *S* (Strengths) responses and place the result here: ☐
= (EA S) Adaptive Aspects–Strengths

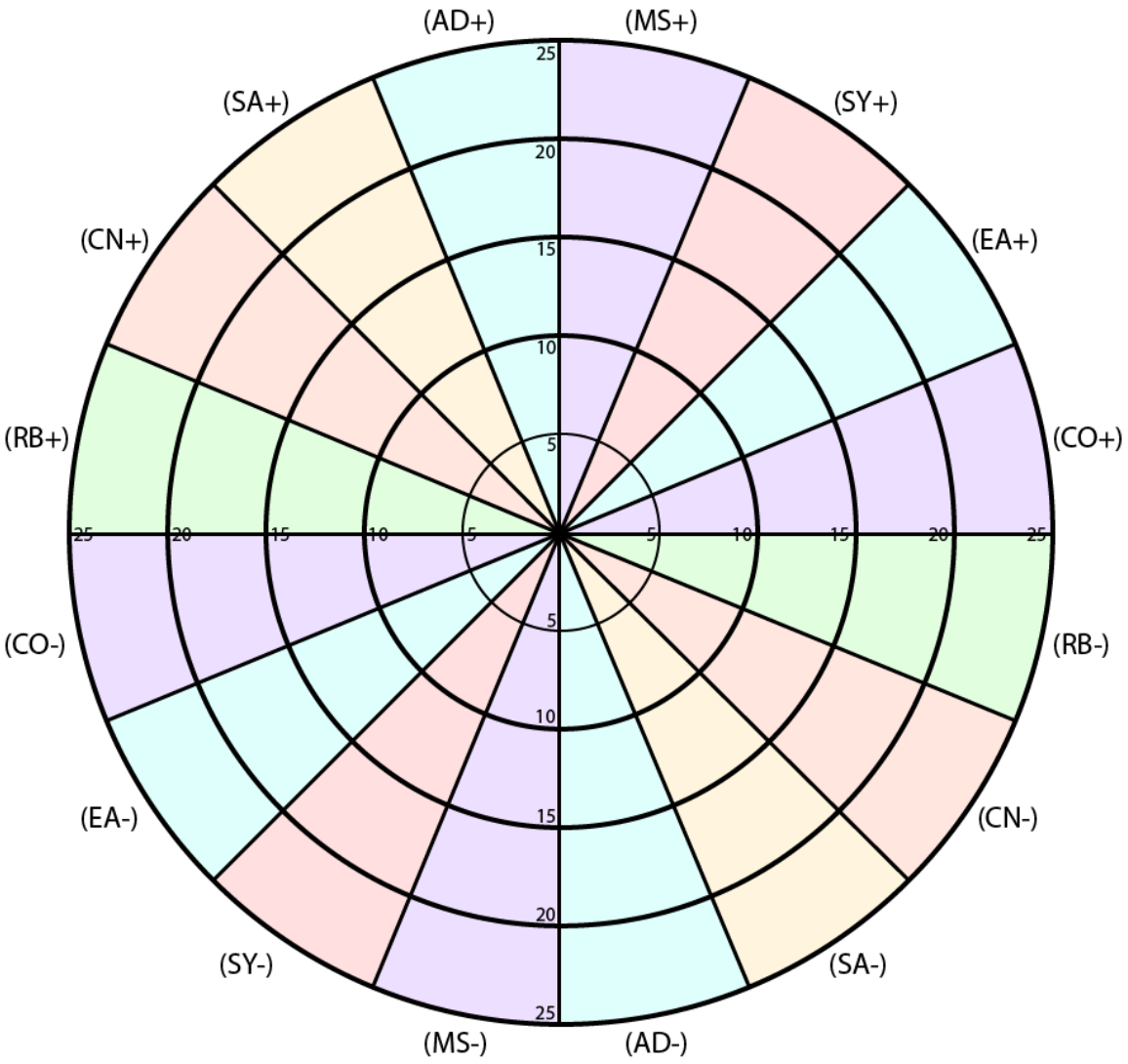
Please add the numbers for all *C* (Challenges) responses and place the result here: ☐
= (EA C) Adaptive Aspects–Challenges

Place the number of each Strengths and Challenges aspects onto the final score sheet with the corresponding code.

- Transfer the scores from the survey into this table, then use the table to complete the diagram o the corresponding page.

Domain	Strengths (S)	Challenges (C)
Activities of Daily Living (AD)		
Mentation (IN)		
Social Aspects (SA)		
Motor Skills (MS)		
Sensory Aspects (SY)		
Emotional Aspects (EM)		
Adaptivity and Self-Regulation (AD)		
Restrictive and Repetitive Behaviors (RB)		
Communication (CO)		
Attention and Distractibility (AT)		

Strengths



Challenges

APPENDIX G

Interview Recruitment Flyer

To whom it may concern,

I am Gwendolyn Barnhart, and I am a PsyD graduate student at Antioch University, Seattle. As part of my degree program, I am performing research for my final doctoral dissertation.

The purpose of this study is to improve the understanding of autism by helping to develop a new tool to help to measure an individual's presentation of autism across the dimensions of autism symptomology. The output of this measure is data that can be visualized in a diagram that showcases individuals' strengths and challenges. This diagram can provide professionals who work with individuals with autism a better idea of where individuals' needs may lie.

Limited tools exist for licensed psychologists who work with individuals with autism to ascertain strengths and weaknesses within the various facets of symptomology. Professionals can use personal interviews and psychological reports to determine individuals' strengths and challenges to determine the type of services that would benefit the individual. A limitation of this practice is that training and use of these measures vary in the field.

I am looking for participants for an in-person one-on-one interviews. This one-on-one interviews should take no more than 60 to 90 minutes to complete. I will make several accommodations to ensure participant confidentiality is maintained throughout the study. All responses will be completely anonymous. No identifying data will be kept from the interview responses.

I do not anticipate that participating in the one-on-one interviews will pose any risks or discomfort.

To participate, you must have worked with IOS/A in a therapeutic capacity for a period of at least 1 year.

