

AN EXPLORATION OF PERSONAL CONSTRUCTS AND COGNITIVE COMPLEXITIES OF  
ADOLESCENTS WITH AUTISM SPECTRUM DISORDER

A Dissertation by

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ADOLESCENTS WITH AUTISM SPECTRUM DISORDER

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## DEDICATION

To my family, especially my Mother, Grandfather, and Nash,  
for their unconditional Love;  
to Babaji, Faith, and Satyam,  
for guiding me through uncharted inner landscapes of my Self on this journey;  
and to the participants and their families whose participation in this study  
made this work possible.

“Some kinds of teachings are not the kind found in a book or a list of paper.  
They come through the heart.  
Listen carefully: you will miss it if you are not paying attention.”

-Babaji Shambhavananda

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## ABSTRACT

Many protocols used for assessing social skills of individuals with Autism Spectrum Disorder (ASD) are based on behavioral observations. It has been suggested, however, that social cognition encompasses processes underlying observable behaviors. Such processes include personal constructs and cognitive complexity, which are associated with successful interpersonal communication skills used in social interactions. Personal constructs can be assessed using repertory grids (Kelly, 1955), and cognitive complexity can be assessed using the Role Category Questionnaire (RCQ; Crockett, 1965). Personal constructs and cognitive complexities of high-functioning teenagers with ASD were explored using repertory grids and the Role Category Questionnaire.

Five high-functioning adolescents diagnosed with ASD participated in the study. All participants completed the RCQ. Results appeared to be more reflective of interpersonal communication ability rather than overall social cognition. With visual structure and verbal scaffolding, all participants successfully engaged in the repertory grid process. It appears that high-functioning adolescents with ASD have well organized, complex construct systems related to social relationships. Data suggests they have a significant understanding of social roles and are interested in social interactions. Repertory grids and the RCQ offer a person-centered view of social cognitive processes, which may provide a starting point for intervention.

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## INTRODUCTION

Autism spectrum disorder (ASD) is a neurobiological disorder of development, which affects social communication, social interaction, behavior, interests, and activities (American Psychological Association, 2013). The manner in which individuals with ASD process information differs from their typically developing peers and has been characterized by core deficits (Ozonoff, Pennington, & Rogers, 1991; Frith & Happé, 1994; Baron-Cohen, 1995; Tsai, 2000; Pangborn & Baker, 2001; Janzen, 2003). Core deficits of ASD include persistent impairment in reciprocal social communication and social interaction across multiple contexts and restricted or repetitive behaviors, interests, or activities (American Psychological Association, 2013).

Though core differences of autistic functioning are discussed in-depth in the literature, the manner in which these differences are present in people with ASD varies on an individual basis (Baron-Cohen, 1995; Baron-Cohen, Tager-Flusberg, & Cohen, 1993, 2000; Frith, 1989, 1991; Frith & Happé, 1994; Janzen, 2003; Ozonoff, Pennington, & Rogers, 1990, 1991; Rogers, 1999; Wing, 1992; Wing & Atwood, 1987). Some degree of difference in social interaction skills is present in all individuals diagnosed with ASD despite individually varying presentations of symptoms (American Psychological Association, 2013; Janzen, 2003). Many well-established theories attempt to explain underlying causes of the differences observed in people with ASD. Theory of mind (Baron-Cohen, Leslie, & Frith, 1985; Flavell, 2004; Premack & Woodruff, 1978), weak central coherence (Frith & Happé, 1994; Happé & Frith, 2006), and executive functioning deficits (Hill, 2004; Ozonoff,

Pennington, & Rogers, 1991) are three of the most prominent theories reported in the literature as crucial foundational underpinnings for individuals with social challenges (Garcia-Winner, 2011).

Typically developing children acquire social communication and interaction skills seemingly seamlessly in tandem with language development in multiple domains: semantics, syntax, and pragmatics (Hulit & Howard, 2002; Owens, 2001; 2012;). Numerous theories account for the processes involved in learning language, and the development of social communication skills depend on typically developing language, especially in the pragmatic domain (Hulit & Howard, 2002; Owens, 2001; 2012;). The relationship between language, cognition, and socioemotional development, however, is not clearly understood (Howlin & Rutter, 1987). Indeed, surprisingly little is known about how we use social communication concepts and skills to form societies from a typical developmental perspective (Garcia-Winner, 2011).

Children with ASD do not develop social communication skills as seamlessly as their typically developing peers. Due to the heterogeneity of differences in social abilities exhibited by individuals with ASD, a multitude of standardized (Bowers, Huisinigh, & LoGiudice, 2005, 2007, 2008, 2010; Carrow-Woolfolk, 1999; Constantino & Gruber, 2012; Gresham & Elliott, 2008; Gilliam & Miller, 2006; Kleiman, 2003; Phelps-Terasaki & Phelps-Gunn, 1992), and a few nonstandardized (Bellini, 2006; Garcia-Winner, 2011) assessment tools exist to help clinicians identify social skill deficits and design interventions. These current assessment tools aid evaluators in identifying observable, discrete social skills and behaviors of

individuals with ASD. Social skills interventions based on such assessments and designed to modify social communicative behaviors yield inconsistent results, and generalization of these skills is often poor (McMahon & Solomon, 2015; McMahon, Lerner, & Britton, 2013; Wong et al., 2015).

Some literature suggests that underlying observable social behaviors are social cognitive processes, and person-centered assessment of social cognition is possible and recommended to understand those processes (Blowers & O'Connor, 1996; Burleson & Caplan, 1998; Burleson, Delia, & Applegate, 1995; Crockett, 1965; Fransella & Bannister, 1977; Ijaz & Mahmood, 2012; Kelly, 1955). The richness of social cognition and how we think about ourselves and other people have been described in the communication literature as cognitive complexity (Burleson & Caplan, 1998). Cognitive complexity can be conceptualized as an individual difference variable indicative of the differentiation, articulation, and integration of an individual's personal constructs in a given domain. Being domain specific, interpersonal cognitive complexity is discussed when considering the domain of social cognition (Burleson & Caplan, 1998). As an index of social-information processing, interpersonal cognitive complexity has been positively associated with functional communication skills, person-centered communication, persuasive communication abilities, and perspective taking abilities (Burleson & Caplan, 1998; Burleson, Delia, & Applegate, 1995). To better understand the underlying correlates of observable behavioral differences, it is necessary to explore first-hand accounts of personal construing processes of individuals with ASD. Research suggests it may be possible to explore underlying psychological factors of social communication skills

of people with ASD using Kelly's (1955) repertory grid technique, and cognitive complexity using Crockett's (1965) Role Category Questionnaire (RCQ). Thus, investigating the possible utility of such assessments with adolescents with ASD may be warranted.

### **Statement of the Problem**

Many current protocols for assessing social skills of people with ASD are based on observations of behaviors. The literature suggests, however, that social cognitive processes underlie observable behaviors. Such processes include personal constructs and cognitive complexity, which are associated with successful interpersonal communication skills used in social interactions. Personal constructs can be assessed using repertory grids (Kelly, 1955), and cognitive complexity can be assessed using the Role Category Questionnaire (Crockett, 1965). Given the review of the literature, it appears there is a need for person-centered assessments that consider individualized social cognitive processes of adolescents with ASD.

### **Purpose of the Study**

The purpose of this study is to explore personal constructs of adolescents with ASD using modified versions of Kelly's (1955) repertory grid, and also to explore interpersonal cognitive complexities of these adolescents using Crockett's (1965) Role Category Questionnaire. Differences in information gained from participants' repertory grids vs. that of a standardized assessment of social skills will be explored. Information about what personal constructs of adolescents with ASD tell us about their interpersonal relationships and how they form will be discussed.

## CHAPTER II

### REVIEW OF THE LITERATURE

The process of language development differs to some degree on an individual basis, and for individuals with ASD the process differs to the degree it is considered atypical (Janzen 2003; Paul, 2007). A foundational understanding of typical communication is helpful to understand the communicative differences of this population. Thus, the typical trajectory of language development, organized by four of the most prominent theories of language development as documented in the literature, will be presented hereafter. Well-founded theories of linguistic development including behaviorism (Skinner, 1957), nativism (Chomsky, 1968), cognitive theory (Piaget, 1967), and social interactional theory (Vygotsky, 1986) will be explored.

Next, core deficits of ASD from perspectives of prominent theories including Theory of Mind (Baron-Cohen, Leslie, & Frith, 1995; Premack & Woodruff, 1978), Weak Central Coherence Theory (Frith & Happé, 1994), and Executive Function Theory (Ozonoff, Pennington, & Rogers, 1991) will be presented to provide perspectives of the social differences of people with autism from well-established research. Social skill assessment tools for adolescents with autism are explored next to show how the tools assess social skills, the products of those assessments, and the appropriateness for their use with teens with ASD. Following that, we explore a constructivist view of ASD and how differences of people with ASD may potentially affect their abilities to develop systems of personal constructs. In this section, the repertory grid and RCQ are presented as tools that may have potential to explore

personal constructs and cognitive complexities of adolescents with ASD. Lastly, ethical considerations of research involving adolescents with ASD are addressed.

### **Theories of Language Development**

**Behaviorism.** Skinner (1957) viewed language acquisition through the lens of operant conditioning. In this view, children learned language behaviors through imitation, reinforcement, and successive approximations toward adult language behaviors (Hulit & Howard, 2002; Skinner, 1957; Watson, 1924). Experienced adult language users in children's environments provided models and reinforcement for children's communicative attempts, and children acquired language as a result of these reinforcements (Bohannon & Warren-Leubecker, 1989; Hulit & Howard, 2002). Skinner described five functions of language behaviors: echoic (imitating a model in the presence of a nonverbal referent), tact (verbal behavior which names or labels something), mand (verbal behavior used to request, command, or demand), intraverbal (verbal production seemingly not directly connected to the preceding utterance: a free-associated, non-requested response in conversation), and autoclitic (verbal responses that influence, and are influenced by the speaker's behaviors and account for the linking of words in sentences). The behaviorist view stressed the importance of the environment and the role of caregivers in shaping children's linguistic behaviors through selective reinforcement (Hulit & Howard, 2002; Owens, 2001). Indeed, it stands to reason this theory explains an aspect of communicative development. Some theorists, however, felt there was more to the process of acquiring language than observable behaviors. Noam Chomsky was one such theorist.

**Nativism.** Chomsky (1968) postulated that language was universal among, and unique to, humans. He believed that the ability to communicate using sophisticated language was one of humanity's most significantly unique, defining aspects. His account of language acquisition came to be known as 'nativism.' In contrast to the behavioristic view of language development, Chomsky argued that learning alone could not account for language acquisition for a variety of reasons. He asserted that children acquire language quickly and early in life, that caregivers did not provide children sophisticated linguistic models designed to teach progressive understanding of language, and that children were constantly exposed to complex, inconsistent, and erroneous forms of language during their development (Hulit & Howard, 2002; Pinker, 1984, 1987; Wexler & Culicover, 1980).

Additionally, and perhaps most importantly, nativists stressed that all languages have grammatical rules and structure that govern their syntactic organization, though the rules may vary slightly based on culture and specific language (Hulit & Howard, 2002). Therefore, if language were explicitly taught to children with no inherent inclinations to learn, language should vary extensively from culture to culture (Hulit & Howard, 2002). Chomsky (1965) found this not to be the case, however, and thus conceptualized a 'language acquisition device' (LAD): an innate language reservoir of information about rules of language structure inherent in human children. Nativists strongly believed language acquisition to be unique to humans, innate, and that the capacity to learn language was present at birth in all human beings, barring any developmental disabilities (Chomsky, 1965; Hulit & Howard, 2002; Lenneberg, 1967; Owens, 2001).

**Cognitive Theory.** Piaget (1967) presented a stages approach to cognitive development, in which he addressed language acquisition. Language, as described from his theory, was not a stand-alone process, but rather a result of integrated cognitive development. He emphasized a qualitative evolution of children's cognitive structures and processes that facilitated linguistic development. Piaget's stages of cognitive development included sensorimotor, preoperational, concrete operational, and formal operational stages (Piaget, 1967). The sensorimotor stage encompasses the first two years of life, during which children explore the world through sensory modalities, learn object permanence, expand their understanding of causality, and linguistic communication emerges. From two- to seven-years-of-age, children progress through the preoperational stage, wherein they begin using speech to conceptualize, categorize an object based on a single feature, socialize, and cooperate with others (Piaget, 1955). Make-believe play emerges during this stage. During the concrete operational stage, which occurs from about 7 years-of-age to about 11 years-of-age, children begin using more logical cognitive structures and processes, which support the use of mental representations to interpret and communicate about the world. Lastly, the formal operational stage begins in adolescence and continues for the remainder of the lifespan as the young person develops cognition capable of supporting abstract concepts and thought processes, increasingly complex language, and deductive reasoning abilities.

**Social Interactionist Theory.** Vygotsky (1986) emphasized the function of language was to communicate and interact with others, and the process of learning language took place through social interactions in the child's environment. It should

be noted that, while publication of Vygotsky's work is documented in the late 1980's, he was actually developing his theory of language development in the 1930s in Russia in and around Moscow, where the politically volatile environment leading up to World War II and the following Cold War delayed publication and dissemination of his groundbreaking works. His theory of social interactionism considered both biological and environmental factors in the process of language acquisition (Hulit & Howard, 2002; Owens, 2012). According to Vygotsky's theory, language acquisition resulted from a child's interactions with caregivers and other people in his or her life. The social, communicative functions of language itself lent to the development and use of complex language structures. Social interaction and communication begins before formal language is developed, and children's social communicative skills improve in complexity and sophistication and increase in frequency of occurrence as their language progresses (Bates & MacWhinney, 1982; Hulit & Howard, 2002; James, 1990). Children are considered active participants in the language learning process, initiating social communicative exchanges at least as often as they receive them (Hulit & Howard, 2002). They learn structure and grammar of a language by imitating models presented in social interactions, during which they are simultaneously processing the social function and use of the language (DePaulo & Bonvillian, 1978; Moerk, 1975, 1983). Vygotsky's zone of proximal development was a key component in his theory of language acquisition (Vygotsky, 1978). He defined this zone as the distance between the real level of development and the potential level of development, wherein children could be

helped by an experienced adult in completing a certain task to facilitate the children's acquisition of skills necessary for completing the given task.

**Summary.** Multiple theories account for children's acquisition of language. These prominent and different perspectives, which consider observable communicative behaviors, innate language structures, cognitively based linguistic development, and social interactive processes, have been discussed. Though many of the theorists who presented these perspectives argued their unique account of language acquisition as the most accurate or comprehensive, it seems more plausible that these different theories account for many aspects of the same intricate, multifaceted process. Developing a sophisticated system of interpreting and assigning meaning and reference while learning and adhering to an established grammar and structure of communicating said meaning and references, and doing so from naïve immersion in this established system, is no small feat. It seems much more reasonable to consider language acquisition as a process involving all of these theories inclusively rather than one of these theories exclusively.

The development of children's social skills is discussed in the literature in terms of pragmatic language development (Hulit & Howard, 2002; Owens, 2001, 2012). As mentioned previously, though the relationship between language, cognition, and socioemotional development is not clearly understood (Howlin & Rutter, 1987), behavioral components of social interaction are mentioned in the literature. The discussion of social skill development is rich during early developmental years and becomes increasingly sparse during middle childhood and

adolescence. What is known about typical social skill development will be discussed in the following section.

### **Typical Social Skill Development**

Social skills, which allow one to navigate social life, can be defined in many terms. The McGraw-Hill Concise Dictionary of Modern Medicine (2002) defines social skill as ‘interpersonal savvy which determines future social adjustment and success as exemplified by friendliness, positive involvement in group activities, respect for others, self control, and positive self-image.’ Gresham, Sugai, and Horner (2001) describe social skills as “behaviors that must be taught, learned, and performed.” Hill and Coufal (2005) further delineate social skills as “those behaviors used by an individual to function in social tasks, such as starting and maintaining conversations, giving and receiving compliments, engaging in play with peers, requesting actions or information, and taking part in other socially relevant activities for the individual’s age group.” However defined, these skills are often considered in the domain of pragmatic language, begin developing in early infancy, and are continually refined on an individual basis as a result of multiple interpersonal interactions across the lifespan (Hulit & Howard, 2002; Owens, 2001, 2012; Paul, 2007).

The development of social skills in the area of pragmatic language occurs in tandem with semantic and syntactic language domains during children’s early developmental years (Hulit & Howard, 2002; Lahey, 1988; Owens, 2001, 2012; Paul, 2007). Thus, descriptions of language development hereafter are presented in semantic, syntactic, and pragmatic domains during the early developmental period.

Multiple theories account for the acquisition of language, and the social skills necessary for successful communication and negotiation of social encounters are dependent upon typically developing language, especially in the pragmatic domain (Hulit & Howard, 2002, Owens, 2001, 2012). Discrete, observable behaviors, including non-verbal social communication skills like eye gaze, visual referencing, joint attention, initiating and sustaining interactions, topic maintenance, perspective taking, sharing, role shifting, and turn taking are referenced in the literature regarding typical social skill development (Adamson & Bakeman, 1985; Bates, Camaioni, & Volterra, 1975; Mandler, 1984; Nelson, 1986; Owens, 2001, 2012; Wetherby & Prizant, 1999).

The developmental trajectory of social skills has been organized using a 'stages' perspective by the Centers for Disease Control (CDC, 2014), as follows: infancy (0-1 years-of-age), early toddlerhood (1-2 years-of-age), late toddlerhood (2-3 years-of-age), preschool (3-5 years-of-age), early school-aged (6-8 years-of-age), school-aged: pre-adolescent (9-11 years-of-age), and adolescence: young teens (12-14 years-of-age). Due to some lack of delineation of social skill developmental stages in the literature, the following stages have been combined to facilitate the following discussion of social skill development in a stages perspective that coincides with the available literature: early and late toddlerhood (combined to include 1-3 years of age) and early and pre-adolescent school-aged (combined to include 6-11 years of age).

**Infancy (0-1 years-of-age).** Piaget (1967) described this period as the sensorimotor learning phase, during which babies learn to acclimate to incoming

sensory information and coordinate stimuli with physical interaction in their world (sucking, grasping, etc.). The child begins to comprehend his- or herself as an individual in a shared environment. Bonds with caregivers are formed, initiating the infant's social emotional development (CDC, 2014). Within the first few months of infancy, a baby gazes at his or her caregiver and gives a 'social smile': a smile not related to the baby's physical state (Owens, 2012, 2001).

Joint referencing, one of the primary foundational skills of social interaction involves the sharing of two or more individuals' focus on a common entity, emerges during this stage via shared gaze patterns at toys or other objects of interest presented to an infant by a caregiver (Owens, 2012, 2001). The child soon begins directing behavior toward initiating and sustaining interactions using eye gaze patterns, which represent an early form of dialog and the foundation of later conversational interactions. The child also begins gesturing, which may include raising his or her arms to be picked up, reaching for desired objects, showing, giving, and/or pointing (Adamson & Bakeman, 1985; Bates, Camaioni, & Volterra, 1975; Owens, 2012, 2001; Wetherby & Prizant, 1999). By eight to nine months, infants begin pairing gestures with vocalizations to communicate their intentions (Owens, 2012, 2001). They also begin using protoimperatives - requesting objects, participation, or actions - during this phase to initiate joint attention (Bruner, 1983), and protodeclaratives - the acts of giving, showing, and pointing - to maintain joint attention (Golinkoff, 1993). The appearance of encoded action during this phase, as exhibited via gesturing, indicates the infant is able to coordinate a plan to achieve a

desired goal (Owens, 2012, 2001). Joint referencing and attention set the stage for joint action (Bruner, 1983; Owens 2012, 2001).

Joint action routines, including games (e.g., 'peekaboo') and daily routines (e.g., bath time, diaper changing) facilitate anticipatory exchanges between the infant and caregiver (Owens, 2012, 2001). Such routines help the infant learn interactive social skills such as role shifting and turn taking. The foundation of infants' event knowledge is laid through joint action routines; such knowledge helps the infant begin associating people, actions, cause-and-effect, and temporal sequencing of events that can later be generalized to other familiar, reoccurring situations (Mandler, 1984; Nelson, 1986). Caregivers facilitate the infant's developing abilities to predict and engage in interactions through repeated presentation of daily interactional routines (Bruner, 1975).