If you choose to participate, I will ask you to confirm that you meet the inclusion criteria. For research purposes, I will record the one-on-one interviews and I will inform each participant and ask permission to continue with this process. Once the study is completed, I will delete all recordings.

If you have questions about the interview, or the research study, I am available to discuss them with you. The contact information is:

Gwendolyn Barnhart: gbarnhart@antioch.edu
Faculty Member: Mike Sakuma, PhD: msakuma@antioch.edu
Thank you for considering this request.

Warmly,
Gwendolyn Barnhart

APPENDIX H

Interview Consent Form

The researcher is asking you to take part in a psychometric creation study as part of a final doctoral dissertation research project at Antioch University, Seattle.

The purpose of this study is to improve the understanding of autism by helping to develop a new tool to help measure the various facets of symptomology. The output of this measure is data that can be used to showcase individuals' challenges and strengths. This data can provide professionals who work with individuals with autism a better idea of where individuals' needs may lie to create individualized treatment goals.

The researchers, through this study, will examine the validity of items suggested for a preliminary version of the autism trait survey.

If you agree to take part, you will not be identified individually in the research. Some of your demographic information may be used, such as your age or gender, but it will not be linked to your name. You will be asked to fill out an online form concerning demographics.

The benefit to you in taking part in this study is the contribution to the field.

It is not expected, but you may have some discomfort from the completion of these forms. You are free to refuse to answer any question for any reason. No one outside of the research team will know about your participation in this research study.

Efforts have been made to make sure no one else can know how you answer the surveys. Your name will not be on the study form with your answers. You will be asked to create your own nonidentifying numeric code to be assigned to your survey responses.

Taking part is voluntary. You may refuse to answer any question, but we hope you will answer as many questions as you can. You may refuse to fill out either or both surveys at any time without adverse ramifications.

If you have any questions about the study, or if you would like the results once this study has concluded, you may contact Gwendolyn Barnhart at (XXX) XXX-XXX or via email at gbarnhart@antioch.edu

If you have any questions about your rights as a research participant, you may contact Dr. Mark Russell, Chair of the Antioch University Seattle IRB, at (XXX) XXX-XXXX or via email at mrussell@antioch.edu.

I agree to take part in the Autism Trait Survey. My questions have been answered. I may refuse to answer any question I want or withdraw from the study at any time.

APPENDIX I

Interview Participant Demographics Form

Please choose your alphanumeric code. Only you will know this code. In the event you wish to withdraw from the study, you may contact the researcher anonymously with your code. The researcher will then delete your data. The code only connects the data to a number, not the participant. _____

Please state your country or state/province (if in the United States or Canada) of origin? _____

What is your age?
- 18–25
- 26–30
- 31–35
- 36–40
- 41–45
- 46–50
- 51–55
- 56–60
- 61–65
- 65 +

What is your gender identity?
- Male
- Female
- Other

What is your race/ethnicity?
- White
- Black
- Chicano
- Asian
- Indigenous
- Jewish
- Pacific Islander
- Middle Eastern
- Indian
- Biracial/Mixed
- Decline to State

What is your relationship status?
- Single
- Partnered
- Married
- Widowed
- Decline to State

What is your profession?
- Psychologist
- Social Worker
- Speech-Language Pathologist
- Occupational Therapist
- Psychometrician
- Psychotherapist
- Licensed Mental Health Professional
- Psychiatrist
- Communication Focused Behavior Therapy
- Applied Behavior Analysis Therapist
- Mental Health Intern
- Physical Therapist

How long have you been working with people with autism?
- 1 Year–2 Years
- 3 Years–4 Years
- 5 Years–6 Years
- 7 Years–10 years
- 10 Years–15 Years
- 15 Years +

APPENDIX J

IRB Form

IRB Application Form

1. Principal Investigator(s) name(s): Gwendolyn Barnhart

2. Academic Department: School of Applied Psychology

3. Departmental Status: Student

4. Phone Number: XXX-XXX-XXXX

5. Name of research advisor: Michael Sakuma, PhD

6. Name & email address(es) of other researcher(s) involved in this project: None

7. Project Title: The Creation of the Autism Trait Survey

8. Is this project federally funded? No

9. Expected starting date for data collection: 11/07/2019

10. Expected completion date for data collection: 06/30/2021

11. Project Purpose(s): (Up to 500 words)

The purpose of this study is to improve the understanding of autism by helping to develop a new tool to help to measure the symptomology within the various facets of autism. The output of this measure is data that can showcase individuals' challenges and strengths. This data can provide professionals who work with individuals with autism a better idea of where individuals' needs may lie to create individualized treatment goals.

Furthermore, this survey will fill a void, as there are no tests that measure the characteristics of autism after diagnosis.[1,2,3] The DSM–5 diagnostic criteria are limiting in the diagnosis of those with autism.[4] Autism is a vast and complex condition; no two

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[1] Rutherford, M., McKenzie, K., McClure, I., Forsyth, K., O'Hare, A., McCartney, D., & Finlayson, I. (2016). A national study to investigate the clinical use of standardized instruments in Autism Spectrum Disorder assessment of children and adults in Scotland. *Research in Autism Spectrum Disorders, 29*, 93–100. https://doi.org/10.1016/j.rasd.2016.05.003

[2] Sappok, T., Heinrich, M., & Underwood, L. (2015) Screening tools for Autism Spectrum Disorders. *Advances in Autism, 1*(1), 12–29. https://doi.org/10.1108/AIA-03-2015-0001

[3] Wilkinson, L. A. (2011). *Identifying students with Autism Spectrum Disorders: A review of selected screening tools*. National Association of School Psychologists.

[4] Dell'Osso, L., Dalle Luche, R., Gesi, C., Moroni, I., Carmassi, C., & Maj, M. (2016). From Asperger's autistischen psychopathen to DSM–5 autism spectrum disorder and beyond: A subthreshold autism spectrum model. *Clinical Practice and Epidemiology in Mental Health, 12*, PAGE–PAGE. https://doi.org/10.2174/1745017901612010120

people with autism are alike.[5] Individuals can manifest a number of different symptomologies, and each one has its own degree of severity that can vary with each individual.[6]

A summary and comparison ensued of 45 different psychometric measures used as tools for autism spectrum disorders.[7] As of October 2019, no measures helped to determine the levels of severity based on symptom phenotype of individuals already diagnosed with an Autism Spectrum Disorder. This survey would help to fill that gap, as it would give professionals in the field a clear picture of individuals' strengths and weaknesses that goes beyond the DSM–5's tertiary model.[8]

12. Describe the proposed participants–age, number, sex, race, or other special characteristics. Describe criteria for inclusion and exclusion of participants. Please provide brief justification for these criteria. (Up to 500 words)

Participants in this study will be individuals who have experience working with individuals with autism. The researcher placed this 1-year modifier as persons familiar with autism will be able to give more informed feedback regarding the creation of the survey. Participants for the one-on-one interviews will need to meet face to face for the one-on-one interviews. Participation in this study is available to all professionals who work with Individuals on the Spectrum/Autistics on a therapeutic level. This may include speech language pathologists, occupational therapists, clinical psychologists, psychometricians, social workers, ABA therapists, licensed mental health professionals, and special education teachers. Participation in data collection is open to all professionals who work with Individuals on the Spectrum/Autistics on a therapeutic level worldwide due to the large amount of participation that is necessary. More specific criteria are that the participants will need to understand and communicate in English, since that is the language the researcher will use for the data-collection process. Participants will also need to be at least 18 years of age.

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[5] Noordhof, A., Krueger, R. F., Ormel, J., Oldehinkel, A. J., & Hartman, C. A. (2015). Integrating autism-related symptoms into the dimensional internalizing and externalizing model of psychopathology. The TRAILS study. *Journal of Abnormal Child Psychology, 43*, 577–587.

[6] Hoffmann, W., Weber, L., König, U., Becker, K., & Kamp-Becker, I. (2016). The role of the CBCL in the assessment of Autism Spectrum Disorders: An evaluation of symptom profiles and screening characteristics. *Research in Autism Spectrum Disorders, 27*, 44–53. https://doi.org/10.1016/j.rasd.2016.04.002

[7] Sappok, T., Heinrich, M., & Underwood, L. (2015) Screening tools for Autism Spectrum Disorders. *Advances in Autism, 1*(1), 12–29. https://doi.org/10.1108/AIA-03-2015-0001

[8] American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). American Psychiatric Publishing.

Inclusion Criteria
Age: 18 years and up
English speaking
Work with those with autism in a therapeutic manner
Practiced for at least 1 year
Experience working with individuals with autism

Exclusion Criteria:
Age: Less than 18 years
Sex: None will be excluded
Race: None will be excluded
Non-English speaking
Does not have any experience working with individuals with autism

13. Describe how the participants are to be selected and recruited. (Up to 500 words)

The researcher will recruit participants for the one-on-one interviews through invitation via email, and they will be persons affiliated with the researcher, such as Antioch University faculty and preinternship coworkers. The recruitment flyer is in Appendix K of this document. The rationale is that coworkers have experience in several disciplines with those on the autism spectrum, including speech-language pathologists, social workers, occupational therapists, ABA therapists, licensed mental health counselors, and licensed clinical psychologists. This participant pool will give the study more validity, as it reaches across disciplines. The one-on-one interviews will take place at a time when no clients are in the office, such as a Friday or Saturday night. Furthermore, participants must have been working with IOS/A for 1 year in a therapeutic capacity and be over the age of 18. Additionally, to ensure that data saturation is possible, the researcher intends to have at least 10 participants in the one-on-one interviews.

The researcher will recruit participants for Phases 4 and 5 of the study online through professional networking sites such as LinkedIn. The recruitment flyer is in Appendix G of this document. Criteria for participation will be similar: participants must have been working with IOS/A for 1 year in some therapeutic capacity and be over the age of 18. The researcher intends to use a drawing for one of six $20 Amazon Gift Cards as an incentive. The incentive should be large enough to encourage participants to contribute to the study despite the lengthy process, without being large enough to become an ethical issue. Furthermore, due to the large number of potential participants for this study, the researcher set the number of gift cards at six so that participants have an increased chance of winning. To maintain anonymity, the researcher will direct participants to another survey within SurveyMonkey and instruct them to enter their email address to enter the draw. This way, the researcher will not collect any personal information other than email, and the drawing entry will have no connection to any survey responses.

To reach data saturation, the researcher intends to have at least 10 participants in the one-on-one interviews. Furthermore, the number for the online data collection portion of the study is unpredictable, as the number will depend upon the number of items the one-on-

one interviews selects. However, the number of participants for the online portion is likely to be around 1,000.

14. Describe the proposed procedures, (e.g., interview surveys, questionnaires, experiments, etc.). in the project. Any proposed experimental activities that are included in evaluation, research, development, demonstration, instruction, study, treatments, debriefing, questionnaires, and similar projects must be described. USE SIMPLE LANGUAGE, AVOID JARGON, AND IDENTIFY ACRONYMS. Please do not insert a copy of your methodology section from your proposal. State briefly and concisely the procedures for the project. (500 words)

The proposed procedures are as follows: The researcher will begin participant recruitment as soon as the IRB approves this proposal. The researcher will recruit participants online through online professional networking platforms such as LinkedIn. The initial recruitment form is in Appendix P of this document. The researcher will provide a link to an online questionnaire within SurveyMonkey. First, participants will see a page that asks if they meet the participant inclusion criteria. Next, participants will read the informed consent form and give their consent to participate. SurveyMonkey will collect demographics, and participants will create a 4-letter code in case they wish to withdraw their data from the study (Appendix M). Only by the participant will know this code and the participant will be able to use it to identify data for deletion.

Survey participants will receive invitations to participate by email. First, the participants will review the consent form (Appendix Q) and ask any questions they may have. Next, the participants will check a box confirming that they have read the consent form and agree to the terms. Next, the participants will complete a demographic questionnaire (Appendix O). As part of this questionnaire, the participants will create their own 4-digit code. Only the participant will know this code, and the participant will be able to use it to identify information for deletion should the participant decide to withdraw. This questionnaire is in Appendix M of this document. Next, the researcher will ask participants if they believe that the test items help to measure what the subtest is designed to measure, yes or no (1 or 0). This will take place online through SurveyMonkey). It is important to note that while the researcher will leave these items open for discussion, the participants will receive a link on SurveyMonkey to enter their opinions and their data privately to avoid bias due to peer pressure. Last, participants will be able to see the results of the study once it is complete. If they so wish, then they are free to add their name to an email list (Appendix S). Again, the researcher will keep these data away from other data the researcher collects.