**Toddlerhood (1-3 years-of-age).** Toward the end of infancy, the appearance of gestures signals the child's growing ability to make a plan to accomplish a goal (Owens, 2012, 2001). Toddlers in this stage of development begin to show more interest in people, imitating movements and actions they observe in others, waving 'bye-bye', and recognizing names of familiar people and objects (CDC, 2014). Joint referencing continues to mature during early toddlerhood, especially toward the end of the first year, and finds the toddler assuming more control and initiating joint referencing more frequently in didactic interactions with caregivers (Bruner, 1975, 1977; Lewis & Freedle, 1973; Ryan, 1974; Scaife & Bruner, 1975).

Children's spoken language repertoire expands rapidly during this period, from about 50 words around twelve months-of-age to 200-300 words combined in two-word utterances around two years-of-age (Chapman, 2000; Miller, 1981; Owens, 2012, 2001; Paul, 2007; Weiss, Gordon, & Lillywhite, 1987). Around two years of age, children's pragmatic language development expands to include an increased ability to continue a topic of discussion, and they begin engaging in symbolic play and misrepresenting reality by telling lies and teasing others (Chapman, 2000; Miller, 1981; Weiss, Gordon, & Lillywhite, 1987). Their expressive narratives are produced in 'heap stories,' consisting primarily of labels and descriptions.

Between two and three years-of-age, children begin using rising intonation patterns to pose questions, and by three years-of-age they understand relationships between agents, objects, and actions, and can use and understand 'why' questions and basic spatial terms such as in, on, and under (Chapman, 2000; Miller, 1981; Paul, 2007; Weiss, Gordon & Lillywhite, 1987). Toward the end of this period as children are approaching three years-of-age, they are extending topics by adding new information, they may begin requesting clarification to repair breakdowns in communication, and their narratives develop sequencing of events though often still lack a primary plotline (Chapman, 2000; Miller, 1981; Paul, 2007; Weiss, Gordon & Lillywhite, 1987).

Vygotsky (1978) noted that, as spoken language develops, children begin using speech to plan solutions to problems and execute those plans in a sort of self-talk. He observed children's use of language in this manner facilitated their

capacities to be both the subject and object of their own behaviors. His observation referenced typically developing children and could be related to early foundations of perspective taking and perspective shifting that facilitate a child's theory of mind (Baron-Cohen, 1995; Premack & Woodruff, 1978).

Pretend and cooperative play emerge during this stage (Owens, 2012, 2001). Vygotsky considered play to be the principal activity for the internalization and appropriation of reality during children's first years (Moll, 1990; Vygotsky, 1978). Symbolic flexibility is exhibited by engagement in pretend play and has been correlated with greater linguistic and communicative progress (Bates, Bretherton, Snyder, Shore, & Volterra, 1980). Toward the end of toddlerhood, approaching 3 years-of-age, children make huge social, emotional, and cognitive changes that allow them to follow multiple-step directions, take turns, play make-believe, and imitate the actions of their playmates and adults (CDC, 2014).

**Preschool (3-5 years-of-age).** Between three and five years-of-age, children begin showing more affection toward others outside the family unit, notice differences between boys and girls, can recall parts of a story, and begin exploring their world beyond their immediate family (CDC, 2014). Additional pragmatic development during this period includes more flexibility in verbal requests of others (including 'would you...' and 'could you...'), the emergence of reasoning and predicting, the ability to express empathy for others, maintain communicative interactions, and create imaginary roles and props during play (Chapman, 2000; Miller, 1981; Weiss, Gordon, & Lillywhite, 1987). Beginning around 3 years-of-age, children can encode the function of activities deeper than physical surface

characteristics, laying the foundation for generalization of knowledge and skills (Bauer, Dow, Bittinger, & Wenner, 1998; Loth, Gomez, & Happé, 2008). Children's semantic development during this period expands to encompass understanding and use of basic color and shape words around three years-of-age, 'when' and 'how' questions approaching four years-of-age, and knowledge of letter names, sounds, and numbers by five years-of-age (Chapman, 2000; Miller, 1981; Paul, 2007; Weiss, Gordon, & Lillywhite, 1987).

Preschool children display a desire to relive their social experiences by talking about them with peers or relatives, which allows them to report on happenings in their life, reflect on how they felt about those events, and make sense of why things happened the way they did (Feldman, 1989; Loth, Gomez, & Happé, 2008). Thus, children's narratives provide an important platform to practice theory of mind and build an understanding of common events (Bruner, 1990; Loth, Gomez, & Happe, 2008). Their narratives are often event sequences without plots at three years-of-age, gain some temporal organization and theme around four years-of-age, and consist of chains of events with some plot, however lacking in climax and resolution, around five years-of-age (Chapman, 2000; Miller, 1981; Paul, 2007; Weiss, Gordon, & Lillywhite, 1987). Toward the end of this period (approaching 5 years-of-age), children's conversational skills improve, and they are often able to address specific requests for clarification from a communication partner (Chapman, 2000; Miller, 1981; Weiss, Gordon, & Lillywhite, 1987).

**School-aged (6-11 years-of-age).** The discussion of typically developing discrete social skills in the literature becomes quite sparse during this

developmental period. From about 6 to 8 years-of-age, children become more invested in friendships and team activities, show desire to be liked and accepted by friends, and begin showing more concern for others and less focus on themselves (CDC, 2014). Early in this developmental period (around 7 to 9 years-of-age), children in this group are able to understand jokes and riddles based on sound similarities (Chapman, 2000; Nippold, 1998; Westby, 1999). Narratives become 'true stories' during this period, with all components of central focus, high point, and resolution (Chapman, 2000; Miller, 1981; Paul, 2007; Weiss, Gordon, & Lillywhite, 1987; Chapman, 2000).

Children between seven and nine years-of-age begin using language to establish and maintain social status with peers, and children show increased ability to take others' perspectives and repair conversational breakdowns by defining terms or giving background information (Chapman, 2000; Nippold, 1998; Westby, 1999). Later in this developmental period (9 to 11 years-of-age), children become able to understand jokes and riddles based on lexical ambiguity. Puberty typically begins during these late school-aged years, and children begin forming stronger and more complex peer relationships, understanding others' perspectives more clearly, experiencing peer pressure, and developing an increased awareness of body image (CDC, 2014).

**Adolescence: Young Teens (12-14 years-of-age).** Physical changes associated with puberty begin in early adolescence (12-14 years-of-age), and children begin developing a stronger sense of right and wrong and become better able to express their feelings verbally. These expressions exhibit teens' deeper

capacity for caring, sharing, and developing more intimate relationships (CDC, 2014). Additional emotional challenges which may include depression, anxiety, and eating disorders emerge as children experience dramatic changes in mood, show more concern about body image, and may be influenced by peer groups to experiment with alcohol, tobacco, drugs, and sex (CDC, 2014).

The study of adolescent language development is not well researched (Nippold, 2007; Owens, 2014); thus, empirical research investigating adolescent language development is scarce. What little is known about adolescent language development would suggest that particular aspects of pragmatic language become vital tools for self-esteem, social adjustment, and academic success during this period of life (Nippold, 2007). Such aspects include skills in the area of conversation, the use of slang terms, code switching, humor, sarcasm, and narration, all of which are presumed to develop rapidly and become increasingly refined during adolescence (Nippold, 2007). Toward the end of this period, adolescents are using language primarily to maintain social bonds by 'just talking' with their peers, and their persuasive and argumentative skills are near adult-level (Chapman, 2000; Nippold, 1998; Westby, 1999).

Nippold (2007), one of the few researchers exploring adolescent language development, described the development of conversational skills throughout adolescence. During adolescence, conversational skills expand to include the individual's ability to carry on longer conversations with conversational partners, engage in more frequent conversations with peers, and introduce and flow between topics smoothly. Adolescents are also better able to consider their conversational

partner's point of view (including their thoughts, beliefs, knowledge of and experience with conversational topics), adjust their message to their listener, and repair conversational breakdowns. Their conversations include more elaboration, exaggeration, humor, and drama, which engage and entertain the listener. Adolescents also begin to differentiate topics of conversations between peers and parents: often, topics adolescents will discuss with peers they will not discuss with parents, and vice versa. Thus, adolescents engage with peers more frequently to gather information, and to gain support and a sense of well-being. It should be noted that conversational skills vary on an individual basis, even for typically developing children, adolescents, and adults, making 'typical' conversational skills difficult to define (Nippold, 2007).

Adolescents become increasingly adept at code switching as a result of their increased awareness and consideration of their listener's point of view, age, and social status (Nippold, 2007). They will adjust their semantic, syntactic, and pragmatic aspects of speech (especially prosody and volume) to accommodate a variety of conversational partners appropriately (e.g., use of more slang terms and vocal intensity with peers vs. more formal vocabulary and reduced vocal intensity with teachers). The use of slang terms has particular utility in peer relationships as it can signify one's belonging to a particular group, can be used playfully, and can lighten the mood of serious situations (Nippold, 2007). Slang terms are often metaphoric in nature. For example, groups of athletic students may be identified as 'jocks,' and groups of students embracing counter-cultures and drugs may be labeled 'junkies.' Further within-group metaphors are often used to provide

members with a sense of belonging and solidarity (e.g., names for jocks such as 'Jumping Machine' and 'Speedy', and names for drugs like 'joints' or 'doobies').

Nippold (2007) describes narrative skills as vital in social and academic arenas, and believes they are continually refined during adolescence. Narratives are monologues that serve the purpose of sharing information about an event or experience in a story-like format (Nippold, 2007). Narrative skillfulness is more challenging than conversational discourse for many reasons, including the required use of more complex language structures and reduced support from partners found in didactic conversational exchanges. Hallmarks of narrative development in adolescence include longer, more elaborative stories, the presence of more complete episodes and embedded episodes within those episodes (sub-plotting). Additionally, greater cohesion across episodes is achieved, and efficient use of story grammar elements, including providing the setting, characters, plot, and episodes in a cohesive and logical temporal trajectory, are present more often. Adolescents are also more adept at providing detailed information regarding characters' inner thoughts, feelings, beliefs, goals, and motivations (Nippold, 2007; Paul, 2011). Narratives are often used in the classroom (e.g., to retell a story verbally or in writing) and during social conversations (e.g., to describe what happened at the movies last weekend).

The role of humor in adolescent language use cannot be overstated. The understanding and use of humor has been associated with reflective problem solving styles, linguistic and cognitive development, creativity, academic achievement, reading skills, and leadership (Nippold, 2007). In early childhood,

much humor takes the form of jokes dependent upon understanding levels of ambiguity to appreciate their humor. Such levels may include phonologic ambiguity ('What kind of soup is this?' *'That's bean soup, madam.'* I don't care what kind of soup it's been, I want to know what kind of soup it is now!); lexical ambiguity ('Order! Order in the court!' *'I'll have a ham and Swiss on rye, your honor.'*); surface structure ('I saw a man-eating shark at the aquarium!' *'That's nothing – I saw a man eating herring at the restaurant!'*); and deep structure ('Call me a cab!' *'You're a cab.'*). During adolescence, however, children tend to find ambiguity less interesting and begin to value witty remarks, spontaneous anecdotes, and more complex forms of humor like irony and sarcasm. Additionally, preferences for specific forms of humor differ on an individual basis, emphasizing the importance of considering others' perspectives when engaging in humorous discourse, especially for the sake of peer inclusion and establishing group solidarity (Nippold, 2007).

Colston and Lee (2004) found that boys and men, more so than girls and women, are particularly attracted to the power sarcasm can bring and are allured by the social riskiness associated with its use. Sarcasm can be a tricky form of humor to comprehend and execute, as one must be simultaneously aware of the dissonance between what is being said and what is truly meant by the message. This form of humor hinges on one's ability to consider the context of the message, the personal experiences and preferences of the person sending or receiving the message, and attendance to nonverbal cues (especially facial expression and prosody, as in the sarcastic message: 'I just LOVE cleaning my room!'). Humor in its many forms, including sarcasm, witty remarks, and spontaneous anecdotes, is especially

appreciated during adolescence for its ability to help children manage their anxiety associated with the social challenges and physical changes of this period in a socially acceptable manner.

**Summary.** The typical development of social skills is deeply rooted in the development of language for communication. Pragmatic, semantic, and syntactic language domains are intertwined and develop together, especially in the early formative years while children develop their linguistic foundation and communicative abilities. As typically developing children grow older, the pragmatic domain of language takes the spotlight as they use their foundational linguistic skills to establish and maintain relationships, especially with their peers.

Though many typically developing adolescents improve and refine their conversational and narrative skills and use of humor without overt instruction, this natural development is often not the case for adolescents with disabilities. In the case of children with ASD, the development of social skills, and subsequently the quality of their social interactions, is different (Baron-Cohen, 1995; Frith & Happé, 1994; Janzen, 2003; Ozonoff, Pennington, & Rogers, 1991). Difficulties with social communication are a core deficit of ASD (American Psychological Association, 2013). Three major theories have been proposed to account for these deficits: theory of mind (Baron-Cohen, Leslie, & Frith, 1985; Premack & Woodruff, 1978), weak central coherence (Frith & Happé, 1994), and executive function deficits (Ozonoff, Pennington, & Rogers, 1991).

## **Core Deficits of ASD from Perspectives of Theory of Mind, Weak Central Coherence Theory, and Executive Function Theory**

Presentation of ASD characteristics vary on an individual basis. Core social communication differences of an individual with autism may include difficulty attending to relevant stimuli; preference to process information locally vs. globally; lack of eye contact; lack of joint attention, lack of social/conversational initiation, deficits in conversational turn-taking, topic initiation, and topic maintenance; diminished visual referencing of others to acquire information regarding their intent, mental states, and emotions; and difficulty attending to, interpreting, and utilizing non-verbal communicative cues (Baron-Cohen, 1995; Baron-Cohen, Tager-Flusberg, & Cohen, 2000. 1993; Frith, 1989, 1991; Frith & Happé, 1994; Happé, 2001; Janzen, 2003; Ozonoff, Pennington, & Rogers, 1990; 1991; Rogers, 1999; Wing, 1992; Wing & Atwood, 1987). These discrete social skills can be considered on a macro level as ‘body language’: the process of communicating nonverbally through conscious or unconscious gestures and movements (Oxford Dictionaries, 2015). Though the ability to use nonverbal communication develops naturally for typically developing individuals, as described previously, this is often not the case for individuals with autism:

The thing is, I didn’t know that I lacked body language. No one ever told me. But one day I saw it for myself. People gesturing, nodding heads, pointing...it was like watching the effects of the wind on a field of grass. (I) tried to count how many students were sitting, yet continuing to move. The answer: all of them. Every person in the room was using body language. And for some

reason, that is when I understood what “body language” signified...it wasn't just a phrase; it was literally a form of communication. Obvious to others. A revelation to me (Kelter, 2014a).

Janzen (2003) suggests that, due to differences in the way individuals with autism process information and attend to other people, they may understand and relate to people and situations differently than their typically developing peers. She further suggests the core social communication characteristics people with autism find so challenging can be categorized into four basic social skill deficits. These include the inability to automatically: 1) understand others' perspectives and the self from others' perspectives; 2) identify and make sense of social information (gestures, facial expressions, nuances of language, etc.); 3) generate or formulate appropriate responses to varied and dynamic social situations; and 4) exhibit competent social judgment (Janzen, 2003). The degree of support an individual needs to engage socially may range from minimal to very substantial depending on his or her unique levels of impairment (American Psychological Association, 2013; Janzen, 2003; Prelock, 2006). Though high-functioning individuals with ASD are often expected to function well socially, unstructured social situations requiring them to quickly process social information and respond appropriately often expose their social deficits (Janzen, 2003; Loth, Gomez, & Happé, 2008).

In spite of individual differences in symptomatic severity, interacting with others socially is a core deficit challenging all individuals with autism spectrum disorder (American Psychological Association, 2013; Janzen, 2003). Multiple theories attempt to elucidate underlying causes of social communication deficits.

Theory of mind (Baron-Cohen, Leslie, & Frith, 1985; Flavell, 2004; Premack & Woodruff, 1978), weak central coherence (Frith & Happé, 1994; Happé & Frith, 2006), and executive functioning deficits (Ozonoff, Pennington, & Rogers, 1991; Hill, 2004) are three of the most prominent theories reported in the literature as crucial foundational underpinnings for individuals with social challenges (Garcia-Winner, 2011).

**Theory of Mind.** A core tenet of theory of mind (Baron-Cohen, Leslie, & Frith, 1985; Flavell, 2004; Premack & Woodruff, 1978) is children with ASD suffer from mindblindness: an inability to represent mental states (e.g., thoughts, beliefs, reasons), which further prohibits their ability to attribute mental states to themselves and others. Thus, unable to attribute others' thoughts, reasons, feelings, and beliefs, people with ASD struggle to understand and predict others' behaviors and motivations and therefore are unable to use this information to guide their social interactions (Baron-Cohen, 1995). The ability to represent mental states of oneself and others, such as beliefs or intentions, is described by this theory as 'mentalizing' (Baron-Cohen, Leslie, & Frith, 1985; Baron-Cohen, Tager-Flusberg, & Cohen, 1993, 2000). Impairments observed in symbolic play, social interactions, and communication – both verbal and nonverbal – for children with ASD are well understood by this mentalizing account of theory of mind (Frith & Happé, 1994).

Studies suggest that advancement of verbal abilities aid in theory of mind development (Bowler, 1992; Loth, Gomez, & Happé, 2008; Trillingsgaard, 1996). Children's ability to mentalize is believed to be rooted in the development of early social-cognitive skills including joint reference, joint attention, gaze following,

pretend play, and imitation (Baron-Cohen, 1995; Leslie, 1987; Loth, Gomez, & Happé, 2008; Meltzoff, 2002; Tomasello, 1999). In children with ASD, the development of these social skills appears to be disrupted during the preschool years (Charman, Baron-Cohen, Swettenham, Cox, Baird, & Drew, 1997; Rogers, 1999). Additionally, impairments in theory of mind and narrative formation, coupled with a lack of motivation to engage in pretend play to rehearse and better understand personal experiences, reduces opportunities for children with ASD to understand how social events unfold and what they mean (Losh & Capps, 2003; Loth, Gomez, & Happé, 2008).

Individuals with ASD often struggle with conversational skills including topic introduction and maintenance, considering their conversational partners' perspectives and adjusting their messages accordingly, visually referencing their conversational partner, and interpreting and appropriately using nonverbal communication (e.g., facial expressions, gestures, prosody, vocal intensity, etc.; Owens, 2014). Individuals with ASD often provide asocial monologues as opposed to inclusive narrations during conversational discourse, and episodes within their monologues may be poorly organized and often inconsiderate of their partners' interests (Owens, 2014). Conversations with peers can be one-sided and revolve solely around topics of interest to the individual with ASD (Janzen, 2003). According to theory of mind, children with ASD possess a fundamental deficit in taking others' perspectives leading to a myriad of difficulties interacting with others; however, Hermelin and O'Connor (1970) found that some children with autism prefer to be

with other people, just like their typically developing peers. This account from an individual with Asperger's syndrome supports their findings:

“Like a lot of kids on the autism spectrum, I very much wanted friends...had a strong desire for connection...but could never hack it. I could never make it work. I'd try to befriend classmates, neighbor kids, but wound up getting rejected every single time, sometimes bullied (Kelter, 2014b).”

Many parents of children with ASD have reported their children are unable to mentalize – a crucial component of sharing attention with others (Baron-Cohen, 1995; Newson, Dawson, & Everard, 1984). Thus, some children with autism may not share mutual feelings, nor engage emotionally with others (Janzen, 2003). They may also behave in unconventional ways and believe others' conventional behaviors to be odd due to a lack of shared social perspective (Dewey, 1991, 1992; Janzen, 2003).

Though the theory of mind provides a compelling account of why people with ASD experience social difficulties, this theory alone does not fully account for their social communication impairments (Tager-Flusberg, 2007). Frith and Happé (1994) point out that, in Baron-Cohen and colleagues' (1985) first test of theory of mind, approximately 20% of children with autism passed the false belief task used to indicate the presence or lack of theory of mind. Most of those children also passed a test of mentalizing, which involved ordering pictures related to mental states, suggesting some competence in representing mental states (Baron-Cohen, Leslie, & Frith, 1986; Frith & Happé, 1994). Further, some higher-functioning individuals with ASD have been found to pass theory of mind tasks consistently and across multiple domains (Bowler, 1992; Frith & Happé, 1994; Ozonoff, Rogers, &

Pennington, 1991). Others, however, though able to pass false belief tasks of theory of mind, have shown striking errors in performing the tasks successfully when required to extract information from a story context to successfully complete the task (Happé, 1994). Thus, though 'mindblindness' captures the essence of autism, it does not fully explain the variety and heterogeneity of the presentation of autism across all individuals (Frith & Happé, 1994).