15. Participants in research may be exposed to the possibility of harm– physiological, psychological, and/or social – please provide the following information: (Up to 500 words)

a. Identify and describe potential risks of harm to participants (including physical, emotional, financial, or social harm).

Other than the time taken for the survey, the researchers do not foresee harm to participants. Participants may choose to answer all or some of the questions and they are at liberty to quit the study at any time with no adverse ramifications.

b. Identify and describe the anticipated benefits of this research (including direct benefits to participants and to society-at-large or others)

Persons on the autism spectrum, indeed, are on a spectrum, with an array of difficulties and strengths. To say an individual has autism does not give a clear picture of that individual's unique needs. Some people with autism are verbal, while others are nonverbal. Some have high levels of cognitive ability but perform poorly with activities of daily living. Several psychometric tests exist, such as the Ritvo Autism Asperger Diagnostic Scale-Revised (RAADS–R),[9] and the Autism Scale Quotient (ASQ).[10] None currently exist that I could locate that focus on measuring each trait of autism after initial diagnosis. Thus, I developed this survey to help professionals to pinpoint individuals' strengths and challenges.

c. Explain why you believe the risks are so outweighed by the benefits described above as to warrant asking participants to accept these risks. Include a discussion of why the research method you propose is superior to alternative methods that may entail less risk.

The potential risks of this study are minimal. The researcher will not link any identifying information to the responses of potential participants. The target population is also made up of therapists who are likely not marginalized due to socioeconomic status, and participants are unlikely to be prisoners or minors. Also, the participants are well educated. The potential risks far outweigh the benefits as the creation of this tool can help individuals with autism to gain resources quicker; it can also help those who care for individuals in this population.

d. Explain fully how the rights and welfare of participants at risk will be protected (e.g., screening out particularly vulnerable participants, follow-up contact with participants, list of referrals, etc.) and what provisions will be made for the case of an adverse incident occurring during the study.

In this study, it is highly unlikely that any vulnerable persons would qualify as participants. Furthermore, participants are free to opt out of the study for any reason at

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[9] Andersen, L. J., Näswall, K., Manouilenko, I., Nylander, L., Edgar, J., Ritvo, R. A., … Ritvo, E. (2011). The Swedish version of the Ritvo Autism and Asperger Diagnostic Scale: Revised (RAADS–R). A validation study of a rating scale for adults. *Journal of Autism and Developmental Disorders, 41*, 1635–1645. https://doi.org10.1007/s10803-011-1191-3

[10] Murray, A. L., Booth, T., McKenzie, K., & Kuenssberg, R. (2016). What range of trait levels can the Autism-Spectrum Quotient (AQ) measure reliably? An item response theory analysis. *Psychological Assessment, 28,* 673–683. https://doi.org/10.1037/pas0000215

any time. Should an unfavorable event occur, the principal investigator will take the necessary steps to mitigate any adverse outcome.

16. Explain how participants' privacy is addressed by your proposed research. Specify any phases taken to safeguard the anonymity of participants and/or confidentiality of their responses. Indicate what personal identifying information will be kept, and procedures for storage and ultimate disposal of personal information. Describe how you will de-identify the data or attach the signed confidentiality agreement on the attachments tab (scan, if necessary). (Up to 500 words)

The researcher will protect participant privacy by first ensuring that all data is secure on a separate hard drive that is encrypted with BitLocker. There is also a Windows password on the computer. In addition, the researcher will also encrypt all files with any type of identifying information on them with a passcode through Microsoft Word. Furthermore, the researcher has no need to save names or personal information. SurveyMonkey will be the survey modality, and as part of its system, it disables IP address tracking. Survey data saved through Survey Monkey are anonymous. Participants will be asked to make up their own code; they only they will know. If they would like to delete their data from the survey, they need to only tell the researcher the code anonymously, and the researcher will immediately remove the data will be immediately removed.

17. Will electrical, mechanical (electroencephalogram, biofeedback, etc.) be applied to participants, or will audio-visual devices be used for recording participants? No

If YES, describe the devices and how they will be used: n/a

18. Type of Review: Please provide your reasons/justification for the level of review you are requesting.

Expedited, as the participants are likely not from a vulnerable population. They are not at high risk of harm due to the procedural process of the study. The researcher will only gather data based on the opinions of the usefulness of a number of survey questions. The participation is also not time-extensive, and it is meant to be convenient to the participant.

19. Informed consent and/or assent statements, if any are used, are to be included with this application. If information other than that provided on the informed consent form is provided (e.g. a cover letter), attach a copy of such information. If a consent form is not used, or if consent is to be presented orally, state your reason for this modification below. *Oral consent is not allowed when participants are under age 18.

See attachments

20. If questionnaires, tests, or related research instruments are to be used, then you must attach a copy of the instrument at the bottom of this form (unless the instrument is copyrighted material), or submit a detailed description (with examples of items) of the research instruments, questionnaires, or tests that are to be used in

the project. Copies will be retained in the permanent IRB files. If you intend to use a copyrighted instrument, please consult with your research advisor and your IRB chair. Please clearly name and identify all attached documents when you add them on the attachments tab.

Instruments:

- Consent Form –
- Demographics Questionnaire –
- Question Survey –

I have agreed to conduct this project in accordance with Antioch University's policies and requirements involving research as outlined in the IRB Manual and supplemental materials.

Gwendolyn Barnhart, Principal Investigator 11/07/2019

Signature/Date

APPENDIX K

Pilot Autism Trait Survey

1 – Strongly Disagree	2- Disagree	3- Not Sure	4- Agree	5 – Strongly Agree

Questions:

L – Live Independently **Circle Desired Response**

1.) Individual can cook and prepare their own meals.	**1** 2 3 4 5
2.) Individual can manage their own money.	**1** 2 3 4 5
3.) Individual can attend to basic cleaning activities.	1 **2** 3 4 5
4.) Individual can attend to self-hygiene tasks.	1 2 **3** 4 5
5.) Individual can carry out safety protocol if needed.	**1** 2 3 4 5
6.) The individual can dress themselves appropriately.	1 2 3 **4** 5
7.) The individual be travel trained and can self-transport.	1 **2** 3 4 5
8.) The individual can administer own medications as prescribed.	**1** 2 3 4 5
9.) The individual is ambulatory.	1 2 3 **4** 5
10.)The individual can shop for necessities appropriately.	**1** 2 3 4 5

L = 20

S – Support Needed **Circle Desired Response**

1.) Individual does not comprehend the need for safety.	1 2 3 4 **5**
2.) Individual is unable to void unassisted nor attend to hygienic tasks.	1 2 **3** 4 5
3.) Individual is not fiscally savvy.	1 2 3 4 **5**
4.) Individual needs assistance with household tasks.	1 2 3 **4** 5
5.) Individual cannot cook or prepare meals.	1 2 3 4 **5**
6.) The individual cannot dress themselves without assistance.	1 2 **3** 4 5
7.) The individual cannot self-transport even with public transportation.	1 2 3 **4** 5
8.) The individual cannot take own medications as prescribed.	1 2 3 4 **5**
9.) The individual is not ambulatory.	1 **2** 3 4 5
10.)The individual cannot shop for necessities appropriately.	1 2 3 **4** 5

S 40 **=**

L or S = S

1 – Strongly Disagree 2- Disagree 3- Not Sure 4- Agree 5 – Strongly Agree

E – Exceptional Intellectuality **Circle Desired Response**

1.) The individual has a profound intellectual talent in one or more areas.	1 2 3 4 **5**
2.) The individual is considered gifted.	1 2 3 4 **5**
3.) The individual is at the genius or at savant level.	1 2 3 4 **5**
4.) The individual over achieves academically.	1 2 **3** 4 5
5.) The individual understands and relates new knowledge to their life.	1 2 **3** 4 5
6.) The individual understands and follows directions.	1 2 3 **4** 5
7.) The individual has no problem with memory.	1 2 3 4 **5**
8.) Knows name, address, and phone number.	1 2 3 4 **5**
9.) Individual has no trouble planning and carrying out activities.	**1** 2 3 4 5
10.)Individual does not show signs of impaired judgement.	1 **2** 3 4 5

E = 39

I – Impaired Intellectuality **Circle Desired Response**

1.) The individual has obvious cognitive impairments.	**1** 2 3 4 5
2.) The individual has a below normative IQ.	**1** 2 3 4 5
3.) The individual has trouble learning new concepts or ideas.	1 **2** 3 4 5
4.) The individual does not understand simple directions.	1 **2** 3 4 5
5.) The individual seems "stuck" in their cognitive development.	1 **2** 3 4 5
6.) The individual is not considered gifted in any area.	**1** 2 3 4 5
7.) The individual has a difficult time remembering things.	**1** 2 3 4 5
8.) Does not know name, address, or phone number.	**1** 2 3 4 5
9.) Cannot plan or carry out activities.	1 2 **3** 4 5
10.)Individual shows impaired judgement.	1 2 **3** 4 5

I = 17

E or I = E

1 – Strongly Disagree 2- Disagree 3- Not Sure 4- Agree 5 – Strongly Agree

V – Verbal **Circle Desired Response**

1.) The individual can effectively vocalize their basic human needs.	1 2 3 **4** 5
2.) The individual can carry on a conversation.	1 2 **3** 4 5
3.) The individual speaks with intonation.	1 **2** 3 4 5
4.) The individual speaks using immense vocabulary.	1 2 3 **4** 5
5.) The individual listens to others when they speak, not interrupting.	1 **2** 3 4 5
6.) The individual had a normal progression of speech development.	**1** 2 3 4 5
7.) The individual can speak at a volume appropriate for the audience.	**1** 2 3 4 5
8.) The individual is able to point to things they want.	1 2 3 **4** 5
9.) The individual did not experience a regression of speech skills.	1 2 **3** 4 5
10.)The individual does not take everything literally and can understand jokes.	**1** 2 3 4 5

V = 25

A – Adaptive Communicator **Circle Desired Response**

1.) The individual can communicate only using assistive technology.	1 **2** 3 4 5
2.) The individual is unable to communicate at all.	**1** 2 3 4 5
3.) The individual exhibits echolalia.	**1** 2 3 4 5
4.) The individual has no receptive language skills.	**1** 2 3 4 5
5.) The individual speaks at people rather than with.	1 2 3 **4** 5
6.) The individual is not able to poin to things they want.	**1** 2 3 4 5
7.) The individual's speech development was hindered.	1 2 3 **4** 5
8.) The individual does not speak at a volume that is appropriate.	1 2 3 **4** 5
9.) The individual lost speech skills after acquiring them.	1 2 3 **4** 5
10.)The individual takes things literally and does not understand jokes.	1 2 3 4 **5**

A = 23

V or A = V

1 – Strongly Disagree	2- Disagree	3- Not Sure	4- Agree	5 – Strongly Agree

R – Repetitive / Ritualistic **Circle Desired Response**

1.) The individual exhibits rocking behaviors.	1 2 3 **4** 5
2.) The individual adheres to strict routines.	1 2 3 4 **5**
3.) The individual stimms.	1 2 3 **4** 5
4.) The individual flaps hands and or twirls.	1 2 3 **4** 5
5.) The individual only interested in certain activities.	1 2 3 4 **5**
6.) The individual will harmfully bang their head repetitively.	1 2 **3** 4 5
7.) The individual has difficulty in new surroundings.	1 2 3 4 **5**
8.) The individual needs to stick to a strict daily schedule.	1 2 3 4 **5**
9.) Appears to have OCD-like tendencies.	1 2 3 4 **5**
10.)The individual has intense knowledge about one subject.	1 2 3 4 **5**