### **Weak Central Coherence Theory.**

As a kid, forgetting what I looked like made for a confounding experience. Mirrors would surprise the crap out of me, catch me off guard. Sometimes I would stare at myself, try to memorize nose- and eye-shapes, try to commit it all to memory. It never took. The second I walked away from the mirror, I was back to my blank fabric self (Kelter, 2014a).

Weak central coherence theory (Frith & Happé, 1994; Happé & Frith, 2006) provides an explanation of the difference often observed in individuals with autism where information in a given context is processed locally as opposed to globally. Aspects of this unique processing style are exemplified in the quote above, especially his focus on memorizing the more local aspects of his face – nose-shapes and eye-shapes – rather than the global gestalt of his entire facial image. Many typically developing individuals process information globally, often at the expense of detail; however, this tendency is reversed for many people with autism where intense attention is paid to specific details at the expense of comprehending information in a more global manner (Frith & Happé, 1994).

Characteristics of autism initially distinguished by Kanner (1943) and Asperger (1944), including a restricted repertoire of interests, obsessive desire for sameness, savant abilities, superior rote memory, and preoccupation with parts of objects, are taken into account by the weak central coherence theory as this tendency to process locally vs. globally could explain such behaviors (Kanner & Eisenberg, 1956; Rimland & Hill, 1984). None of these aspects, though important to consider when discussing social impairments of children with ASD, can be well explained by a lack of mentalizing – the core of the theory of mind hypothesis of autism (Frith & Happé, 1994).

Thus, Frith & Happé (1994) proposed a different, or perhaps additional, underlying cognitive impairment contributing to information processing challenges of people with ASD. The suggested impairment, weak central coherence, is characterized by a difficulty or inability to draw together diverse information to construct higher-level, global meaning in context (Frith, 1989; Frith & Happé, 1994). This could provide an explanation for results of studies showing children with autism preferentially processing parts of information over holistic gestalts in stark contrast to their typically developing peers (Frith & Happé, 1994; Lockyer & Rutter, 1970; Prior, 1979; Shah & Frith, 1983).

Loth, Gomez, and Happé (2008) suggest that, though weak central coherence may not be the primary cause of social deficits for individuals with ASD, it could underlie difficulties with forming social schemas and organizing schemas hierarchically, which may impair social cognition. Janzen (2003) explains how individuals with autism may process information in a gestalt – by encoding all input

from a given moment, including localized details (e.g., the loops of thread in the carpet, reflection of ceiling lights off a peers' glasses, the sound of the air conditioning unit), regardless of their importance or relevance to the moment. They may not sort-out extraneous details and analyze information from the moment for relevance, which may result in storing information without a more global meaning (Janzen, 2003). Such a process may make it difficult for the individual to focus on meaningful events, retrieve relevant information in a sequential, temporal order, integrate information from multiple experiences, and reference relevant information to inform his or her behaviors and decisions (Janzen, 2003; Loth, Gomez, & Happé, 2008). Further, weak central coherence may account for difficulties children with ASD may have initiating, entering, and sustaining social interactions as they struggle to integrate multiple components of others' subtle body language to navigate the conversation in a mutually agreeable direction (Frith, 1989; Frith & Happé, 1994; Janzen, 2003). Weak central coherence theory may also account for insistence on adhering to strict, inflexible, and often unproductive routines by people with ASD (Loth, Gomez, & Happé, 2008).

**Executive Function Theory.** Disrupted attention and memory processes are addressed by weak central coherence theory; however, other atypical executive functions are not. The memory processes of encoding, storing, and retrieving information, as well as processes of attention and problem solving, are traditionally explained in terms of executive functions (Anderson, 2010). Ozonoff, Pennington, and Rogers (1991) presented a theory of executive function deficits to explain differences people with ASD exhibit when processing information.

“I walk into the grocery store. I immediately forget why I’m there. I look around, confused. I check my pockets...and find a list. Relief (Kelter, 2014c).” To remember why he went to the store, Kelter would have to maintain awareness of, and retrieve his goal from working memory (Anderson, 2010). Kelter is diagnosed with Asperger’s syndrome. His difficulty remembering and recalling the reason for his trip to the store may have been due to executive function deficits resulting from his disorder. Executive function can be defined as the ability to solve immediate problems to attain future goals by planning, controlling impulses, inhibiting prepotent but irrelevant responses, organized searching of a problem set, and flexibility of thought and action (Anderson, 2010; Ozonoff, Pennington, & Rogers, 1991). Differences in how individuals with ASD process information across domains may impact how they experience and represent events, and these differences are reminiscent of executive function deficits (Hill, 2004; Loth, Gomez, & Happé, 2008; Ozonoff, Pennington, & Rogers, 1991). Characteristics of this cognitive bias that cause difficulties with social interactions include lack of consideration of the future, failing to consider long-term consequences of immediate behaviors, difficulties self-monitoring and self-reflecting, impulsivity, and difficulties inhibiting responses (Ozonoff, Pennington, & Rogers, 1993, 1991).

Memory, attention, and problem solving are executive functions that appear to be compromised for many children with ASD, thus contributing to difficulties they experience in dynamic social interactions (Anderson, 2010; Gilotty, Kenworthy, Sirian, Black, & Wagner, 2002; Ozonoff, Pennington, & Rogers, 1991, 1993). Social interactions involve rapidly and seamlessly assessing information and responding

appropriately (Gilotty, Kenworthy, Sirian, Black, & Wagner, 2002). Individuals navigating social situations must hold social rules in working memory while selectively attending to subtle cues such as body language, gesture, and vocal intonation to plan their actions in accordance with their personal goals (Gilotty, Kenworthy, Sirian, Black, & Wagner, 2002). Neuroimaging and the results of behavioral research have suggested that some people with ASD show diminished attention to social cues (Klin, Jones, Schultz, Volkmar, & Cohen, 2002a; Klin, Jones, Schultz, Volkmar, & Cohen, 2002b; Loth, Gomez, & Happé, 2008). Presumably related to difficulties with executive functions, when children with ASD learn social rules, those rules may be learned and subsequently executed rigidly and inflexibly without awareness that acting within a range of acceptable social behaviors is permissible (Janzen, 2003). Many children with ASD do not process social information in the same way as their typically developing peers: they may be unable to scan an environment and focus on relevant information and important events when interacting with others, thereby inhibiting their ability to have a shared experience (Janzen, 2003).

**Summary.** Theory of mind (Baron-Cohen, Leslie, & Frith, 1985), weak central coherence (Frith & Happé, 1994), and executive function deficits (Ozonoff, Pennington, & Rogers, 1991) all contribute to aspects of the social differences experienced by people with ASD. As mentioned previously, no one theory fully accounts for social challenges individuals with ASD experience (Frith & Happé, 1994, Ozonoff, Pennington, & Rogers, 1991, 1993). Thus, Goodman (1989) and Ozonoff, Pennington, and Rogers (1991) have suggested that, rather than searching

for one primary cause accounting for all manifestations of the syndrome, in a disorder as complex as ASD it may be better to consider multiple primary deficits causing the variety of differences observed in individuals with ASD (Goodman, 1989; Ozonoff, Pennington, & Rogers, 1991).

Given the difficulties individuals with ASD face in social interactions, clinical interventions for social skills are recommended (Wong, Odom, Hume, Cox, Fettig, Kucharczyk, et al., 2014). A number of assessment tools founded on Theory of Mind, Weak Central Coherence Theory, and Executive Function Theory are currently used to evaluate social skills of individuals with ASD, and many of these tools evaluate these skills via observational reports of specific behaviors (Bowers, Huisinigh, & LoGiudice, 2005, 2007, 2008, 2010; Carrow-Woolfolk, 1999; Constantino & Gruber, 2012; Gresham & Elliott, 2008; Gilliam & Miller, 2006; Kleiman, 2003; Phelps-Terasaki & Phelps-Gunn, 1992). Social skills interventions based on such assessments yield inconsistent results, and generalization of these skills is often poor, especially for adolescents with ASD (McMahon & Solomon, 2015; McMahon, Lerner, & Britton, 2013; Wong et al., 2015). Further, there is a dearth in the literature and a need for research focusing specifically on adolescents with ASD (McMahon & Solomon, 2015; McMahon, Lerner, & Britton, 2013). Thus, a review of tools used for assessing social skills of adolescents with ASD follows.

### **Current Tools Used to Assess Social Skills in Adolescents and their Appropriateness for Use with Adolescents with ASD**

**Language assessment in adolescents with ASD.** Receptive and expressive language abilities are among the most significant predictors of long-term outcomes

for children and adolescents with ASD (Lotter, 1974; Ozonoff, Goodlin-Jones, & Solomon, 2005; Rutter, 1984; Stone & Yoder, 2001). The American Psychological Association (2013) warns that many individuals with ASD have language impairment (e.g., language comprehension behind production), and even those with average or high intelligence have an uneven profile of abilities. Comprehensive assessments of language skills of individuals with ASD administered by certified speech-language pathologists are recommended to profile specific linguistic strengths and weaknesses of each individual (Fillipek et al., 1999; Ozonoff, Goodlin-Jones, & Solomon, 2005). Therefore, the absolute necessity of comprehensive assessment of receptive and expressive language skills of adolescents with ASD cannot be overstated.

Tools used for assessing social skills in adolescents with ASD are considered using the aforementioned categorical delineation from the CDC (2014a-h), which defines adolescents as children aged 12 to 17 years. A number of standardized assessment tools are available that provide clinicians with rating systems or checklists to quantify observable behaviors. Popular standardized assessment tools include the Social Skills Improvement System (SSIS; Gresham & Elliott, 2008), the Pragmatic Language Skills Inventory (PLSI; Gilliam & Miller, 2006), the Social Responsiveness Scale, Second Edition (Constantino & Gruber, 2012), the Social Language Development Test: Adolescent (Bowers, Huisinigh, & LoGiudice, 2008; 2010), the Test of Problem Solving: Adolescent (TOPS; Bowers, Huisinigh, & LoGiudice, 2005; 2007), the Test of Pragmatic Language (TOPL; Phelps-Teraski & Phelps-Gunn, 1992), the Comprehensive Assessment of Spoken Language (CASL;

Carrow-Woolfolk, 1999), and the Functional Communication Profile-Revised (FCP-R; Kleiman, 2003). The review of nonstandardized assessment tools, which are useful for obtaining ecological validity of individuals' abilities in real-world settings and activities (Coelho, Ylvisaker, & Turkstra, 2005), includes Garcia-Winner's (2011) Social Thinking-Communication Profile and Bellini's (2006) Autism Social Skills Profile.

**Standardized assessments.** Standardized assessments are used to compare social skills of children with ASD to their typically developing peers. The Social Skills Improvement System (SSIS; Gresham & Elliott, 2008), Pragmatic Language Skills Inventory (PLSI; Gilliam & Miller, 2006), Social Responsiveness Scale 2 (SRS-2; Constantino & Gruber, 2012), and Functional Communication Profile (FCP-R; Kleiman, 2003) provide administrators with rating scales to compare the frequency of occurrence of specific behaviors between adolescents with ASD and their typically developing peers. The strength of this type of assessment is to provide clinicians and caregivers with a quantitative measure of how the adolescent with ASD compares to their peers in terms of the frequency of their use of expected social behaviors. One may also gain an understanding of what social behaviors may be expected of a child of a given age. Test scores may also be useful in qualifying individuals for services. Such observations of behavior only, however, provide little if any information regarding social cognitive processes of the individual observed. Social skill interventions based solely on assessments of observable behaviors yield inconsistent results, however, and warrant further research into assessments that consider more than observations of discrete behaviors (McMahon & Solomon, 2015;

McMahon, Lerner, & Britton, 2013; Wong et al., 2015). Details of these assessment tools are provided below.

***Social Skills Improvement System (SSIS; Gresham & Elliott, 2008)***. The SSIS is normed for children aged 3 years to 18 years. This tool evaluates social skills, problem behaviors, and academic competence in individuals or small groups. Standardized, norm-referenced scales allow multiple observers to rate the frequency of occurrence of behaviors in the domains of social skills functioning and problem behaviors. There are forms for teachers and parents to assess the frequency of behaviors (e.g., taking turns, arguing, making eye contact, being polite) and emotional states (e.g., anxiety, depression) on a 4-point Likert-type scale with the options: 'almost always,' 'often,' 'seldom,' and 'never' (Gresham & Elliott, 2008). Students being evaluated are able to complete a self-report using a 4-point Likert-type scale with options: 'very true,' 'a lot true,' 'a little true,' and 'not true' (Gresham & Elliott, 2008). Available subscales include evaluation of categories of 'cooperation,' 'assertion,' 'responsibility,' 'empathy,' and 'self-control' (Gresham & Elliott, 2008). Though this tool is not specifically designed for adolescents with autism, the SSIS has a Problem Behaviors scale that rates categories of 'externalizing,' 'bullying,' 'hyperactivity/inattention,' 'internalizing,' and 'autism spectrum.' The 'autism spectrum' subscale rates items such as 'avoiding eye contact' and 'nonfunctional routines' (Gresham & Elliott, 2008). The SSIS provides a method of assessing observable behaviors (e.g., lack of eye contact) and making subjective judgments of emotional states (e.g., anxious) and adolescents' social skills. This observation rating scale's subcategory of 'autism' for rating problem behaviors is

presumably the most appropriate scale of this assessment for rating individuals with ASD based on its design to be more sensitive to those with ASD.

***Pragmatic Language Skills Inventory (PLSI; Gilliam & Miller, 2006).*** The standardized, norm-referenced PLSI is another rating system that measures observable pragmatic communicative behaviors on a nine-point scale. The scale can be completed by teachers and/or parents, and can be used for children aged five-years- to twelve-years, eleven-months-of-age. Thus, this scale would be useful for early adolescence only. Subscales of the PLSI include ‘classroom interaction skills’ (e.g., maintaining topic, using figurative language), ‘social interaction skills’ (e.g., taking turns in conversations, knowing when to talk and knowing when to listen), and ‘personal interaction skills’ (e.g., initiating conversation, using appropriate nonverbal gestures; Gilliam & Miller, 2006). This scale was not designed specifically for individuals with autism, and contains no specific subscale designed with consideration of unique challenges faced by those with ASD in their pragmatic language profiles. Though the PLSI, like the SSIS (Gresham & Elliott, 2008), was not designed specifically for evaluation of individuals with autism, it allows for comparison of the evaluated individual’s frequency of occurring behaviors to age-matched typically developing peers to determine a degree of normalcy of observed behaviors (‘below average’, ‘average’, or ‘above average’). Additionally, this rating scale is appropriate for early adolescents only.

***Social Responsiveness Scale 2 (SRS-2; Constantino & Gruber, 2012).*** The SRS-2 is a quantitative assessment designed specifically for identifying social impairments of individuals with autism. This rating scale has gender-specific forms,

and separate forms that evaluate individuals of the following ages: preschool (parents and/or teachers may evaluate individuals 2.5-4.5 years-of-age), school-aged (4-18 years-of-age), adult (parents, spouses, and/or significant others may evaluate individuals 19+ years-of-age), and a self-report form for individuals 19 years-of-age and older (Constantino & Gruber, 2012). Observed behaviors are rated based on frequency of occurrence using a 4-point Likert-type scale with the options: 'almost always true,' 'often true,' 'sometimes true,' and 'not true' (Constantino & Gruber, 2012). Scores are tallied within the following subscales: Social Awareness, Social Cognition, Social Communication, Social Motivation, and Restricted Interests and Repetitive Behaviors (Constantino & Gruber, 2012). Two additional subscales, Social Communication and Interaction and Restricted Interests and Repetitive Behaviors are compatible with the DSM-5 (American Psychological Association, 2013; Constantino & Gruber, 2012). Standardization, including raw and T-scores, facilitate diagnosing ASD with specified levels of severity: 'normal,' 'mild,' 'moderate,' and 'severe' (Constantino & Gruber, 2012).

***Functional Communication Profile – Revised (FCP-R; Kleiman, 2003).*** The FCP-R compiles information from behavioral observations of teachers, caregivers, and one-to-one testing of an individual with developmental and acquired delays to inventory his or her communication abilities, mode of communication, and degree of independence. The test is normed on individuals aged three years to adult. Subtests cover multiple areas including sensory/motor, attentiveness, receptive language, expressive language, pragmatic/social language, speech, voice, oral, fluency, and non-oral communication (Kleiman, 2003). The pragmatic/social language subtest

assesses communicative intent; questioning skills; conversational skills; turn-taking, topic initiation, maintenance, and elaboration; and appropriateness of communication (Kleiman, 2003).

Other standardized tests provide opportunities for test subjects to demonstrate skills in specific areas, and include the Social Language Development Test: Adolescent (Bowers, Huisingsh, & LoGiudice, 2008, 2010), Test of Problem Solving-2 Adolescent (TOPS-2; Bowers, Huisingsh, & LoGiudice, 2005, 2007), Test of Pragmatic Language (TOPL; Phelps-Terasaki & Phelps-Gunn, 1992), and the Comprehensive Assessment of Spoken Language (CASL; Carrow-Woolfolk, 1999).

***Social Language Development Test: Adolescent (Bowers, Huisingsh, & LoGiudice, 2008, 2010).*** The Social Language Development Test: Adolescent is based on students' linguistic responses to simulated peer interactions, distinguishing its administration from behavioral observations of many other standardized pragmatic assessments (e.g., SSIS, PLSI, SRS-2). This test is normed for individuals aged twelve years to seventeen years, eleven months. The subject's social language abilities are evaluated in the areas of making inferences, interpreting social language, problem solving, social interactions, and interpreting ironic statements (Bowers, Huisingsh, & LoGiudice, 2008, 2010). This test measures age-appropriate skills such as responding to sarcasm, sensitive information, and rumors (ASHA, 2014).

This test is not specifically designed for adolescents with ASD, and therefore may not be sensitive to specific differences of this population. This test is based on the subject's linguistic response to hypothetical situations. The linguistic foundation

of this test may be problematic for subjects with ASD (American Psychological Association, 2013). Therefore, the results may be confounded by potential misunderstandings of test stimuli. Consequently, results may not accurately reflect their pragmatic abilities, and comparison to normed populations should be done with caution.

***Test of Problem Solving-2 Adolescent (TOPS-2; Bowers, Huisingsh, & LoGiudice, 2005, 2007).*** This test is normed on individuals aged twelve years to seventeen years, eleven months. It evaluates how adolescents use language to think, reason, and solve problems, and it includes questions targeting critical thinking skills including clarifying, analyzing, generating solutions, evaluating, and affective thinking (ASHA, 2014). Scores from subtests used to evaluate abilities in making inferences, determining solutions, problem solving, interpreting perspectives, and transferring insights can be interpreted to conceptualize the subject's social abilities related to these areas (Bowers, Huisingsh, & LoGiudice, 2005, 2007).

***Test of Pragmatic Language (TOPL; Phelps-Terasaki & Phelps-Gunn, 1992).*** The TOPL breaks-down pragmatic language skills into six core areas of physical setting, audience, topic, purpose, visual-gestural cues, and abstraction. The TOPL is normed for individuals aged five to twelve years (Phelps-Terasaki & Phelps-Gunn, 1992). Social situations are presented to the child, who is asked to provide an example of what they would do in a given situation. Authors suggest results can be used to identify subjects' pragmatic language strengths and deficits, identify students significantly below peers' pragmatic language skills, and document

subjects' pragmatic language improvement in response to intervention (Phelps-Terasaki & Phelps-Gunn, 1992).

***Comprehensive Assessment of Spoken Language (CASL; Carrow-Woolfolk, 1999).*** The CASL measures language processing skills (comprehension, expression, and retrieval) in four categories: lexical/semantic, syntactic, supralinguistic, and pragmatic language (ASHA, 2014). The CASL is normed on individuals aged three- to twenty-one years, subtests include areas of pragmatic judgment, nonliteral language, inference, ambiguous sentences, and deriving meaning from context (Carrow-Woolfolk, 1999). Though the CASL can be used to assess language abilities in the pragmatic domain for individuals with ASD, the assessment battery is used ideally to evaluate language delays, oral language disorders, dyslexia, and aphasia (Pearson Clinical, 2014).

**Nonstandardized assessments.** Coelho, Ylvisaker, and Turkstra (2005) suggest that nonstandardized procedures serve several purposes. Of those, perhaps the most pertinent to the assessment of social interactions of individuals with ASD are describing performance in the context of real-world settings and activities, and identifying cognitive and communicative demands of relevant, real-world communication contexts. Though assessments of this design are few, Garcia-Winner's (2011) Social Thinking-Social Communication Profile and Bellini's (2006) Autism Social Skills Profile may be used to evaluate social communication abilities of adolescents with ASD in a more flexible, ecologically valid manner.