R = 45

D – Diminished – No Repetitive or Ritualistic Behavior **Circle Desired Response**

1.) The individual does not rock back and forth.	**1** 2 3 4 5
2.) The individual is flexible in their schedule.	**1** 2 3 4 5
3.) The individual does not stimm.	**1** 2 3 4 5
4.) The individual does not flap hands or twirl.	**1** 2 3 4 5
5.) The individual has a number of different interests.	**1** 2 3 4 5
6.) The individual does not bang their head on hard surfaces repetitiously.	1 2 **3** 4 5
7.) The individual is comfortable in new surroundings	**1** 2 3 4 5
8.) The individual does not need to adhere to a strict schedule or routine.	**1** 2 3 4 5
9.) Appears to not have OCD -like tendencies.	**1** 2 3 4 5
10.)The individual does not have intense knowledge about a certain subject.	**1** 2 3 4 5

D = 12

R or D = R

1 – Strongly Disagree	2- Disagree	3- Not Sure	4- Agree	5 – Strongly Agree

O – Overt Stimulus **Circle Desired Response**

1.) Individual has sensitivity to noise or sounds.	1 2 3 **4** 5
2.) Individual has sensitivity to light.	1 2 3 **4** 5
3.) Individual has tactile sensitivities towards clothing.	1 2 **3** 4 5
4.) Individual experiences pain or trauma with overt stimulus.	1 2 3 **4** 5
5.) Individual prefers certain textures of foods over others.	1 2 3 4 **5**
6.) Individual needs to chew on clothing or other objects.	1 2 3 4 **5**
7.) The individual will harm self with overt stimulus.	1 2 3 4 **5**
8.) The individual has a high threshold for pain.	1 2 **3** 4 5
9.) The individual is attracted to spinning things or twirls.	1 2 3 4 **5**
10.)The individual is abnormally attracted to light and or shiny objects.	1 2 3 4 **5**

O = 43

T – Typical – No Overt Stimulus **Circle Desired Response**

1.) The individual can wear any article clothing without discomfort.	**1** 2 3 4 5
2.) The individual can enjoy foods regardless of texture.	**1** 2 3 4 5
3.) The individual does not have a sensitivity to light.	1 **2** 3 4 5
4.) The individual can handle numerous modes of sensory input simultaneously.	1 2 3 4 5
5.) The individual does not have sensitivity to noise or sounds.	**1** 2 3 4 5
6.) The individual does not chew on objects.	**1** 2 3 4 5
7.) The individual does not injure themselves with overt stimulus.	1 **2** 3 4 5
8.) The individual has a normal threshold for pain.	**1** 2 3 4 5
9.) The individual is not abnormally drawn to spinning objects or twirls.	**1** 2 3 4 5
10.)The individual is not abnormally attracted to light and or shiny objects.	1 **2** 3 4 5

T = 13

O or T = O

1 – Strongly Disagree	2- Disagree	3- Not Sure	4- Agree	5 – Strongly Agree

G – Group and People Function **Circle Desired Response**

1.) The individual enjoys group activities.	1 **2** 3 4 5
2.) The individual voluntarily seeks out others.	1 **2** 3 4 5
3.) The individual responds to sounds.	1 2 **3** 4 5
4.) The individual can interpret facial expressions.	1 **2** 3 4 5
5.) The individual can interpret body language and gestures	1 **2** 3 4 5
6.) The individual can read facial expressions.	1 **2** 3 4 5
7.) The individual can play social games without difficulty.	**1** 2 3 4 5
8.) The individual maintains eye contact with others when appropriate.	**1** 2 3 4 5
9.) The individual seeks out comfort when upset.	**1** 2 3 4 5
10.)The individual is comfortable with physical contact such as hugging.	**1** 2 3 4 5

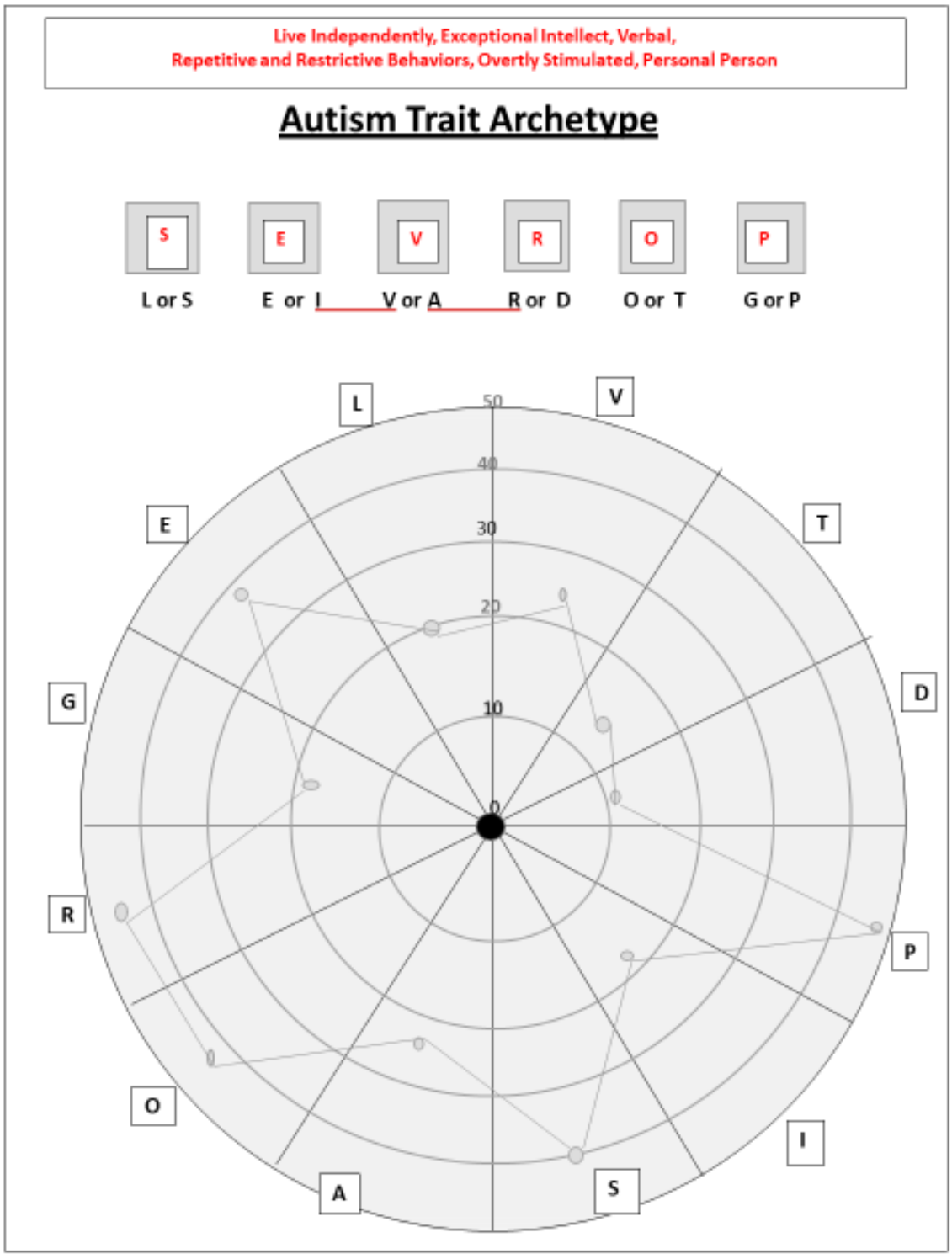
G = 17

P – Personal – Individualistic/Auto **Circle Desired Response**

1.) The individual cannot understand body language and gestures.	1 2 3 4 **5**
2.) The individual prefers to be alone.	1 2 3 4 **5**
3.) The individual cannot read facial expressions.	1 2 3 4 **5**
4.) The individual does not respond to sounds as if deaf.	1 2 **3** 4 5
5.) The individual does not seek out others.	1 2 3 **4** 5
6.) The individual does not respond to their name.	1 2 **3** 4 5
7.) The individual has difficulty engaging in group activities.	1 2 3 **4** 5
8.) The individual has difficulty maintaining eye contact.	1 2 3 4 **5**
9.) The individual does not seek out comfort when upset.	1 2 3 4 **5**
10.)The individual is uncomfortable with physical contact such as hugging.	1 2 3 4 **5**

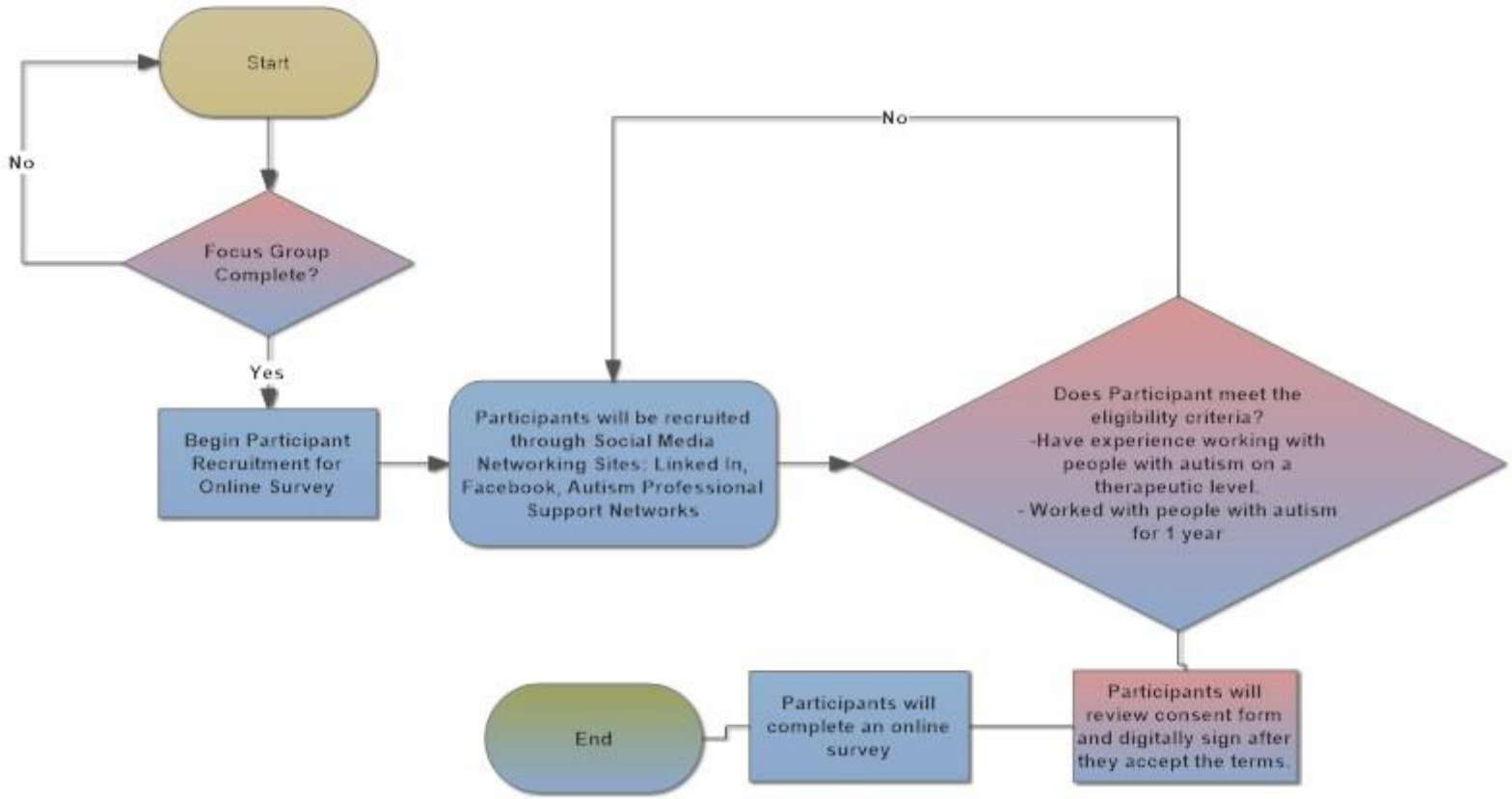
P = 44

G or P = P


Live Independently, Exceptional Intellect, Verbal,
Repetitive and Restrictive Behaviors, Overtly Stimulated, Personal Person
Autism Trait Archetype
S
E
V
R
O
P
L or S
E or I
V or A
R or D
O or T
G or P
L
V
T
D
P
I
S
A
O
R
G
E
50
40
30
20
10
0