***Social Thinking-Social Communication Profile (ST-SCP).*** Garcia-Winner (2011) proposes the main goals of professionals who work with young people who

have what she calls Social Communication Learning Challenges (SCLC) are to define key factors of assessment and use that information to develop treatments that help them transition into adulthood and beyond. This process entails examining individuals' social communication learning abilities, considering mental health factors, social developmental level, temperament, and specific likes and dislikes (Garcia-Winner, 2011). The ST-SCP touts a practice-driven theoretical approach and provides six categories for identifying assessed individuals based on their social communicative abilities: 1) significantly challenged social communicator; 2) challenged social communicator; 3) emerging social communicator; 4) nuance challenged social communicator; 5) neurotypical social communicator; and 6) resistant social communicator (Garcia-Winner, 2011). The manner of assessing individuals in order to classify them by their level of social functioning for this profile entails extensive observation of the individual to match him or her to a rather rich, in-depth description of one of the six mentioned categories of social functioning. This test can be used to describe individual differences in communication for people with ASD, although it was not specifically designed for assessing individuals with ASD. Though this nonstandardized assessment provides a more in-depth view of the individual's communication skills, the assessment is still based on subjective opinions of observed behaviors, discounting the social cognitive processes underlying the behaviors observed.

***Autism Social Skills Profile.*** Bellini's (2006) Autism Social Skills Profile is a nonstandardized assessment component of a program called Building Social Relationships (Bellini, 2006). The model provides five steps with the intention of

incorporating multiple strategies to develop an individuals' social skills: 1) assess social functioning; 2) distinguish between skill acquisition and performance deficits; 3) select intervention strategies; 4) implement intervention; and 5) evaluate and monitor progress (Bellini, 2006). The social functioning assessment uses a Likert-type, 4-point rating scale that allows a caregiver to rate the frequency of occurrence of observed behaviors ('very often,' 'often,' 'sometimes,' or 'never') of his or her adolescent with ASD. There is also an option to provide a 'brief description' for the caregiver to provide additional information on the particular skill or behavior (Bellini, 2006). Skill areas upon which the observed individual is rated include, however are not limited to, such items as 'joins in activities with peers,' 'expresses sympathy for others', and 'makes appropriate comments' (Bellini, 2006). Results from the profile can be used to guide implementation of activities included in the program package designed to develop social skills (Bellini, 2006). Though this assessment is not used to compare the individual assessed to a normed population, the premise is still based on observation of behaviors, following suit of the standardized assessments that lack a person-centered approach to investigating individual processes underlying and contributing to observable behavior.

**Summary.** Though these standardized tests provide behavioral observations of the presence or absence of discreet social skills, and in some scenarios provide respondents opportunity to exhibit their abilities to apply various social skills, they provide little if any insight into an individual's cognitive processes underlying the observed behaviors. Just as Skinner's (1957) behavioristic approach to language acquisition is a valid component of a larger system of linguistic development and

use, but is not the sole component of that process, there may be more to an individual's use of pragmatic social interaction skills than solely the observed presence or absence of discreet skills.

The nonstandardized assessment tools, though capable of providing a more flexible approach to assessment, are anchored, much like many of the standardized assessments, by behavioral observations made by external raters. These assessment approaches provide clinicians and caregivers little insight into the unique, internal processes of adolescents with ASD that may contribute to the observed behaviors (or lack thereof). Though it has been theorized that individuals with ASD process information differently than their typically developing peers (Premack & Woodruff, 1978; Baron-Cohen, Leslie, & Frith, 1985; Ozonoff, Pennington, & Rogers, 1991; Frith & Happé, 1994; Flavell, 2004; Hill, 2004; Happé & Frith, 2006), can it be assumed they do indeed use the information they process to construct their realities and interact with their worlds?

There is a dearth in the literature exploring how, from their perspectives, adolescents with ASD process information for the purpose of constructing their unique, individual representations of reality and predicting events. The heterogeneous nature of autistic phenotypes begs for person-centered assessment approaches that can provide a truer perspective of, and from, each individual. Constructivist psychology (Kelly, 1955) provides a unique approach to considering the process by which adolescents with ASD construct their unique realities. The repertory grid, an assessment technique from constructivist psychology, may be able to facilitate a communicative exchange between adolescents with ASD and the

people who serve them that affords an understanding of the construing process of these adolescents from their unique perspectives.

### **Constructivist View of Autism Spectrum Disorder and the Potential Impact of Information Processing Differences on the Development of Personal Constructs**

Constructivist psychology was born from Kelly's (1955) theory of personal constructs, which postulates that individuals construe their very own unique perception of reality through an abstract, hierarchically organized system of constructs. Construing is a way of seeing events that makes them look regular; by construing events it becomes possible to anticipate them (Kelly, 1955). One's construct system provides a variety of rating scales of sorts, which an individual can use to evaluate, understand, and predict people and their actions, situations, and events (Blowers & O'Connor, 1996; Fransella, 2003).

Proctor (2001) suggests that adopting a constructivist approach to studying the thinking and functioning of individuals with ASD may help deepen our understanding of the disorder and help therapists and caregivers of people with ASD. This approach, he believes, may provide a glimpse into the individualized constructions within the minds of those with autism, allowing others to understand and relate to people with ASD in a way that emphasizes their experiential lives (Proctor, 2001). A mother with ASD and two children diagnosed with ASD, reflecting on her experiences with clinical interventions, support Proctor's position:

Autistics are the experts. When I am talking about Autistic life, Autistic people are, hands down, the experts. I understand we have many

professionals that are experts in the *study* of Autism, I know several I respect highly. However, unless they themselves are Autistic, they cannot share our experiences. They cannot tell you, personally, what being Autistic is like because they cannot experience it (Salas, 2014).

Proctor (2001) has applied Kelly's (1955) theory of personal constructs to ASD, and presents Kelly's fundamental postulate and associated corollaries in relation to individuals with ASD.

### **Theory of Personal Constructs.**

***Fundamental Postulate:*** "A person's processes are psychologically channelized by the way he or she anticipates events" (Kelly, 1955, p. 46). This position makes the psychology of personal constructs an anticipatory theory of behavior (Kelly, 1955). There are many possibilities for use of this theory, including anticipating events, situations, and others' behaviors (Kelly, 1955; Fransella, 2003). The process of anticipating others' behaviors includes an individual anticipating what others will do and what others expect him or her to do (Kelly, 1955). In their theory of ASD as a disorder of prediction, Sinha and colleagues (2014) suggest that differences in how people with ASD process information makes it difficult for them to use environmental cues to make predictions. Proctor (2001) stresses the importance of viewing an individual with ASD as a person with consciousness, emotions, and points of view, and notes that, especially in early development, it is unclear whether some children with ASD either (a) do not construe other people as being people (e.g., when using others for means-end purposes; for example, using a

mother's hand to open a bottle), or (b) do indeed construe, however they are unable to communicate what they construe.

**Construction corollary:** "A person anticipates events by construing their replications" (Kelly, 1955, p. 50). People with ASD, says Proctor (2001), exhibit problems anticipating human action – both their own and others' – due to difficulties constructing meaningful interpretations of social communications. Thus, the stereotyped and repeated behaviors of people with ASD may indicate a construct system governed more by concrete constructs covering more predictable actions (routines, desire to repeatedly view the same video, recite movie credits, etc.) rather than psychological constructs anticipating more fluid aspects of human intentions, emotions, and meanings (Proctor, 2001).

Impaired executive functioning (Ozonoff, Pennington, & Rogers, 1991, 1993) could create difficulty in any number of process steps of construing and anticipating events, from making sense of incoming sensory information, holding pieces of events in working memory, transferring events to long-term memory, and accessing those events for anticipating novel events that could be understood using information from past events. Impaired mentalizing, as suggested in Baron-Cohen's (1995) Theory of Mind hypothesis, would make it difficult for someone with ASD to anticipate events involving other people. Difficulty attending to relevant details and tying those details together to create a comprehensive view and understanding of situations as explained by the Weak Central Coherence Theory (Frith, 1989) could further complicate this process of understanding and anticipating events. Sinha and colleagues (2014) show neurological correlates of the deficits implied by these three

theories and suggest those differences at the biological level make the process of predicting difficult for individuals with ASD.

***Individuality corollary:*** “Persons differ from each other in their construction of events” (Kelly, 1955, p.55). It is possible for two people to experience the same events, yet experience those same real events differently because they construe them differently (Kelly, 1955). This difference in construing will cause each person to anticipate the events differently, and, thus, behave differently. An individual with ASD may not comprehend that a person’s experience of an event may differ from his or her own (Janzen, 2003; Proctor, 2001). Further, Proctor (2001) emphasizes the uniqueness of every individual with ASD and cautions that we must be wary of standardized theories and techniques for the person with ASD without considering the individual’s unique position, interests, and tendencies (Proctor, 2001).

***Organization corollary:*** “Each person characteristically evolves, for the convenience in anticipating events, a construction system embracing ordinal relationships between constructs” (Kelly, 1955, p. 56). Construct systems are hierarchically organized, with relationships between overarching constructs (e.g., the concept of ‘cat’) and relative, subsumed constructs (e.g., is furry, has four legs, purrs, etc.). The process of organizing one’s construct system entails constant assessment of the system’s functionality (Kelly, 1955). If some constructs are found to be faulty and not lending to one’s ability to anticipate events and his or her role in those events, the individual must have the courage to modify the system and the introspection to determine how much of the system can be modified while preserving some sense of one’s self constructed by the current system.

Individuals with ASD may struggle in a number of aspects with this corollary. First, and perhaps foremost, the potential difference in linguistic abilities must be considered. The American Psychological Association (2013) cautions that individuals with ASD often have linguistic profiles that include deficits that may not be reflected in, or indicated by, their respective levels of intelligence. Adolescents with ASD, especially those who are higher-functioning, may appear at first-glance to have average or above-average linguistic skills. These individuals are capable of communicating verbally, may be hyperlexic, and appear via conversation to have average or above-average receptive and expressive language skills with pragmatic communication deficits (atypical social communication behaviors, as previously delineated: lack of reciprocal conversational exchanges, atypical visual referencing of their conversational partners, etc.). Language comprehension may lag significantly behind language production for these individuals; therefore, it is absolutely essential to comprehensively evaluate the language skills for individuals with ASD using untimed testing to evaluate each individual's specific language impairments, strengths, and weaknesses (American Psychological Association, 2013).

Weak central coherence (Frith, 1989) and executive function deficits (Ozonoff, Pennington, & Rogers, 1991, 1993) may cause difficulties for a person with autism trying to internally and abstractly organize his or her constructs into a hierarchy, trying to see his or her constructs as they relate to one another and to any given event, situation, or person as a whole (Proctor, 2001). The resulting construct system may be fragmented, lacking an overarching structural composition, and

manifesting behaviorally as restricted areas of interest in which an individual with ASD may become fixated based on the activities' predictability (Proctor, 2001).

***Dichotomy corollary:*** "A person's construction system is composed of a finite number of dichotomous constructs" (Kelly, 1955, p.59). This corollary establishes the nature of constructs as bipolar scales upon which elements (e.g., events, people, situations) are evaluated (Fransella, 2003; Kelly, 1955). Though people may not consciously evaluate elements in a mode of comparing and contrasting (e.g., "This is hard, which means it is not soft."), the act of experiencing anything or any person in one way implies that, whatever the experience ('good'), it is contrasted by the opposite pole of that construct (e.g., 'bad'; Kelly, 1955). Proctor (2001) proposes a potential challenge of this corollary for individuals with ASD could be difficulty with the concepts of 'opposite' or 'different.'

***Choice corollary:*** "A person chooses for himself the alternative in a dichotomized construct through which he anticipates the greater possibility for extension and definition of his system" (Kelly, 1955, 64). Kelly speaks of a person having the opportunity to make an 'elaborative choice,' which could expand his or her construct system if he or she is willing to take some risk. The implied risk is making a choice that allows one to experience the next moment without fully and comfortably anticipating that moment based on one's current construct system. Taking such a risk provides opportunity to elaborate and expand one's construct system, thereby broadening the system's predictive range. Choosing not to take such a risk may make one's construct system even more concrete, moving in the direction of definition rather than in the direction of extension as expressed in the corollary's

original semantics (Proctor, 2001). A potential challenge for individuals with ASD with making choices to define or extend their construct system lies in the potential lack of hierarchical structures for their systems (Proctor, 2001). Impaired structural organization of super- and subordinate constructs may result in difficulty understanding the concept of 'choice,' and may manifest restriction in the breadth of choices to more concrete, sensory dimensions, and creating significant difficulty making choices of how to construe others and choosing appropriate actions in the social domain (Proctor, 2001).

***Range corollary:*** "A construct is convenient for the anticipation of a finite range of events only" (Kelly, 1955, p. 68). Any given construct has a 'range of convenience' within which elements can be evaluated (Kelly, 1955). It is vitally important to understand what an individual qualifies at both poles of any given construct, not just at one end: for instance, without understanding how an individual construes 'unhelpful,' one cannot fully understand what is construed as 'helpful,' nor can they begin to comprehend the scope of applicability of the construct. Thus, contrast is an essential feature of all constructs as their meaning depends on it. Constructs of individuals with ASD may have limited ranges of convenience, contributing to their restricted repertoires of interest, preference for sameness (perhaps more defining of their construct systems), and difficulty with change (perhaps fearing to extend their construct systems; Proctor, 2001). This may imply insistence on very narrow ranges of constructs to define objects, people, and actions, and would narrow the range of differences in people's personality traits that could be subsumed by their constructs. If the range of personal construct

systems of those with ASD are too restricted, people they encounter whose personalities fall outside that range would be difficult, if not impossible, to understand. This would make anticipating how these others might behave in social situations near impossible. Such a construct system would not be useful for understanding and anticipating actions of people outside the system's range of convenience.

***Experience corollary:*** "A person's construction system varies as he successively construes the replication of events" (Kelly, 1955, p. 72). The succession of events in the course of time continually subjects one's construct system to a process of validation (Kelly, 1955). Essentially, an individual applies his or her construct system to any given event and revises the system based upon their success or lack thereof with anticipating the unfolding of the event using the current system. Experience, then, is key to the evolution, expansion, and refinement of one's construct system. It can be difficult for individuals with ASD to reflect on their own experiences and use them to modify their construct systems (Proctor, 2001). Additionally, it stands to reason that limited experiences in given domains that challenge people with ASD (e.g., social interaction; Janzen, 2003) would further hinder development of constructs in that domain since the major source of experience, reciprocal social interaction, would be inaccessible or impaired (Proctor, 2001). Lack of experience stifles growth and expansion of the individual's constructs, which limits the people and events that can be understood and anticipated by the construct system, which further limits the situations in which the person can successfully interact. This starts and continues a cycle of potential

avoidance of difficult situations and lack of experience successfully negotiating the situations, which leads to further avoidance, etc.

***Modulation corollary:*** “The variation in a person’s construction system is limited by the permeability of the constructs within whose range of convenience the variants lie” (Kelly, 1955, p. 77). A construct is permeable if its range of convenience can be modified to encompass new elements which are not yet construed within its framework, adding new events to those the construct already embraces (Kelly, 1955). As mentioned in the experience corollary, limited reciprocal social interaction reduces experiences necessary to evolve constructs in that domain. This lack of experience and revision of constructs may also result in decreased permeability, restricting the amount of change and variation possible in the development of the autistic construct system (Proctor, 2001). A person’s superordinate constructs must have some degree of permeability to allow for tolerance of inevitable inconsistencies with the day’s events and his or her constructions of those events. Otherwise, as the person’s constructions fail to provide sufficient consistency in anticipating events, the individual must resort to a more primitive and less effective system (Kelly, 1955).

***Fragmentation corollary:*** “A person may successively employ a variety of construction subsystems which are inferentially incompatible with each other” (Kelly, 1955, p. 83). A person is constantly modifying his or her construct system; however, the modified and/or new constructs are not necessarily direct derivatives of existing constructs (Kelly, 1955). This corollary attempts to explain individuals’ behaviors that sometimes run contradictorily to their overarching, superordinate

constructs. Proctor (2001) discusses lack of integration, or scattering, of autistic behaviors in light of this corollary, referring to Frith's (1989) weak central coherence theory. Construct systems of individuals with ASD, Proctor maintains, may be even more dramatically and extensively fragmented than typically developing individuals due to difficulties establishing superordinate construction to tie together features into coherent wholes.

***Commonality corollary:*** "To the extent that one person employs a construction of experience which is similar to that employed by another, his psychological processes are similar to those of the other person (Kelly, 1955, p. 90)." Here, Kelly (1955) asserts the way people construe events determines their experience of and behaviors in and around those events; so, in the case that two or more individuals share similar experiences of a given event, it can be assumed that their processes of construing that event are similar. Proctor (2001) urges us to consider what people with ASD have in common with all people: they are people trying to make sense of themselves and the rest of the world – people who experience emotions and need love and often approval and validation.

The degree of inconsistency between one's self-construction and the construction of others, termed interpersonal isolation by Cipolletta (2011), may indicate the individual having awareness he or she is unlike anyone he or she knows, and may be observed by the individual representing him-or herself as being alone. This separation of oneself from others may prevent one from sharing thoughts, feelings, and behaviors with others, leaving one with no basis for personal-social interaction (Cipolletta, 2011; Norris & Makhoul-Norris, 1976).

***Sociality corollary:*** “To the extent that one person construes the construction process of another, he may play a role in a social process involving the other person” (Kelly, 1955, p. 95). In order to play a constructive role in a person’s social process, one must have an acceptance of the other’s way of seeing things (Kelly, 1955). This corollary is reminiscent of Premack & Woodruff’s (1978) theory of mind, & Baron-Cohen, Leslie, & Frith’s (1985) application of that theory to individuals with ASD. If we can predict accurately what others will do, we can adjust ourselves to their behavior (Kelly, 1955).

Difficulties understanding others’ viewpoints, feelings, and experiences present significant consequences, especially socially, for individuals with ASD (Baron-Cohen, 1995; Proctor, 2001; Janzen, 2003). These difficulties present significant challenges for this corollary: without being able to understand the social processes of another, it becomes very difficult – or even impossible – to be part of that person’s social world. This is a significant challenge faced by those with ASD. Though, as mentioned previously by Proctor (2001), it is unclear given what little is known about personal constructs of those with ASD whether these individuals do not construe other people as do typically developing individuals, or whether they do indeed construe others similarly but are unable to access that system and use it to communicate effectively.

**Summary.** A personal construct system provides individuals with a structure and process for making sense of other people, understanding their social worlds, and anticipating the ways in which people may behave in social settings. This constructivist view considers the prominent theories of ASD together from the

perspective of difficulty of prediction. Impairments in theory of mind (Baron-Cohen, Leslie, & Frith, 1985; Premack & Woodruff, 1978) make it difficult to consider others' perspectives, which would create difficulty understanding their behaviors, and further difficulty anticipating future behaviors. Executive function deficits (Ozonoff, Pennington, & Rogers, 1991) cause a multitude of any range of difficulties from focusing on relevant information (e.g., social cues) given by other people, remembering details or important components of social events, storing and retrieving that information, social problem solving and more. A system of executive functioning that processes information differently from typical individuals would make it difficult to construe shared situations similarly with others, thus potentially creating a different experience and resulting in challenges anticipating similar future events. The inability to tie all the pieces of other people, their views, and their behaviors together to create a holistic picture as a result of weak central coherence (Frith, 1989) would further complicate the process of anticipating others. Additionally, individuals with ASD seem to have a 'heirarchisation deficit,' which entails difficulty forming ordinal relationships between constructs (Mottron, Belleville, & Ménard, 1999; Proctor, 1999).

In sum, these differences in functioning can be considered from the perspective of the difficulties they may create in understanding others and anticipating their social behaviors (Sinha et al., 2015). These differences may also make the construction, revision, and use of a hierarchically organized system of personal constructs difficult for persons with ASD (Proctor, 2001). The truth of this presumption, or lack thereof, however, is largely unexplored. Proctor (1978, 1985,

1996, 2001) suggests it is possible to explore construct systems of individuals with ASD, including measures of interpersonal empathy and sociality, using an assessment tool called the repertory grid.

**Development and theoretical background of repertory grids.** The repertory grid was designed as an instrument for eliciting personal constructs and was originally called the role construct repertory test (Kelly, 1955). The test was initially aimed at role constructs: constructs an individual has regarding people in their social lives. This assessment underpins Kelly's fundamental postulate: 'a person's processes are psychologically channelized by the ways in which he anticipates events' (Kelly, 1955, p. 46), and eventually became known as the repertory grid (Fransella, 2003). The *ways* mentioned in Kelly's fundamental postulate are the constructs of the repertory grid, and the *events* are the elements. The technique of the repertory grid is to establish a set of elements (which may be provided by the clinician or elicited from the client) pertinent to the individual, elicit constructs that distinguish among the elements, and relate the elements to the constructs (Fransella, 2003).

Repertory grids should always be constructed on the foundation of what is meaningful to the client – this is a client-driven assessment facilitated with support from the clinician (Blowers & O'Connor, 1996). The repertory grid is flexible in its application: the domains selected for evaluation (e.g., people, places, events) may be elicited from the individual being assessed, or they may be provided by the clinician assessing the individual to gain insight into constructs regarding a specific domain (Blowers & O'Connor, 1996). When working with a client to create a repertory grid,

it is vital to assess the client's meaning and the clinician's understanding of the constructs. Remembering Kelly's individuality corollary reminds one that sharing a common language does not equate to sharing precise meanings for the same words (Blowers & O'Connor, 1996). Kelly (1955) describes the importance of purpose and utility of assessments:

The first function of a test which is to be used in a clinical setting is to define the client's problem in usable terms. It is not enough for a test to be "valid"; it must be "valid for something." A test which does not define a client's problem in a way which helps the clinician to deal effectively with him is not valid for clinical usage, no matter how highly it correlates with certain "external criteria." This principal is an application of the construct approach to psychodiagnosis, in contrast with the entity approach. Usability, rather than accuracy, per se, is the minimum standard of a good clinical test. One might even argue that usability is a good operational definition of accuracy. Such an argument would make sense in terms of our philosophical position (Kelly, 1955).

The repertory grid provides a framework to investigate the respondent's internal processes while providing him or her freedom of choice from limited questionnaires and standardized instruments that may not allow the individual to tap into a deeper understanding of his or her problems (Fransella & Bannister, 1977; Ijaz & Mahmood, 2012). This flexibility of repertory grid assessments allows for a better view of an individual's unique construing processes (Blowers & O'Connor, 1996).

There are multiple ways to analyze data of repertory grids. The foundational examination of the structure of a grid, and thus the structure of one's personal construing system, is the relationship between pairs of constructs (Fransella, 2003). These relationships are usually measured by simple correlations or other measures of associations (Fransella, 2003; Shaw, 1980). There is a long-standing process of summarizing indices of association between constructs known as 'cognitive simplicity-complexity' (Burlison & Caplan, 1998; Fransella, 2003;). Though psychometric components of repertory grid tests have been questioned (Jackson & Paunonen, 1981; Neimeyer, 1985), it appears that test-retest correlations have been found upwards of 0.80 on a number of grid measures when subjects choose their own rating schemes (Caputi & Keynes, 2001; Feixas, Moliner, Montes, Mari, & Neimeyer, 1992; Lohaus, 1986). With respect to assessment of construct structure, repertory grids have been found to demonstrate convergent validity (Dempsey & Neimeyer, 1995; Fransella, 2003). The elements may provide qualitative information while the relationships between the constructs and elements may be interpreted as quantitative data (Fransella, 2003). When analyses of grid data focuses on quantitative data in the grid, the grid can be analyzed at univariate, bivariate, and multivariate levels depending on the kinds of questions an inquirer has about the respondent's psychological processes represented by the grid (Bell, 2000; Fransella, 2003).

A concern for use of personal constructs in a repertory grid is whether they should be elicited from the respondent or supplied by the clinician (Fransella, 2003). In reviews of studies using repertory grids (Adams-Weber, 1970; Fransella,

2003) the personal constructs supplied by the respondents afforded significantly higher inferential accuracy than those based on constructs supplied by the grid administrator when participants had to make inferences about others. Dalton (1996) suggested that, when attempting to understand young people's construing, investigators must suspend their own construing to attempt to see the world through the respondents' eyes. Otherwise, one may erroneously impose their own personal meanings and constructs on the participants (Dalton, 1996).

The focus of the repertory grid in many practical, applied situations is on the nature of the personal constructs, and these constructs are used as qualitative data (Fransella, 2003). Initially, Kelly (1955) suggested that elements, when related to the constructs, would lie extremely at one pole or the other – otherwise, the element could be considered as not residing within the construct's range of convenience (Fransella, 2003). This, however, created difficulty for some subsequent analyses of grid data and has since been modified, allowing elements to fall along a range between the poles of a given construct (Fransella, 2003). Landfield (1971, 1977), Fransella and Bannister (1977), and Krosnick (1999) have facilitated over time the evolution of a ranking system (the most popular being a scale of 1 to 7) that can be applied to constructs providing flexibility in relating elements to the constructs.

Kelly (1955) originally presented multiple triadic methods of eliciting constructs. His 'maximum context' form, in which the respondent is presented with three elements and asked how two of the elements are alike in some way, and how the third element differs from the way in which the two others are alike, is perhaps the most influential elicitation method (Fransella, 2003). Another method called the

'dyadic method' compares or contrasts two elements from one another by asking the respondent how the elements are similar or different from one another (Fransella, 2003). This method may be useful in instances where applying the maximum context triadic method mentioned above proves excessively difficult for the respondent (Fransella, 2003; Hare, Jones, & Paine, 1999).

Kelly (1955) asserted that individuals understand themselves to the degree they understand others. Jackson and Bannister (1985) found in their studies using repertory grids and self-characterizations that children's construing of themselves and their peers confirmed Kelly's (1955) assertion. Dalton (1996) found younger children using fewer, more concrete constructs in their construing processes. With age, however, children's constructs become more psychological in nature, increasingly complex, discriminatory, and logically consistent (Winter, 1992).

**Use of repertory grids with typically developing adolescents.** Use of repertory grids with adolescents has focused primarily on better understanding the nature of phenomena from the unique perspectives of individual experiencers (Ijaz & Mahmood, 2012; Ravenette, 1990). In a case study of an adolescent, A. B., who ran away from home, Ijaz and Mahmood (2012) used the repertory grid assessment technique to explore the young person's perceptions of significant people in his life, his construction of his relationships with them, and how his construction of those relationships contributed to his runaway behavior. An individual's cognitions, they posited, are not formed in a vacuum – they are probably influenced by a number of cultural and contextual factors (Ijaz & Mahmood, 2012). The individual they worked with was from Pakistan, a collectivistic culture in which religious values are

practiced in all walks of life, and where adolescent friendships outside the authoritarian parenting establishment are considered gateways to deviant and problematic behaviors (Cheung, Liu, & Lee, 2005; Ijaz & Mahmood, 2012). The case study was rich in description of A. B. in the areas of physical description, life experiences, familial relationships, academic and social history, and childhood memories associated with previous attempts to run away (Ijaz & Mahmood, 2012). Ironically, some of the foundational cultural beliefs of A. B.'s household were found to contribute significantly to his runaway behaviors, especially the parents' views of his friendships.

The triadic, 'maximum context' method mentioned above (Fransella, 2003; Kelly, 1955) was employed in this study. Ijaz and Mahmood (2012) mention one of the study's goals of exploring the applicability of the grid technique with children, and they observed the client responding well to the technique. Elements and constructs were elicited from the A. B. rather than being provided by the clinicians. His construction system revealed a number of factors contributing to his decision to run away rather than a single variable, and these results emphasized the need to consider multiple personal constructs and their relationships when seeking a better understanding of the nature of behaviors in adolescents (Ijaz & Mahmood, 2012).

Dalton (1996) suggested that young people's construing may be difficult if their feelings are threatening or too confusing to verbalize, and further suggests clinicians should clarify participants' meanings of constructs, perhaps through non-verbal means (e.g., drawing, describing pictures). Ravenette (1990) introduced a technique called "the elaboration of a line and the elicitation of its opposite," in

which he drew a curved line on a page and asked the child to turn the line into a picture, then draw another picture representing the first picture's opposite. He documented successful interventions with a 14-year-old girl using this technique to elicit constructs around her refusal to attend school, and with an 8-year-old girl to elicit constructs around her interpersonal relationships with family and educators who were concerned about her lack of interaction with others (Ravenette, 1990).

**Use of repertory grids with adolescents with ASD.** Literature exploring the use of repertory grids with adolescents with ASD is sparse. Proctor (1999, 2001) reports on his experiences working with families with children with ASD. He notes the use of repertory grids for eliciting personal constructs of individuals with ASD may reveal where the person's thinking falls short of being useful for anticipating and participating in any number of events. Hare, Jones, and Paine (1999) suggest repertory grids, with their formal structure, external cues, order and sequence, are especially well suited for use with people with ASD. Proctor (1999) suggests the use of perceiver-element grids (PEG; Proctor, 1996) may be useful in investigating interpersonal interactions between an individual and members of a group. The PEG lists group members down the side as perceivers, and along the top as perceived; each member of the group describes all members along the rows (Proctor, 2002). These grids are qualitative as opposed to using rating, raking, and other numerical methods, and descriptions used in the grid may contain words, phrases, and/or pictures.

Proctor (1999) used the PEG when working with a 13-year-old boy with Asperger's to explore his relationships with his family members. He notes the

usefulness of the grid to visually depict conversation in the form of a structured diagram that can be used to encourage social discourse (Proctor, 1999). Proctor (1999) further suggests using grids with the individual and his or her family members to establish, understand, and work with their unique family construct systems as opposed to imposing the clinician's framework upon them. Though it can be difficult to improve the ability of a child with ASD to consider others' perspectives, even with the use of PEGs, the grids may still help members of the family or group better understand where the young person with ASD is having difficulties (Proctor, 2002). Proctor further suggests the use of pictures for grids is often more helpful than verbal explanations alone.

Though the literature exploring the use of repertory grids with adolescents with ASD is scant, Hare, Jones, and Paine (1999) used repertory grids with four adult males with Asperger's syndrome, ranging in age from 23 to 36 years, to demonstrate usefulness of this assessment approach with this population. In a multiple case study design, a therapist asked each individual to write (or the therapist would write in the case that the individual did not want to write) the names of important people their lives on separate blank notecards, and also 'how (the individual) is' (investigating the individual's perception of their current self), and 'how (the individual) would like to be' (exploring the individual's constructs of his ideal self), to elicit each individual's elements.

To elicit constructs, the dyadic (comparing/contrasting two elements), triadic (comparing contrasting two elements with a third element), and/or self-characterization methods (asking the person to describe himself in the third person

and using his descriptors as constructs) were used (Hare, Jones, & Paine, 1999). The client was then asked what the opposite of each elicited construct would be to establish construct poles and provide a basis for rating elements along the constructs. Each participant was asked to provide further behavioral descriptions of each construct pole to confirm their unique understanding of their constructs (e.g., a description of 'nice' entailed 'makes you a cup of tea'). Constructs were then presented as visual analogues – a sort of pictorial scale (Dagnan & Ruddick, 1995) – on which participants ranked elements (Hare, Jones, & Paine, 1999). Prior attempts at assessment and/or interventions had failed for many of these individuals. Repertory grid assessment in these studies provided researchers with participants' personal perspectives, facilitated better understanding of their needs and internal processes, and guided recommendations and directions for further therapeutic interventions (Hare, Jones, & Paine, 1999).

**Summary.** Kelly's theory of personal constructs provides a model of human beings as active constructors of their respective worlds (Blowers & O'Connor, 1996). It appears from the limited literature exploring personal constructs of people with ASD that some of these individuals do indeed construct, make sense of, and anticipate their realities using psychological processes described by Kelly (1955). Further, use of the repertory grid assessment technique may provide practitioners with insight into the interpersonal construing processes of individuals with ASD direct from the source. Considering their social lives from their perspectives may potentially inform the construction and implementation of individualized support

services for people with ASD. An individual with ASD stresses the importance of person-centered intervention that considers individual uniqueness:

As a kid on the spectrum, I received a lot of pressure to blend in and hide differences. When you are young and traits that are part of who you are receive negative reactions from people – especially from parents and teachers – it can very quickly erode your sense of confidence and well being. Interventions aimed at hiding...interventions that establish a goal of blending in: ultimately, these devalue individuals and do more harm than good. I'm not saying that therapies and supports are bad; I've just learned that they work best when they are based on respect for a person's unique personality and way of being (Kelter, 2014b).

Wing (1980) emphasized the importance of trying to see the world from the point of view of an individual with ASD so the “adaptive function of peculiar behaviors (could) be understood in the context of his or her challenges.” The repertory grid may be one of the first assessment tools potentially affording clinicians a glimpse into the internal constructive processes of individuals with ASD, a first-step in seeing the world through their eyes, which may in turn allow practitioners to work with this population in a more conscious, person-centered manner.

### **Interpersonal Cognitive Complexity**

The richness of social cognition and how we think about ourselves and other people have been described in the communication literature as cognitive complexity (Burlison & Caplan, 1998). Cognitive complexity can be conceptualized as an individual difference variable indicative of the differentiation, articulation, and

integration of an individual's personal constructs in a given domain. Being domain specific, interpersonal cognitive complexity is discussed when considering the domain of social cognition. As an index of social-information processing, interpersonal cognitive complexity has been positively associated with functional communication skills, person-centered communication, persuasive communication abilities, and perspective taking abilities (Burleson & Caplan, 1998; Burleson, Delia, & Applegate, 1995). Further, interpersonal cognitive complexity may be presumed to underlie all social perception processes and predict effective social communicative interactions.

Many theorists have asserted that the manner in which parents interact with their children may be the most predictive factor in the child's development and expression of social skills (Burleson, Delia, & Applegate, 1995). Indeed, in a review of multiple studies investigating the relationship between parenting style and the acquisition of children's functional communication skills, Burleson, Delia, and Applegate (1995) found person-centered parenting styles were positively and significantly correlated with parents' levels of interpersonal cognitive complexity. Person-centered parenting styles were considered inclusive modes of communication, and found to facilitate children's development of socially complex orientations and constructs, and the use of more person-centered communication with peers. Person-centered communication has been associated with the development of fulfilling peer relationships throughout childhood and adolescence (Burleson, Delia, & Applegate, 1995).

Delia, Kline, and Burleson (1979) investigated the development of interpersonal cognitive complexity and its relationship to persuasive communication skills, investigating these skills in 200 kindergarten through twelfth grade students. Students first completed a peer perception task (essentially the RCQ) in which they described a liked and disliked peer. Second, they role-played two scenarios with the investigator. First, they were to imagine the investigator was their mother, and they were to attempt to persuade her to allow them to have an overnight birthday party. In the second scenario, they were to imagine the investigator was a stranger, and they were to attempt to persuade her to adopt a puppy they had found. Students' responses were rated for person-centered persuasiveness using the following levels: lowest level: students showed no awareness of the other's point of view; second level: students showed some awareness of the other's point of view; however, did nothing to overtly adjust their message in light of their awareness; third level: students were aware of the other's point of view, and prepared counterarguments for potential refutations from the other; fourth level: students were aware of the other's point of view, and provided advantages to the other for acceding to their request.

Results indicated students' arguments became increasingly more persuasive with age. They described the trend as monotonic with exception to a significantly larger increase from first to second grades, and a slight decline from seventh to eighth grade. Investigators suspect the decline seen from seventh to eighth grade was related to the emergence of Piaget's (1967) formal operations stage of development, the emergence of puberty, and subsequent egocentricity and

preoperational behaviors, which made taking others' perspectives more difficult for the students during that time. Correlational analyses revealed that age, construct differentiation (as measured by the RCQ), and construct abstractness (also measured by the RCQ) were all significantly and positively correlated with the persuasive efficacy of students' messages. Additionally, with age partialled out, construct differentiation and construct abstractness were significantly and positively associated with the persuasive efficacy of students' messages. This research supports the assertion that interpersonal cognitive complexity has developmental roots, is related to individuals' ability to consider others' perspectives and adjust their communicative messages in light of those perspectives in attempts to persuade others, and that these abilities become more refined with age.

### **Development and theoretical background of the Role Category**

**Questionnaire.** The Role Category Questionnaire (RCQ; Crocket, 1965) is the most commonly used tool to evaluate interpersonal cognitive complexity, demonstrating for over 30 years superior validity and reliability above other instruments on this measure (Burleson & Caplan, 1998). Additionally, the RCQ has been found repeatedly to be unaffected by potentially confounding factors such as general intelligence, verbal intelligence, loquacity, verbal fluency, and narrative writing skills (Burleson & Caplan, 1998). Administration of the RCQ entails requesting a respondent to describe a liked peer and a disliked peer. The respondent is timed in providing the response. Using a codebook, constructs provided in the respondent's answers are coded and tallied by trained individuals. The total of tallied constructs

is considered a measure of interpersonal cognitive complexity. It should be noted that the RCQ is not meant to exhaustively elicit all interpersonal constructs of a respondent; rather, the provided constructs are considered a representative sample of the respondent's interpersonal construct system in its entirety. The higher the score on the RCQ, the more interpersonal cognitive complexity an individual is considered to have (Burlison & Caplan, 1998; Crockett, 1965). Data taken from Kelly's (1955) repertory grid can also be used to measure an individual's cognitive complexity. Data from the repertory grid can be analyzed at the univariate, bivariate, and factorial levels (Fransella, 2003). Computer programs, such as OMNIGRID and GRIDSTAT can analyze repertory grid data, conducting correlational and factorial analyses as measures of cognitive complexity.

**Use of the Role Category Questionnaire with typically developing adolescents.** In a study by Zhang, Xin, and Lin (2012), adolescents completed both the RCQ and the repertory grid to evaluate their levels of cognitive complexity and the relationships between cognitive complexity and age, peer relationships, and academic success. The *H*-statistic, a measure of cognitive complexity taken from the respondent's grouping patterns of elements, was also computed. Constructs in the repertory grid were preselected by investigators, and each construct was presented on a rating scale of 1-6. Participants rated elements along the scales of preselected constructs. Participants' responses were tallied from the scales, and data was entered into GRIDSTAT, which conducted correlational, factorial, and conflict analyses. Zhang, Xin, and Lin noted the RCQ scores were sensitive to, and significantly correlated with, participants' age, peer relationships, and academic

success, but the measures computed from the repertory grids and *H*-statistic were not. It should be noted that, in other studies, use of repertory grids in which constructs are provided by investigators rather than elicited from participants have resulted in poorer use of constructs for person perception by research participants (Blowers & O'Connor, 1996).

The average number of constructs produced by respondents on the RCQ was 10.71. The effect of gender was significant on the number of constructs produced, with males averaging 9 interpersonal constructs, and females averaging 12 interpersonal constructs. Consistent with findings of Delia, Kline, and Burleson (1979) and assertions from multiple studies reviewed by Burleson and Caplan (1998), researchers found that adolescents' constructs became more differentiated and abstract as grade level increased, averaging 8 interpersonal constructs for seventh graders, 9 for eighth and ninth graders, 11 for tenth graders, and 16 for eleventh graders. Investigators suggest the stagnation in interpersonal construct development between eight and ninth grades may be related to egocentrism subsequent to puberty, as did Delia, Kline, and Burleson (1979).

**Effects of adolescent development on social cognition.** Few studies have investigated the effects of adolescent development on social cognition (Blakemore & Choudhury, 2006; Paus, 2005). What little is known about this developmental period suggests that adolescents undergo changes in identity, self-consciousness, and cognitive flexibility linked to cortical development during this time of life (Blakemore & Choudhury, 2006; Rutter & Rutter, 1993). The frontal lobe has been indicated in many cognitive and emotional capacities that develop throughout

childhood, adolescence, and beyond (Stuss & Levine, 2002; Rosso & Yurgelun-Todd, 2004). The prefrontal cortex, which undergoes a process of neural pruning and maturation during adolescence, is indicated in higher-level cognitive abilities, including theory of mind and self-awareness (Ochsner, 2004; Frith & Frith, 2003; Frith, 2001). As children transition into adolescence, this cortical growth facilitates increased capacity to consider others in more abstract than concrete terms (Anderson et al., 2001; Klenberg, Korkman, & Lahti-Nuutila, 2001; Levin et al., 1991; Luciana & Nelson, 1998; Spear, 2000; Williams et al., 1999). Though the study of the effects of adolescence on social cognition is in its infancy, cortical changes during this period are linked to these abilities can be expected to result in changes in social cognition of adolescents (Blakemore & Choudhury, 2006).

**Use of the Role Category Questionnaire with adolescents with ASD.** The literature exploring the use of repertory grids with children diagnosed with ASD is sparse, and there is no known literature exploring the use of the RCQ with these individuals. Proctor (2001, 2000, 1999), in his work with families with children with ASD, has used a modified version of Kelly's (1955) repertory grid called the person perception grid. Using this grid, each member of the family is listed down the side (as a perceiver) and across the top (as perceived; **Figure 1**).