APPENDIX L

Flowchart of Online Data Collection


Start
No
Focus Group Complete?
Yes
Begin Participant Recruitment for Online Survey
Participants will be recruited through Social Media Networking Sites: Linked In, Facebook, Autism Professional Support Networks
No
Does Participant meet the eligibility criteria?
-Have experience working with people with autism on a therapeutic level.
- Worked with people with autism for 1 year
Participants will review consent form and digitally sign after they accept the terms.
Participants will complete an online survey
End

APPENDIX M

Online Participant Recruitment Flyer

To whom it may concern,

I am Gwendolyn Barnhart, and I am a PsyD graduate student at Antioch University, Seattle. As part of my degree program, I am performing research for my final doctoral dissertation.

The purpose of this study is to improve the understanding of autism by helping to develop a new tool to help to measure the various facets of symptomology. The output of this measure is data that can be visualized in a diagram that showcases individuals' strengths and challenges. This diagram can provide professionals who work with individuals with autism a better idea of where individuals' needs may lie.

Limited tools exist for licensed psychologists who work with individuals with autism to ascertain strengths and weaknesses within an individual's presentation of symptoms. Professionals can use personal interviews and psychological reports to determine individuals' strengths and challenges to determine the type of services that would benefit such individuals. A limitation of this practice is that training and use of these measures vary in the field.

Limited tools exist for licensed psychologists who work with individuals with autism to ascertain strengths and weaknesses within the various facets of symptomology. Professionals can use personal interviews and psychological reports to determine individuals' strengths and challenges to determine the type of services that would benefit the individual. A limitation of this practice is that training and use of these measures vary in the field.

Participants are asked to follow the link provided below to complete the survey. The survey is expected to take no longer than one hour. The researcher will make a number of accommodations to ensure participant confidentiality is maintained throughout the study. All responses are completely anonymous. No identifying data is kept from the interview responses.

To participate, you must have at least 1 year of work or volunteer experience working with persons on the autism spectrum in a therapeutic capacity and be 18 years of age or older.

If you choose to participate, I will ask you to confirm that you meet the inclusion criteria. For research purposes, I will ask each participant if they consent to participate in the study and I will ask permission to continue with this process.

If you have questions about the research study, I am available to discuss them with you. The contact information is:

Gwendolyn Barnhart: gbarnhart@antioch.edu
Faculty Member: Mike Sakuma, PhD: msakuma@antioch.edu
Thank you for considering this request.

Warmly,
Gwendolyn Barnhart

APPENDIX N

Online Participant Consent Form

The researcher is asking you to take part in a psychometric creation study as part of a final doctoral dissertation research project at Antioch University Seattle.

The purpose of this study is to improve the understanding of autism by helping to develop a new tool to help measure the various facets of symptomology. The output of this measure is data that can be used to showcase individuals' challenges and strengths. This data can provide professionals who work with individuals with autism a better idea of where individuals' needs may lie to create individualized treatment goals.

The researchers, through this study, will examine the validity of items suggested for the final version of the autism trait survey.

If you agree to take part, you will not be identified individually in the research. Some of your demographic information may be used, such as your age or gender, but it will not be linked to your name. You will be asked to fill out an online form concerning demographics.

The benefit to you in taking part in this study is the contribution to the field.

It is not expected, but you may have some discomfort from the completion of these forms. You are free to refuse to answer any question for any reason. No one outside of the researchers will know about your participation in this research study.

The researcher has tried to make sure no one else can know how you answer the surveys. Your name will not be on the study form with your answers. You will be asked to create your own nonidentifying alphabetic code to be assigned to your survey responses.

Taking part is voluntary. You may refuse to answer any question, but we hope you will answer as many questions as you can. You may refuse to fill out either or both surveys at any time without adverse ramifications.

If you have any questions about the study, or if you would like the results once this study has concluded, you may contact Gwendolyn Barnhart at (XXX) XXX-XXXX or via email at gbarnhart@antioch.edu

If you have any questions about your rights as a research participant, you may contact Dr. Mark Russell, Chair of the Antioch University Seattle IRB, at (XXX-XXX-XXXX) or via email at mrussell@antioch.edu.

I agree to take part in the Autism Trait Survey. My questions have been answered. I may refuse to answer any question I want or withdraw from the study at any time.

APPENDIX O

Participant Demographic Questions–Online Participants

Please choose your alphanumeric code. Only you will know this code. In the event you wish to withdraw from the study, you may contact the researcher anonymously with your code. The researcher will then delete your data. The code only connects the data to a number, not the participant. _____

Please state your country or state/province (if in the United States or Canada) of origin? _____

What is your age?
- 18–25
- 26–30
- 31–35
- 36–40
- 41–45
- 46–50
- 51–55
- 56–60
- 61–65
- 65 +

What is your gender identity?
- Male
- Female
- Other

What is your race/ethnicity?
- White
- Black
- Chicano
- Asian
- Indigenous
- Jewish
- Pacific Islander
- Middle Eastern
- Indian
- Biracial/Mixed
- Decline to State

What is your relationship status?
- Single
- Partnered
- Married
- Widowed
- Decline to State

What is your profession?
- Psychologist
- Social Worker
- Speech-Language Pathologist
- Occupational Therapist
- Psychometrician
- Psychotherapist
- Licensed Mental Health Professional
- Psychiatrist
- Communication Focused Behavior Therapy
- Applied Behavior Analysis Therapist
- Mental Health Intern
- Physical Therapist

How long have you been working with people with autism?
- 1 Year–2 Years
- 2 Years–3 Years
- 3 Years–5 Years
- 5 Years–7 Years
- 7 Years–10 years
- 10 Years–15 Years
- 15 Years