	Mom	Dad	Dahlia	Shad (has ASD)
Shad (has ASD)	Helps me			I'm very smart
Dahlia				
Mom				
Dad		Keeps the order & brings home the bacon		I often don't understand why he gets mad

**Figure 1:** Person Perception Grid

Proctor (1999, 2000, 2001) suggests that use of such grids can help stimulate and regulate communication between families of children with ASD and their child. Though it is often difficult for individuals with ASD to consider the perspectives of others and infer their thoughts and beliefs due to impaired theory of mind (Baron-Cohen, 1995), Proctor asserts that such a grid as the one depicted in Figure 1 can be helpful in facilitating communication for the child with ASD, especially with the use

of tacit construing (Blowers & O'Connor, 1996) as seen in Figure 1 by the pictures in place of words. Such grids have been found to be helpful, too, in affording families of children with ASD deeper understanding of their child(ren) with ASD (Proctor, 2001, 2000, 1999).

Hare, Jones, and Paine (1999), in their work with adults with Asperger syndrome found that modified versions of repertory grids could be used to elicit interpersonal constructs of participants. Using a qualitative, multiple case study design, investigators were able to gain a deeper understanding of individuals with Asperger's who exhibited complex behavioral challenges that proved resistant to multiple previous therapeutic interventions. The participants' constructs were used to determine more effective, person-centered future interventions using an interprofessional approach. Academic literature exploring interpersonal cognitive complexity of individuals with ASD does not currently exist. Considering the well-documented association between interpersonal cognitive complexity and person perception, perspective taking, peer relationships, social perception and social communication (Burlison & Caplan, 1998; Burlison, Delia, & Applegate, 1995; Delia, Kline, & Burlison, 1979), it stands to reason that an index of interpersonal cognitive complexity could provide a novel measurement of these skills and domains for individuals with ASD that may be potentially useful in diagnosis and treatment.

**Summary.** An individual's interpersonal construct system determines how he or she interprets and predicts others' behaviors (Kelly, 1955), which allows one to navigate varied social interactions. Little is known about the social cognitive development of adolescents, and even less is known about construct systems of

adolescents with ASD. The repertory grid may be used as a tool to better understand people and social interactions from the perspectives of adolescents with ASD. It can be difficult for individuals with ASD to express their thoughts and feelings about other people and social situations using conversational discourse and written narrative. The repertory grid, with its flexibility – especially in the use of tacit construing methods (e.g., pictures, drawings, pictorial representations, etc.) – has potential to assist individuals with ASD in communicating their inner beliefs and feelings related to people and the social world. Additionally, if used by all individuals in a group setting (which is oft the setting for social skill interventions), it may help individuals with ASD consider others’ perspectives to exchange and view repertory grids with peers. Further, given the allure of structured, concrete operational systems for people with ASD, such exchanges and exploration of one’s own and others’ personal constructs could potentially aid development of the abstract theory of mind in a more concrete, systematic fashion.

The process of creating a repertory grid with adolescents with ASD may need to be modified in light of their information processing differences. Modifications to the process of creating a grid for adolescents with ASD will be done using evidence-based practices for providing visually structured support. The evidence base supporting these modifications comes from the Treatment and Education of Autistic and other related Communication handicapped CHildren (TEACCH) program (Shopler, 1971).

## **Structured Teaching**

Dr. Eric Shopler founded the Treatment and Education of Autistic and other related Communication handicapped CHildren (TEACCH) program in 1971. A primary aim of TEACCH is to develop and promote understanding of individuals with ASD and provide assessments and supports designed around each individual's strengths, skills, interests, and needs (University of North Carolina School of Medicine, 2014). Structured teaching is a core component of this program. Goals of structured teaching include providing meaning and understanding within the individual's environment and eliminating irrelevant stimuli to help the individual focus on relevant information to facilitate learning.

Elements of structure in this process include visually structuring tasks and providing work systems for individuals with ASD. The proposed process of creating participants' repertory grids for this project include a number of visually structured scaffolds under the premise of this evidence-based approach to supporting individuals with ASD. Visually structured tasks help people with ASD compensate for their challenges with abstract conceptualization by incorporating concrete visual cues into the tasks, thereby allowing these individuals to combine and organize a series of steps (e.g., establishing construct scales) to achieve a desired outcome (creation of a repertory grid; University of North Carolina School of Medicine, 2014).

Individuals with ASD often struggle with concepts of time and the temporal flow of events and information, with particular challenges recognizing when events and processes begin and end (Janzen, 2003). Work systems provide individuals with ASD a clear, systematic, and visual representation of a process; specifically: what

work there is to do, how much work there is to do, how to know when they are finished, and what they will do next (University of North Carolina School of Medicine, 2014).

### **Ethical Considerations of Research Involving Adolescents with ASD**

Stress, anxiety, and depression are frequently comorbid conditions of individuals with ASD (Paxton & Estay, 2007). Further, it can be difficult for individuals with ASD to recognize these emotions and explore them externally. Rates of depression in the general public range, on average, between 2% and 3% for males and between 4% and 9% for females. Rates of depression for individuals with ASD have been reported as high as 52%. Anxiety may be the most universally comorbid condition for individuals with ASD, with rates as high as 84% in this population (Paxton & Estay, 2007). Worrying, non-situational anxiety, panic, specific fears, and hypochondriasis are commonly reported by young people with high-functioning ASD and Asperger's syndrome (prior to publication of the DSM-5; Sofronoff et al., 2005). The social difficulties people with ASD often experience often leads to social anxiety, which leads to social phobia, and ultimately social avoidance (Atwood, 2003).

Paxton and Estay (2007) mention the difficulty individuals with ASD may experience in recognizing their internal emotional states and their ability to externalize those states linguistically with others. This is particularly concerning in consideration of the proposed research as it is possible that eliciting participants' constructs regarding disliked peers (which is a component of the research methods) may: a) be the first time the participant has externalized their thoughts about these

peers; and/or b) bring about an awareness of the magnitude of the effects the peers have on the individuals, giving rise to intense emotional states (e.g., stress, anxiety, depression) to which individuals with ASD are particularly prone; and/or c) exacerbate an already existing emotional condition affecting the participants' psychological well-being.

Dalton (1996) suggested that process of construing may be difficult for young children, especially when feelings are confusing and threatening. Upholding the ethical standard of non-malevolence, and protecting the welfare of these adolescents with ASD, researchers must be astutely aware of the emotional states of participants. It can be difficult, however, for adolescents with ASD to recognize, label, and express their feelings (Paxton & Estay, 2007), which in turn can make it difficult for researchers to be aware of participants' distress and act accordingly.

Identifying and establishing a support network for research participants is essential, and requires collaboration with their families, caretakers, and loved ones (Bracken, 2000; Grandin, 1996; Lambie, 2000; Prelock et al., 2003). In the endeavor to collaborate with families, they should be considered from a system's theory perspective, which holds that any assessment or intervention that affects one individual in the family unit will affect all members of the family system at some level (Lambie, 2000). It is often difficult, though essential, to consider the 'hidden clients' – those individuals affected indirectly by research conducted with a member of their unit – when conducting research (Brown et al., 2001). It is essential, therefore, to consider the familial situation, their well-being, and challenges when working with a member of their family. Particular challenges that may face families

of adolescents with ASD include social difficulties, peer relationships, peer isolation, physical changes related to puberty and subsequent emerging sexuality, and relinquishing self-care and hygienic maintenance to the child (Lambie, 2000; Paxton & Estay, 2007). Given the potential risk of upsetting a very delicate inner-balance for these individuals already taxed in nearly every social environment in their worlds, as well as their families that work tirelessly to care for these children, it is absolutely essential that a support network exists to care for them as fully as possible.

Social support networks are essential for individuals with ASD, but often these individuals may not know when they need the support or who to engage to help them access that support network (Grandin, 1996). Bracken (2000) suggests the family as the starting point for identifying and establishing support for individuals with disabilities and disorders. Sources of support for the adolescent with ASD and their families may be found within the family unit, through extended family members, community, members of the child's school environment, professionals that provide services to the child and/or family, and possibly peers (Bracken, 2000; Prelock et al., 2003).

In the assessment process, it is vital to involve individuals who know the person with ASD well: people who know the strengths and challenges of the individual; people who can identify the individual's emotional states – when they are happy, frustrated, anxious, or scared – involving these people in the process as much as possible will help researchers keep a keen, close eye on the participant so that help can be provided when it is needed (Bracken, 2000). By meeting with

parents/caregivers and people who know the participant well prior to the assessment process, researchers can learn important information about the adolescent's strengths and challenges, sensory issues, behaviors, coping abilities and mechanisms, and consider how to orchestrate the optimal environment for interacting with the participant (Bracken, 2000, Prelock et al., 2003).

### **Statement of the Purpose**

Many current protocols for assessing social skills of people with ASD are based on observations of behaviors. The literature suggests, however, that social cognition encompasses processes underlying observable behaviors. Such processes include personal constructs and cognitive complexity, which are associated with successful interpersonal communication skills used in social interactions. Personal constructs can be assessed using repertory grids (Kelly, 1955), and cognitive complexity can be assessed using the Role Category Questionnaire (Crockett, 1965). Given the review of the literature and the need for person-centered assessments that consider individualized social cognitive processes of adolescents with ASD, the following questions will be investigated:

1. How do interpersonal cognitive complexities of adolescents with ASD compare to adolescents described in the literature?
2. What modifications are needed to successfully elicit constructs for adolescents with ASD in the repertory grid process?
3. How is information gained from a repertory grid different from that of a standardized test of social skills?

4. What do personal constructs of adolescents with ASD tell us about their interpersonal relationships and how they form?

## CHAPTER III

### METHOD

Prior to presenting the methods for the proposed study, a pilot study was conducted. The basic procedures for administering the repertory grid were modified and additional procedures developed and trialed to determine the feasibility of using this tool with adolescents with ASD.

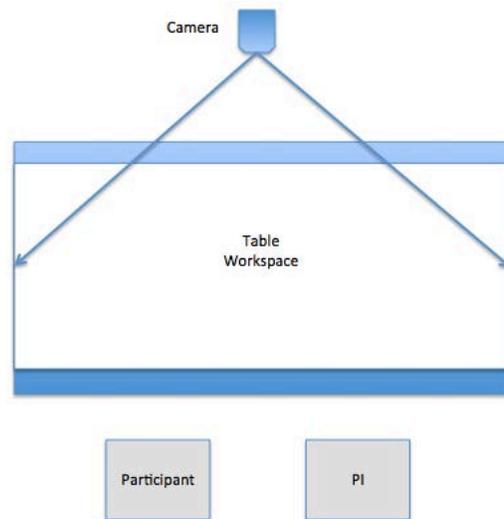
#### **Pilot Study**

**Participant.** Jeremy (pseudonym), an 18-year-old male diagnosed with Asperger's syndrome (diagnosed prior to publication of DSM-5), participated in the pilot study. Jeremy is primarily home-schooled and was recruited for the pilot study from a weekly social skills intervention group conducted at the Wichita State University-Speech-Language Hearing Clinic (WSU-SLHC). He has two younger brothers, one of whom has a diagnosis of ASD, and one younger sister. Jeremy enjoys role-playing video games, science fiction, and 'bad' media productions, such as *Sharknado* and *Birdemic*. One of his favorite cuisines is Papa John's Pizza. He is interested in human factors psychology and will be attending Wichita State University (WSU) as a freshman in the fall of 2015.

**Cognitive and Language Measures.** The primary investigator administered the TONI-3 (Brown, Sherbenou, & Johnson, 1997) and the CELF-5 (Semel, Wiig, & Secord, 2013) to Jeremy. His standardized quotient of 115 on the TONI-3 indicated his intelligence quotient was within the average range for age-matched peers. His scores on the CELF-5 indicated his core language skills were within the average or above average range when compared to age-matched peers.

Jeremy attended one 3-hour session at the WSU SLHC and the repertory grid and RCQ were administered. The session was video recorded using a Sony Full HD 60p Handycam Camcorder mounted on a tripod for hands-free recording. The tripod and video camera were set-up by the primary investigator prior to the start of the session. The completed video recording was transferred to digital videodisc (DVD) using a Sony DVDirect DVD Recorder VRDMC5 immediately following the session. The video was then deleted from the video camera, and the DVDs are being stored in the primary investigator's locked office located in Ahlberg Hall on the WSU campus.

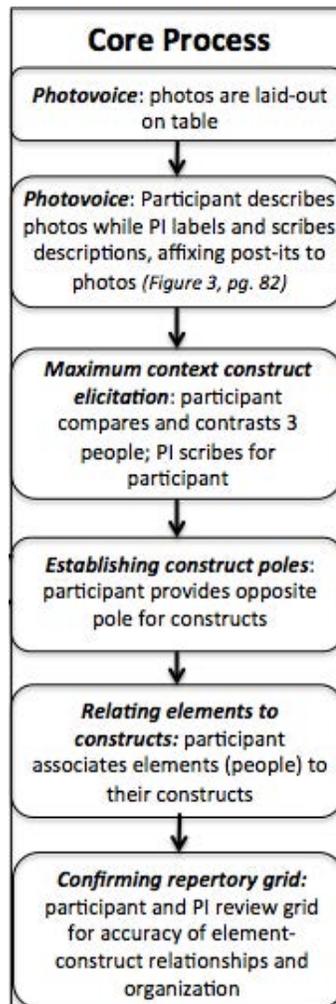
**Physical Configuration of the Room.** The physical organization of the room was modified to minimize distractions for Jeremy. The research room included one table, two chairs, a work system, materials for constructing the repertory grid, and the previously mentioned recording equipment (**Figure 2**).



*Figure 2: Physical configuration of the room for pilot study*

**Repertory Grid.** Kelly's fundamental postulate, which underpins the theoretical foundation of the repertory grid, states: "a person's processes are

psychologically channelized by the ways in which he anticipates events” (Kelly, 1955, p. 46). The *ways* mentioned in Kelly’s fundamental postulate are the constructs of the repertory grid, and the *events* are the elements (Fransella, 2003). The technique of the repertory grid is to establish a set of elements (which may be provided by the clinician or elicited from the client) pertinent to the individual, elicit constructs that distinguish among the elements, and relate the elements to the constructs (Fransella, 2003). The process for eliciting a repertory grid from Jeremy is depicted in **Figure 3**.



**Figure 3:** Core process for eliciting repertory grid from Jeremy

Jeremy supplied the elements for his grid, which consisted of people from his life he chose to discuss. Prior to the meeting for creating his repertory grids, Jeremy was asked to take and email the primary investigator a total of 10 photos: 5 photos of liked individuals and 5 photos of disliked individuals. The primary investigator printed 10 copies of each photo prior to the research session. These photos were used as proposed in Wang's (1999) description of photovoice to help Jeremy provide elements (people) for his grid rather than having the elements chosen for him.

During the research session, a series of evidence-based visual scaffolds (Shopler, 1971; University of North Carolina School of Medicine, 2014) were systematically introduced into the process of eliciting constructs until the primary investigator determined the participant could produce no further novel constructs. These scaffolds included photovoice (Wang, 1999) and visual analog rating scales. The first visual scaffold introduced in the process of creating Jeremy's repertory grid was photovoice (Wang, 1999). Jeremy was presented with copies of the photos he submitted one-at-a-time and asked to describe each person in the photo (e.g., 'describe Alice to me,' or 'how would you describe Alice?'). As he described each person, the primary investigator took notes of potential constructs from his descriptions on post-it notes (e.g., 'he's very friendly,' 'she's like a vulture,' etc.). After Jeremy completed his description of a person, the primary investigator affixed the post-it note with potential constructs to the photo for future reference (**Figure 4**).

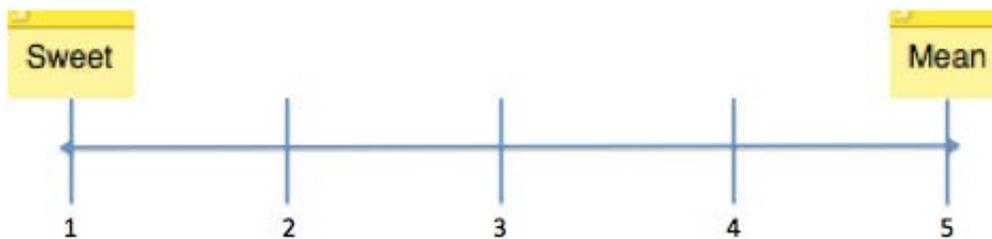


**Figure 4:** Photovoice process using photos and post-it notes to document potential constructs

Constructs were further elicited using Kelly's (1955) maximum context triadic method. In this method, Jeremy was asked to choose three known people and describe how two of them were alike in some way and how the third person differed from the way in which the other two were alike. He was, however, unable to engage in this request with only a verbal prompt. Seeing his hesitation, the primary investigator produced two 3.5"x5" blank index cards. On one card, he wrote 'same'; on the other card, he wrote 'different'. Next, the primary investigator asked Jeremy to place two photos under the 'same' card, and one photo under the 'different' card. Then, he asked Jeremy to tell him how the two under the 'same' card were similar, and how the one under the 'different' card was different from the two under the 'same' card. With the aid of the index cards as visual supports, Jeremy was able to independently complete the requested task, completing the maximum context triadic method of eliciting constructs in this manner. The primary investigator noted

use of the index card visual supports may help future study participants. Upon completing discussion of his photos of people, Jeremy took a 7-minute break.

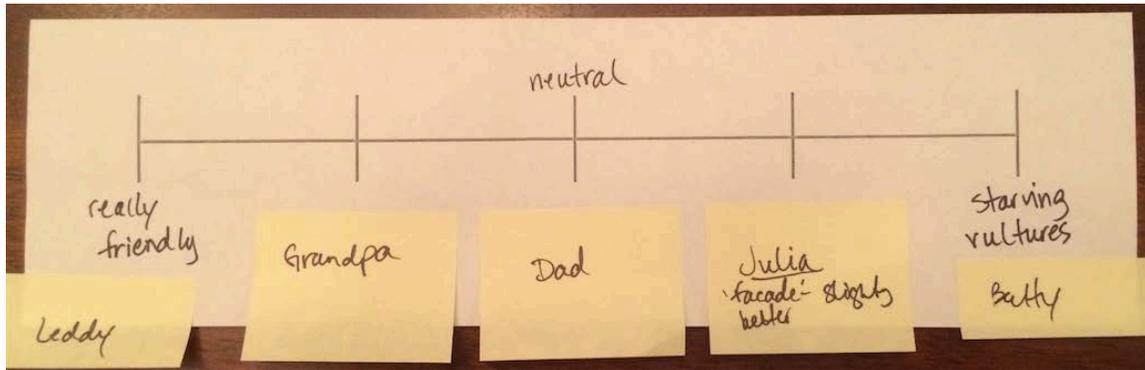
During the break, the primary investigator wrote one construct on one pole of a scale using one photocopied, blank, 5-point visual scale (**Figure 5**), for each construct. Each analog scale was printed on 8.5"x3" white office paper to help illustrate the concept of opposites and begin establishing the repertory grid in a manner that allowed Jeremy to see the grid's construction in concrete form. Each construct was visually depicted using a visual analogue scale (1 visual scale per construct).



**Figure 5:** Visual analogue scales depict construct poles

Upon returning from the break, Jeremy was asked to define the opposite of each construct he supplied during the photovoice discussion (i.e., for one construct, Jeremy was asked what was the opposite of 'really friendly'). As he supplied the opposite poles of his constructs, Jeremy began writing the names of people he provided for photovoice on small post-it notes and applying the named post-it notes along each construct scale. Initially, the primary investigator believed Jeremy would want to use copied photos of people to place along the points on the construct poles. Jeremy, however, informed the primary investigator that the photos 'were annoying

for (that) task' and asked if he could use small 2"x2" post-it notes to write names of people and affix those post-it notes to the visual-analog construct scales instead (Figure 6).



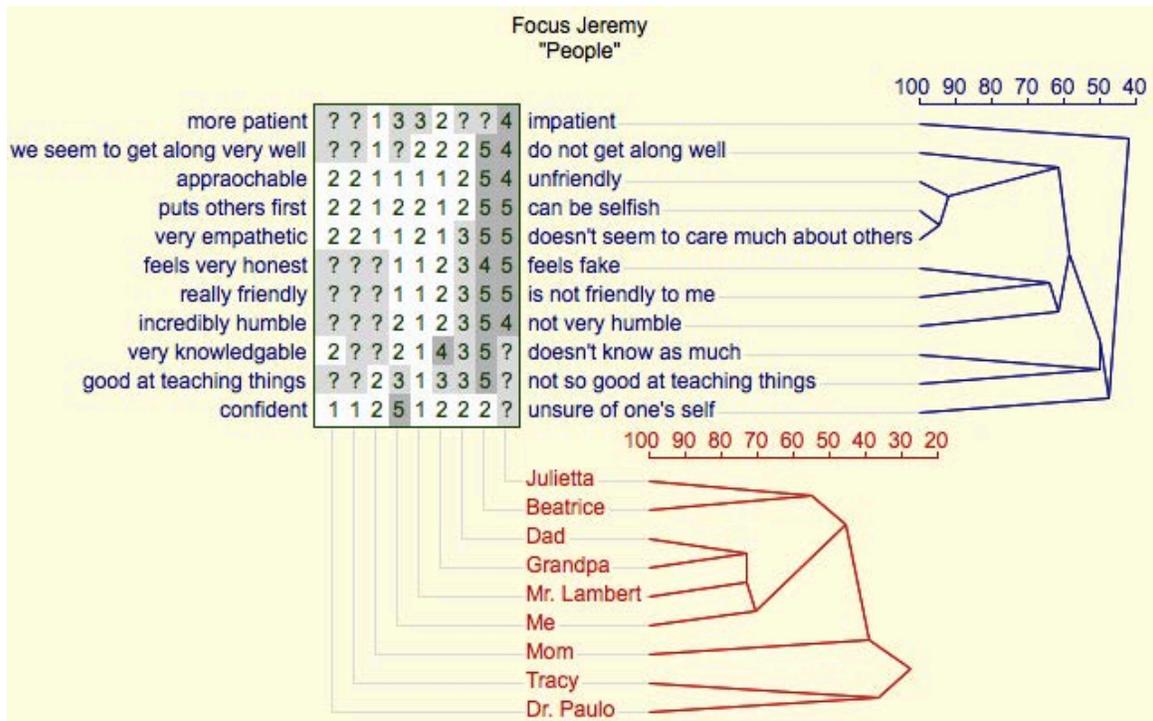
**Figure 6:** Elements related to constructs using visual analog scale

While placing individuals along the construct scales, it became apparent that Jeremy believed he had to place a person on each of the five points of the scale. The primary investigator informed Jeremy this was not the case, and that he could place more than one person at the same point on a scale. Jeremy was able to place elements (people) on the scales more accurately according to his evaluations of the elements once this was pointed out to him. The primary investigator noted this instruction should be given to study participants during the explanation of placing elements on the construct scales. Upon completing each construct scale and placing individuals along each construct, the primary investigator discussed the completed repertory grid with Jeremy, verifying the accuracy of representation of his constructs, the placement of his selected individuals on the grid, and any other thoughts important to him.

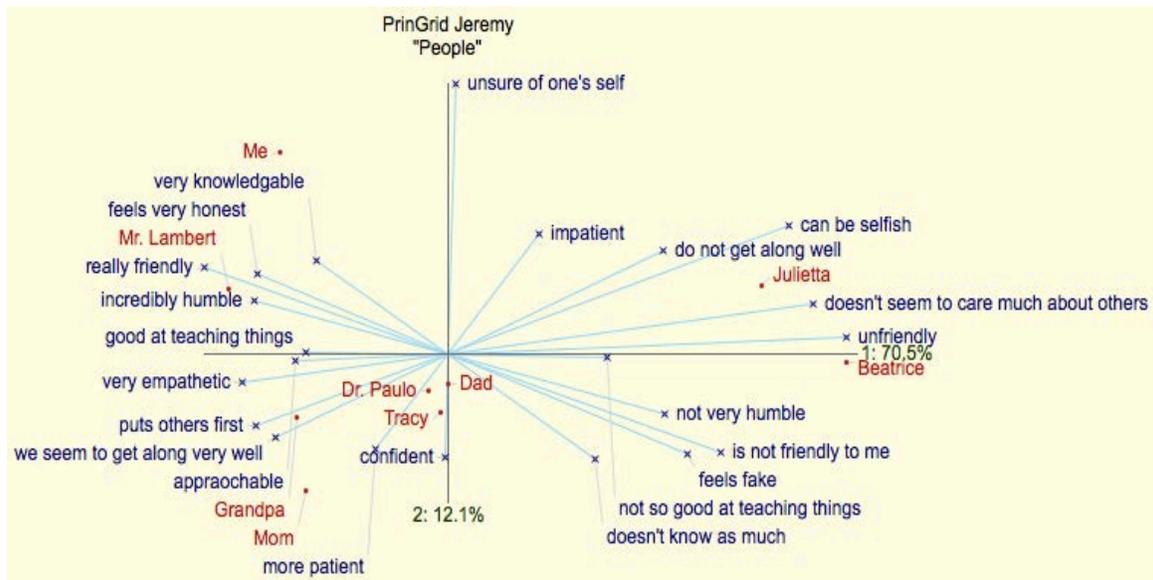
**Role Category Questionnaire (RCQ).** The standard two-person form of *Crockett's (1965) Role Category Questionnaire* was administered to Jeremy. Printed

instructions were provided (Appendix D), and he was allowed to read the directions and ask questions/seek clarification prior to beginning the task. The form required Jeremy to describe, in writing, one liked person and one disliked person in a timed (5-minute) response. The response format was modified for Jeremy to allow him to write only descriptive words in a list-format rather than writing complete sentences. Jeremy completed the RCQ before the time limit was reached, and provided 11 constructs. Upon completing the RCQ, he took another short break.

When the session was over, the primary investigator presented Jeremy with a \$20 gift card to Papa John's Pizza – his retailer of choice. Jeremy verbally expressed his gratitude for the gift card, asked what was the primary investigator's favorite kind of pizza, and invited the primary investigator to his graduation party. Jeremy and his mother requested a follow-up session to discuss the results of the repertory grid following completion of the grid's analysis. Data from this pilot study was entered into a computer software program, Rep 5 Research Version 1.03 (Gaines & Shaw, 2009), that allowed investigators to analyze data from the elements and constructs Jeremy provided (**Figures 7 and 8**).



**Figure 7:** Jeremy's Repertory Grid



**Figure 8:** Jeremy's Principal Component Map

**Conclusions from pilot study.** The evidence-based visual supports provided in this pilot study made the process of creating a repertory grid accessible for Jeremy. This was evidenced by his independent initiation of using the photos to produce constructs and using the visual analog rating scales to produce opposite construct poles. He also rated individuals along the construct scales independently. It was apparent that Jeremy did indeed have specific constructs, which he used to anticipate, to some degree, people he may or may not prefer to interact with socially. The structure and organization of Jeremy's repertory grid (**Figure 7**) and principal component analysis (**Figure 8**) are what one would expect to see, further indicating that the modified repertory grid process used with Jeremy was successful.

From this study, the principal investigator (PI) learned that evidence-based visual supports could be used to elicit interpersonal constructs of an adolescent with ASD in the process of constructing a repertory grid. He also learned that providing choices among those visual supports (i.e., providing post-it notes for writing names of people to affix to visual analog construct scales instead of photos) might better accommodate future study participants' personal preferences in constructing their repertory grids. Further, the PI learned that providing participants with clearly defined instructions (i.e., the participant does not need to place elements on every point of the construct scale) may help future participants provide more valid data and reduce their anxiety in completing tasks.

The PI believes that, due to the unique spectrum of differences exhibited by individuals with ASD, it is important to trial this protocol with more participants.

Based on the success of the experimental protocol used in this pilot study and information gleaned from the literature review, the following procedural design was proposed for this investigation.

### **Proposed Study**

**Participants.** Study participants were recruited by word of mouth from local school districts. Letters explaining the study purpose, procedure, and incentives for participation were given to caregivers of potential participants. Caregivers of participants signed a consent form permitting their child to participate in the study (Appendix A), and participants signed an assent form indicating their willingness to participate (Appendix B).

Five adolescents diagnosed with ASD participated in this study. The chronological age range of potential participants was set at 16 to 18 years of age. This selection criterion stemmed from evidence in the literature suggesting that cortical development of adolescents of this age enables them to think more abstractly and consider others in more psychological terms than basic physical descriptions. All participants in this study were 16-17 years old and had received medical diagnoses of ASD or Asperger's syndrome (prior to publication of DSM-5). ASD diagnoses were confirmed during a 30-60 minute caregiver interview using the Childhood Autism Rating Scale, Second Edition, High-Functioning (CARS2-HF; Schopler, Van Bourgondien, Wellman, & Love, 2010). The principal investigator, who is experienced in administering and scoring the CARS-2 assessment, conducted the caregiver interviews.

Participants' eligibility requirements included an existing medical diagnosis of ASD or Asperger's syndrome, hearing and vision within normal limits, and receptive vocabulary score and nonverbal intelligence quotient within +/- 1.5 SD from the mean as assessed using standardized diagnostic instruments (delineated in the section **Cognitive and Language Measures for Participants** below).

Exclusionary criteria included no medical diagnosis of ASD, vision and/or hearing not within normal limits, or receptive vocabulary and/or intelligence quotient scores more than +/- 1.5 SD from the mean.

**Informed consent.** When requesting individuals with ASD to provide their informed consent to participate in research, the method of 'informing' their consent must be modified in given his/her information processing differences (Barnbaum, 2008). Such modifications may include, however may not be limited to, presenting the information about the research endeavor using visual prompts, thus relying less on linguistic presentations; suggesting to the potential participant's caregiver(s) that a surrogate – someone close to the adolescent who knows him or her best – be chosen to assist the individual in the consent process; providing extra time for the individual to make a decision to participate (or not), and allowing him or her to make the decision outside the presence of the researchers in an environment that is safe, familiar, and comfortable to the individual with ASD (Barnbaum, 2008).

Additionally, Kellet and Nind (2001) suggested that, in research involving individuals with disorders and disabilities, the consent process be ongoing rather than a one-time occurrence. This process would vary depending on the nature and longevity of the research endeavor, and would potentially involve investigators

checking-in with the participants and their families regularly (e.g., weekly, daily, etc.) to verify the well-being of the participants, provide necessary support services in the event the participants are not doing well, and remind participants and families of their rights to withdraw from the study at any time (Kellet & Nind, 2001).

In the informed consent process, potential research participants and their families were made aware of the researchers' intent to use information collected in the study to further the academic literature and, thus, the professions' understanding of individuals with ASD. Measures to safeguard the information, privacy, and integrity of the participants included assigning a code and pseudonym to each of the participants, changing the names of participants and peers referenced in the research processes, informing participants under the age of 18 years that their caregiver(s) may have access to their thoughts and feelings divulged during the study, omitting any additional information that will identify the participants and their families in any way, and coding, changing, and/or omitting any other information the participant and/or his or her family preferred not be published.

Researchers arranged additional meetings with participants' caregivers at their discretion when information disclosed during the research process warranted follow-up discussion (e.g., recommendation of services, modifications to existing services, etc.). These safeguards were explained in the informed consent form and discussed with participants and their caregivers (see Appendices A and B). Collaboration with participants, their families, and support system (as appropriate) throughout the research process was ongoing to provide participants and their

families every opportunity to request expunging any recorded information disclosed, gathered, and/or discussed at any time.

**Qualifying measures for participants.** The principal investigator (PI) administered all participants' qualifying measures and test protocols. All qualifying assessments were conducted at the WSU Evelyn Hendren Cassat Speech-Language-Hearing Clinic and were supervised by licensed speech-language pathologists who are on faculty in the Department of Communication Sciences and Disorders at WSU. Each participant was tested separately in an individual clinic treatment room. Each room contained a table, chairs, and a work system that provided the participant with the following information: the number of assessments, the order of assessments, optional breaks to be taken at the discretion of the participant, and an item/picture representing the conclusion of the testing process (Appendix C).

### **Instruments.**

#### ***Cognitive and language measures for participants.***

*Understanding Test Scores.* Scores obtained from cognitive and language measures for participants were reported in the form of standard scores. The standard scores used for the Peabody Picture Vocabulary Test – Fourth Edition (PPVT-4; Dunn & Dunn, 2007), the Test of Nonverbal Intelligence – Third Edition (TONI-3; Brown, Sherbenou, & Johnson, 1997), and the Clinical Evaluation of Language Fundamentals – Fifth Edition (CELF-5; Semel, Wiig, & Secord, 2013) are derived quotients, which have a predetermined mean of 100 and a standard deviation of 15; the larger the quotient, the better the test performance that it represents (Brown, Sherbenou, & Johnson, 1997). Quotients and other standard

scores are extremely versatile and are therefore somewhat more valuable than percentile ranks, even though both types of scores are computed directly from the raw score distribution and convey essentially the same information (Brown, Sherbenou, & Johnson, 1997).

***Peabody Picture Vocabulary Test – Fourth Edition (PPVT-4; Dunn & Dunn, 2007).*** The PPVT-4 was administered to assess participants' receptive language ability, specifically understanding the meaning of single words. Understanding of word meanings is essential for skills and abilities such as verbal reasoning and extracting meaning from information presented orally and in printed text. This standardized test requires the examinee to choose the most suitable picture from a choice of four when verbally given a word by the examiner. Administration to individuals aged 2 to 90 years takes approximately 20 to 30 minutes. During administration of the PPVT-4, the PI presented 4 colored and numbered images per page on a test easel. The PI said a word and participants either identified the number corresponding to the picture or pointed to the picture on the test easel.

***Test of Nonverbal Intelligence – Third Edition (TONI-3; Brown, Sherbenou, & Johnson, 1997).*** The TONI-3 is a language-free measure of intelligence. It measures a specific component of intelligent behavior by testing an individual's ability to solve problems without using language. The TONI-3 assesses the examinee's abstract reasoning and problem-solving skills in the areas of generalization and classification, discrimination, analogous reasoning, seriation, induction, deduction, and detail recognition. This standardized test can be administered to individuals aged 6 to 89 years in approximately 15 to 20 minutes.

During administration of the TONI-3, the PI presented 4 to 12 black and white images per page on a test easel. After presenting oral instructions to participants during sample test items, participants will respond to test problems nonverbally by pointing to their selected answer on the page on the test easel. Participants' scores on the TONI-3 are reported as standard scores. A standard score of 100 is the mean, or average score, on this test, and it represents the performance of a typical student of the same age. One standard deviation from the mean is 15 points above or below the mean of 100. Thus, one standard deviation below the mean is 85, and one standard deviation above the mean is 115.

***Clinical Evaluation of Language Fundamentals – Fifth Edition (CELF-5; Semel, Wiig, & Secord, 2013)***. To formally assess participants' language abilities, the *Clinical Evaluation of Language Fundamentals, Fifth Edition* (CELF-5; Semel, Wiig, & Secord, 2013) was administered. The CELF-5 is a flexible, comprehensive assessment of core language abilities assessed by subtests in the areas of receptive language, expressive language, language structure, language content, and reading comprehension. This standardized test can be administered to individuals aged 5 to 21 years in approximately 45 to 60 minutes. During administration of the CELF-5, researchers provided oral instructions to participants for each subtest, and participants responded orally to provide their answers to test questions. Formatting for test administration varied by the subtest using a colored photo easel and short paragraphs read aloud by the test administrator. Percentile rank represents the percentage of age-matched peers the individual's score met or surpassed. For example, a score at the 60<sup>th</sup> percentile means the student scored at or above 60% of

his same aged peers. Percentile ranks range from <0.1 to >99.9, with 50 as the average.

Subtests of the CELF-5 examine discrete language skills. The subtest scaled scores are then combined to generate index scores, which provide an overall description of the individual's language ability. Scaled scores are used to compare the student's performance to the typical performance of same-aged peers. A scaled score of 10 is the mean, or average score, on the subtests of the CELF-5 and represents the performance of a typical student of the same age. One standard deviation from the mean is 3 points above or below the mean of 10. Thus, one standard deviation below the mean is 7, and one standard deviation above the mean is 13. Percentile rank represents the percentage of age-matched peers the individual's scores surpassed, met, or failed to meet. For example, a score at the 60<sup>th</sup> percentile means the student scored at or above 60% of her same-aged peers. Percentile ranks range from <.01 to >99.9, with 50 as the average. CELF-5 subtests are described hereafter.

The **Word Classes** subtest requires participants to choose which two of four words best went together (e.g., the examiner said the words *north*, *Celsius*, *globe*, *west*, and asked the participant which two words would go best together. The answer for this particular example was *north* and *west*). This subtest evaluates participants' abilities to understand relationships between words based on their class features, functions, or place and/or time of occurrence.

The **Following Directions** subtest requires participants to follow verbal directions of increasing length and complexity by correctly pointing to a series of

pictures in the order given by the examiner. Concepts evaluated included, but were not limited to, inclusion and exclusion (e.g., all, except), coordination (e.g., and), and temporal and spatial relationships (e.g., before, after, first, and left/right).

The **Formulated Sentences** subtest assesses participants' abilities to verbally produce sentences when given a word or phrase and an illustration. Proficiency in creating novel sentences using nouns, pronouns, verbs, adjectives, and coordinating and subordinating conjunctions and adverbs is assessed by this subtest and reflects abilities to produce meaningful, grammatically and syntactically appropriate sentences to respond to questions and engage in conversational exchanges.

The **Recalling Sentences** subtest, which requires participants to repeat sentences presented verbally, assesses their ability to accurately reproduce the surface structure of increasingly complex sentences.

The **Understanding Spoken Paragraphs** subtest assesses participants' abilities to recall and think critically about information from a paragraph read aloud to them. Participants must understand and restate the main ideas and supporting details of the paragraphs to demonstrate proficiency on this subtest. They must also make predictions on possible future events based on the information from the paragraphs. Performance on this subtest is indicative of participants' abilities to listen to spoken instructions or information, use the information presented to them, and think critically about the information presented to learn and create new knowledge.

The **Sentence Assembly** subtest assesses participants' abilities to create grammatically correct and meaningful sentences. The examiner presented participants with a page of words printed in a random sequence, and participants then mentally rearranged the words to create two different and novel sentences. Participants' performances on this subtest were indicative of their abilities to describe events and actions, respond to questions, and participate in conversation by rephrasing descriptions and flexibly using variations of sentences.

The **Semantic Relationships** subtest measures participants abilities to interpret passages of multiple sentences that make comparisons (e.g., Participants were read the passage: *'a man is bigger than a...'*, and shown four answers: *'house, button, spoon, plane'*, from which they must select two correct answers), identify location or direction (e.g., *'the ball rolled to the left of the goal; the ball was...'*, four answer options: *'next to the goal, on the left side of the goal, in the goal, behind the goal'*), and includes specific orders of events and/or persons (e.g., *In the alphabet, 'G' comes...*, four answer options: *'between L and Z, after C, before M, between A and E'*). Participants scores on this subtests were indicative of their abilities to interpret concept relationships using comparisons, following oral or written directions, and completing assignments for which they must understand conventional series (e.g., days, months), order of actions, locations, and/or spatial direction.

*CELF-5 Composite Scores.* The **Core Language Score** and index scores are composite scores. Composite scores are standard scores based on the sum of the subtest scaled scores. These composite scores reflect a student's abilities in a skill area (e.g., receptive language, expressive language) across multiple tasks (as

measured from the subtests). A standard score of 100 is the mean, or average score, on these indices, and it represents the performance of a typical student of the same age. One standard deviation from the mean is 15 points above or below the mean of 100. Thus, one standard deviation below the mean is 85, and one standard deviation above the mean is 115.

The **Core Language Score** indicates participants' abilities to use language to understand and interpret information, think critically about that information, and formulate and express responses. The **Receptive Language Index** reflects participants' abilities to listen to instructions and process auditory information accurately. Scores on the **Expressive Language Index** indicate participants' abilities to express themselves, their needs, and participate in conversational exchanges.

***Childhood Autism Rating Scale, 2<sup>nd</sup> Edition – High Functioning Form.*** The *Childhood Autism Rating Scale, 2<sup>nd</sup> Edition – High Functioning Form* (Schopler, Van Bourgondien, Wellman, & Love, 2010) is a 15-item rating scale used to identify children with autism and distinguish them from those with developmental disabilities. It is empirically validated and provides quantifiable ratings based on reports of behavioral observations of the assessed individual's development in both early formative years as well as current levels of functioning. The high-functioning form used for participants in this study included 15 items addressing multiple functional areas associated with autism spectrum disorder. Individuals were rated using a 4-point Likert-type scale for each of the 15 functional areas. Scores from each individual area were then tallied to derive an overall score which fell in one of

three severity groups: Minimal-to-No Symptoms of Autism Spectrum Disorder (scores of 15-27.5), Mild-to-Moderate Symptoms of Autism Spectrum Disorder (scores of 28-33.5), and Severe Symptoms of Autism Spectrum Disorder (scores of 34 and higher).

***Social Responsiveness Scale, 2<sup>nd</sup> Edition.*** The *Social Responsiveness Scale, 2<sup>nd</sup> Edition* (SRS-2; Constantino & Gruber, 2012) is a 65-item, Likert-scale, objective measure of symptoms associated with autism. The SRS-2 is a quantitative assessment designed specifically for identifying social impairments of individuals with autism. This rating scale has gender-specific forms, and separate forms that evaluate individuals of the following ages: preschool (parents and/or teachers may evaluate individuals 2.5-4.5 years-of-age), school-aged (4-18 years-of-age), adult (parents, spouses, and/or significant others may evaluate individuals 19+ years-of-age), and a self-report form for individuals 19 years-of-age and older. Observed behaviors are rated based on frequency of occurrence using a 4-point Likert-type scale with the options: 'almost always true,' 'often true,' 'sometimes true,' and 'not true'. Scores are tallied within the following subscales: Social Awareness, Social Cognition, Social Communication, Social Motivation, and Restricted Interests and Repetitive Behaviors. Two additional subscales, Social Communication and Interaction and Restricted Interests and Repetitive Behaviors are compatible with the DSM-5. Standardization, including raw and T-scores, facilitate diagnosing ASD with specified levels of severity: 'normal,' 'mild,' 'moderate,' and 'severe'.

The Social Responsiveness Scale 2 (SRS-2; Constantino & Gruber, 2012) was administered to participants to compare information from a standardized test of

social skills designed for people with ASD from 2.5 years to adulthood with information gained from repertory grid assessments conducted with adolescents with ASD. This test was not used as an inclusionary or exclusionary measure.

Extensive research and independent studies document the use of this scale for clinical interpretation of diagnoses and educational and psychological planning for individuals with ASD ranging from mild to severe in their respective symptomologies. Nationally representative standardization samples collectively comprise 4,709 ratings of 1,963 individuals. Sampled populations showed good correspondence for gender, ethnicity, and education level, and were collected in representative portions from the four U.S. Census regions. These samples support strong evidence of the instrument's consistency reliability (alpha coefficients on the order of .95) and interrater agreement validity (coefficients ranging from .72 to .82).

The total Social Communication & Interaction *T*-score is determined by summing *T*-scores from the following treatment subscales:

*Social Awareness*: Ability to pick up on social cues; this category represents the sensory aspects of reciprocal social behavior.

*Social Cognition*: Ability to interpret social cues once they are picked up; this category represents the cognitive-interpretive aspects of reciprocal social behavior.

*Social Communication*: Includes expressive social communication; this category represents the 'motoric' aspects of reciprocal social behavior.

*Social Motivation*: The extent to which a rated individual is generally motivated to engage in social-interpersonal behavior; elements of social anxiety, inhibition, and empathic orientation are included among these items.

*Restricted Interests & Repetitive Behavior:* Includes stereotypical behaviors or highly restricted interests characteristic of autism.

Constantino and Gruber (2012) note, however, that the available evidence supporting the use of the SRS-2 does not support the individual interpretation of these subscales. Thus, scores for these subscales will be omitted from the research findings.

***Repertory Grid.*** The technique of the repertory grid was to establish a set of elements (elicited from the client) pertinent to the individual, elicit constructs that distinguish among the elements, and relate the elements to the constructs (Fransella, 2003). Constructs for the repertory grid in this protocol were elicited from the client using the maximum context triadic method. In this method, respondents chose three known people and described how two of them were alike in some way and how the third person differed from the way in which the other two were alike. The repertory grid was elicited from each participant in a series of steps that systematically introduced evidence-based scaffolds using prompts as needed to potentially improve their ability to produce constructs.

***Role Category Questionnaire (RCQ).*** The standard two-person form of *Crockett's (1965) Role Category Questionnaire* was administered to each participant following the repertory grid process. Printed instructions were provided to participants (Appendix D), and they were allowed to read the directions and ask questions and/or seek clarification prior to beginning the task. This form required participants to describe, in writing, one liked peer and one disliked peer in a timed (5-minute) response. The response format was modified for participants to allow

them to choose to write only descriptive words in a list-format rather than writing complete sentences if they so desired. A score of cognitive complexity (specifically differentiation of the interpersonal construct system) was secured by tallying the total number of constructs provided by participants.

**Detailed descriptions of participants.**

**Participant #1: Kristina.** Kristina (pseudonym), a seventeen-year-old female, attended a social skills group for building and practicing social pragmatic communication skills with peers at a Midwestern university speech-language-hearing clinic. She attended this group once weekly for one hour and thirty minutes throughout the fall and spring academic semesters. Kristina was referred to the study because she met preliminary inclusionary criteria of being diagnosed with autism spectrum disorder. Further inclusionary criteria for the study included cognitive and language testing, the results of which are presented in **Table 1**.

**Table 1:** *Kristina’s qualifying assessment scores*

Assessment	Standard Score
TONI-3	115
PPVT-4	110
CELF-5 Core Language	113
CELF-5 Receptive Language	112
CELF-5 Expressive Language	118
CARS2-HF	39

As indicated by her scores, Kristina’s cognitive and language abilities as assessed by the qualifying cognitive and language evaluations were above the mean for her same-aged peers. Kristina was engaged and attentive throughout the qualifying assessment process. She appeared to be highly motivated by doing well on the tests, and asked multiple times what her scores were and how she compared

to other individuals who had previously completed the testing protocols. She was occasionally argumentative when she struggled to provide responses on more difficult tasks, asking what the correct answer was, then justifying the answer she provided. She negotiated with the examiner to combine the three 5-minute breaks provided in her schedule to take one 15-minute break during the first scheduled break to play a video game on her portable gaming device. The examiner explained to her verbally that, if she combined all breaks into one occurrence, she would be unable to take additional breaks later during the evaluation process. He also used marker and paper to provide visual support for the explanation, showing Kristina the combination of the three breaks into one occurrence, and deleting the additional breaks appearing later on her schedule. The examiner agreed to allow Kristina to take one 15-minute break to play her video game. Though Kristina expressed her dismay at the end of the 15 minutes and her desire to continue playing, she eventually resumed the testing process after multiple verbal and visual prompts (using the schedule) provided by the examiner. Toward the last two subtests on the CELF-5, she appeared to be quite exhausted, slumping in her chair, asking multiple times how many questions were left and when she would be finished with the testing process.

Based on the results of the tests administered in this evaluation, it appears that Kristina's overall receptive and expressive language abilities are in the average range. It should be noted, however, that recalling and restating sequences of events and making inferences using information from, and identifying sequential orders of

events, persons, temporal relationships, and identifying location and direction were difficult for her.

**Participant #2: Daniel.** Daniel (pseudonym), a seventeen-year-old male, was referred to the study because he met preliminary inclusionary criteria of being diagnosed with autism spectrum disorder. Further inclusionary criteria for the study included cognitive and language testing, the results of which are presented in **Table 2.**

**Table 2:** Daniel's qualifying assessment scores

Assessment	Standard Score
TONI-3	125
PPVT-4	103
CELF-5 Core Language	81
CELF-5 Receptive Language	79
CELF-5 Expressive Language	79
CARS2-HF	38.5

As indicated by his scores, Daniel's nonverbal intelligence was significantly higher than many of his same-aged peers. His single-word receptive vocabulary, as assessed by the PPVT-4, was in the average range. His core, receptive, and expressive language abilities, as measured by the CELF-5, were at the very low end of the average range.

Though the PI chose a room for the qualifying assessment process designed to provide minimal visual and auditory distractions, frequent loud voice and noises from other activities occurring simultaneously in adjacent rooms distracted Daniel multiple times during the testing process. He asked the PI to repeat directions multiple times due to the volume of competing noises in the environment. Despite this recurring challenge, Daniel was very attentive to the tasks presented to him during the testing. Though he would occasionally take a few moments between

subtests to speak to the examiner about some of his personal interests, he would redirect himself back to the testing independently. Daniel took all breaks provided in his schedule. He went 'for a stroll' on both of the breaks provided. During one of these breaks, the examiner had to search for Daniel outside of the clinic and bring him back to the testing room. Though some of the tasks during the testing process appeared difficult for Daniel, he provided an answer for every question asked of him, fully completing all test protocols.

Based on the results of the tests administered in the qualifying evaluation, it appeared that Daniel had receptive and expressive language challenges, but was within 1.5 standard deviations of the mean (with a mean of 100 and one standard deviation of 15 points). These challenges may include difficulty understanding relationships between words and the objects and/or concepts they represent and struggling to remember spoken sentences accurately to recall directions and explanations. This could make it difficult for him to use auditory information to follow directions, engage in conversation, and understand specific details of content presented verbally to him. It could also be difficult for him to listen to spoken instructions or information, use the information presented to him, and think critically about the information presented to him to learn and create new knowledge. Testing further indicated Daniel may experience difficulty producing meaningful, grammatically and syntactically appropriate sentences to respond to questions and engage in conversation at home, school, and other social environments, and he may struggle to describe events and actions, respond to questions, and participate in conversation by rephrasing descriptions and flexibly

using variations of sentences. He may struggle to follow oral or written directions and complete assignments for which he must understand conventional series (e.g., days, months), order of actions, locations, and/or spatial direction. He may experience these difficulties in multiple environments including, however not limited to, home and school.

**Participant #3: Angela.** Angela (pseudonym), a seventeen-year-old female, was referred to the study because she met preliminary inclusionary criteria of being diagnosed with autism spectrum disorder. Further inclusionary criteria for the study included cognitive and language testing, the results of which are presented in **Table 3.**

**Table 3: Angela’s qualifying assessment scores**

Assessment	Standard Score
TONI-3	96
PPVT-4	99
CELF-5 Core Language	95
CELF-5 Receptive Language	104
CELF-5 Expressive Language	87
CARS2-HF	38.5

As indicated by her scores, Angela’s cognitive, core, and receptive language scores were in the average range compared to same-aged peers. Her expressive language abilities, as measured by the CELF-5 fell in the low-end of the average range. Angela appeared to put forth very focused, concentrated effort during the qualifying assessment process. Though the PI chose a room designed to provide minimal visual and auditory distractions, frequent loud voice and noises from other activities occurring simultaneously in adjacent rooms distracted Angela multiple times during the testing process.

Angela's results from the CELF-5 indicated she may experience challenges using expressive language. Based on her unique profile, some of those challenges may include using auditory information to follow directions, engage in conversation, and understand specific details of content presented verbally to her. She may also sometimes experience difficulty producing meaningful, grammatically and syntactically appropriate sentences to respond to questions and engage in conversation in social environments. Describing events and actions, responding to questions, and participating in conversation by rephrasing descriptions and flexibly using variations of sentences may also be difficult for her. She may also struggle to follow oral or written directions for which she must understand conventional series (e.g., days, months), order of actions, locations, and/or spatial direction.

***Participant #4: Casey.*** Casey (pseudonym), a seventeen-year-old male, was referred to the study because he met preliminary inclusionary criteria of being diagnosed with autism spectrum disorder. Further inclusionary criteria for the study included cognitive and language testing, the results of which are presented in **Table 4.**

**Table 4:** Casey's qualifying assessment scores

Assessment	Standard Score
TONI-3	115
PPVT-4	107
CELF-5 Core Language	95
CELF-5 Receptive Language	94
CELF-5 Expressive Language	91
CARS2-HF	38.5

As indicated by his scores, Casey's nonverbal intelligence was higher than many of his same-aged peers. His receptive and expressive language skills were in the average range. Casey appeared very thoughtful in the testing process, taking more time to answer difficult questions. He would occasionally reflect on and react to his answers. For example, after providing a wrong answer and becoming aware his answer was incorrect, his brow would furrow, he would squint his eyes, say: 'noooooo....', shake his head, and provide an alternate response. Though some of the tasks during the testing process appeared difficult for Casey, he provided an answer for every question asked of him, fully completing all test protocols.

Based on the results of the qualifying examinations, it appeared that Casey's overall receptive and expressive language abilities are in the average range. It should be noted, however, that testing of his receptive language skills indicated it may be difficult for him to understand relationships between words and the objects and/or concepts they represent. Testing of his expressive language skills indicated he may struggle to remember spoken sentences accurately to recall directions and explanations. These challenges may make it difficult for him to use auditory information to follow directions, engage in conversation, and understand specific details of content presented verbally to him.

**Participant #5: Beau.** Beau (pseudonym), a seventeen-year-old male, was referred to the study because he met preliminary inclusionary criteria of being diagnosed with autism spectrum disorder. Further inclusionary criteria for the study included cognitive and language testing, the results of which are presented in **Table 5.**

**Table 5:** *Beau's qualifying assessment scores*

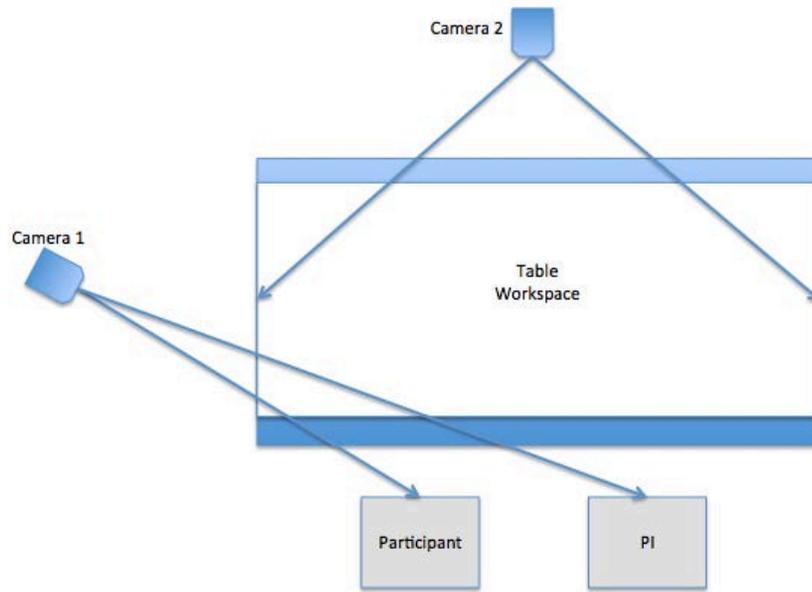
Assessment	Standard Score
TONI-3	98
PPVT-4	102
CELF-5 Core Language	93
CELF-5 Receptive Language	88
CELF-5 Expressive Language	93
CARS2-HF	38.5

As indicated by his scores, Beau's nonverbal intelligence, single-word receptive vocabulary, and core and expressive language scores fell within the average range. His receptive language abilities, as measured by the CELF-5, were in the low-average range. Specific areas of difficulty for Beau on the CELF-5 indicated he may have difficulty understanding relationships between words and the objects and/or concepts they represent. He may also exhibit some difficulty describing participating in conversation by rephrasing descriptions and flexibly using variations of sentences. Following oral or written directions and understanding conventional series (e.g., days, months), sequential processes, and order of action may also be difficult for him.

**Procedure.** The research study was a multiple case study design. Participants, their caregivers (whenever possible), and the researcher(s) attended all sessions. The research process began with one session that lasted up to two

hours, during which the primary investigator administered the repertory grid and RCQ. All research sessions were conducted at the WSUSLHC.

**Equipment.** Research sessions during which the repertory grid and RCQ are completed were videotaped using two Sony Full HD 60p Handycam Camcorders mounted on tripods for hands-free recording. One camcorder recorded the tabletop on which the grid is constructed to capture the process of using materials and supports/prompts to create the grid. The other camcorder recorded participants and the PI to capture interactions between the two throughout the research process (Figure 7). The tripods and video cameras were set-up on-site by the PI prior to the start of each session. Completed video recordings were transferred to digital videodisc (DVD) using a Sony DVDirect DVD Recorder VRDMC5 immediately following each session. Videos were then deleted from video cameras, and the DVDs were stored in the primary investigator's locked office located in Ahlberg Hall on the WSU campus. Data from this research sessions were entered into a computer software program, Rep 5 Research Version 1.03 (Gaines & Shaw, 2009), which allowed the researchers to analyze data from the elements and constructs provided by participants.



**Figure 9:** Physical design of room for experimental protocol

**Experimental protocol.**

*Work System.* At the beginning of each research session, participants were given a work system (University of North Carolina School of Medicine, 2014; Appendix C) that provided them with the following information: the number of research components, the order of components to be completed, optional breaks to be taken at the discretion of the participant, and a visual marker that indicates that the research process is finished. At the conclusion of the entire research protocol, each participant received a \$20 gift card to a retailer of his or her choosing. The presentation of this motivator signified completion of the participant’s involvement in the research process. Upon completion of the protocol and presentation of the motivator gift card to the participant, the participant and caregiver(s) were provided an opportunity to ask final questions about the results and/or process of the research. Caregivers were reminded that, during discussion of questions and

concerns, full confidentiality with respect to participants' disclosures throughout the research process would be maintained. Participants and caregivers were given researchers' contact information at this time and advised to contact researchers if additional questions or concerns arose following completion of the protocol.

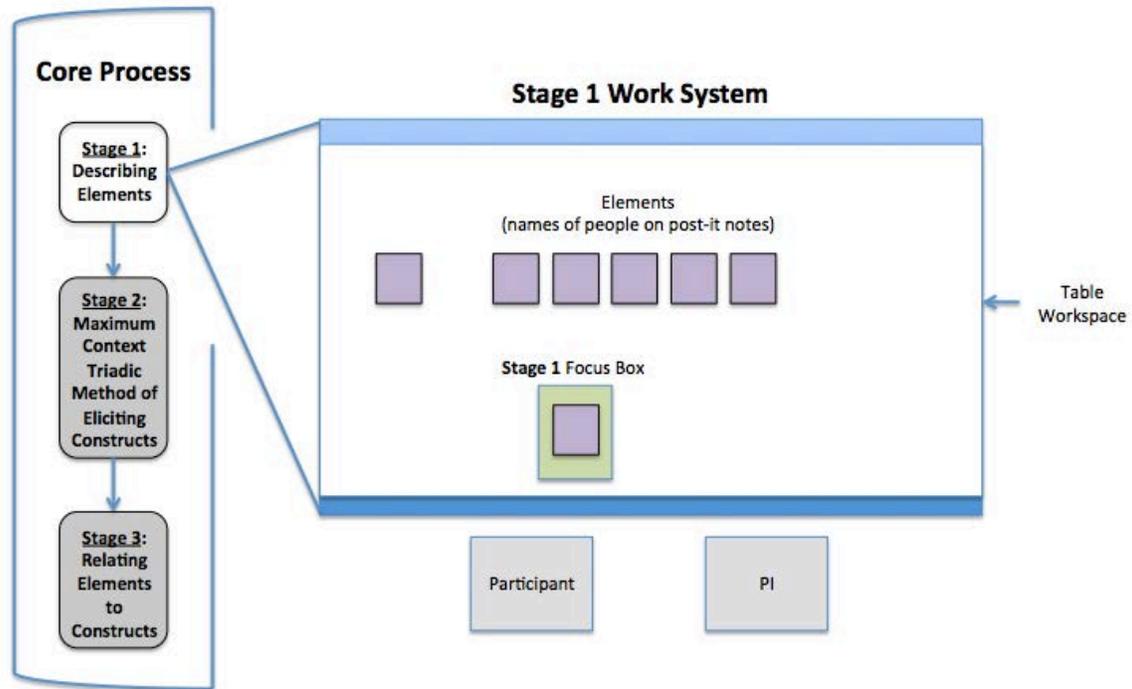
*Repertory Grid Procedure.* Based on what was learned from the pilot study, a modified process for eliciting repertory grids with participants was developed. These modifications included evidence-based visual scaffolds (Shopler, 1971; University of North Carolina School of Medicine, 2014), which were systematically introduced into the process, using prompts (Neitzel & Wolery, 2009) as applicable, until researchers determined the participant could produce no further novel constructs. These scaffolds included category labels for comparing and contrasting elements (people), photovoice (Wang, 1999), and visual analog rating scales. Additional visual scaffolds that may be used as needed include Kidspiration app (Inspiration Software, 2014) and/or thought and speech bubbles (Figure 8). Wichita State University's Internal Review Board did not permit the use of photovoice as a visual scaffold for participants. The level of prompting needed for eliciting constructs varied by participant; thus, the PI documented the level of prompting required for each participant for each stage of the process.



**Figure 10:** Thought bubbles used to help participants express challenging constructs nonverbally

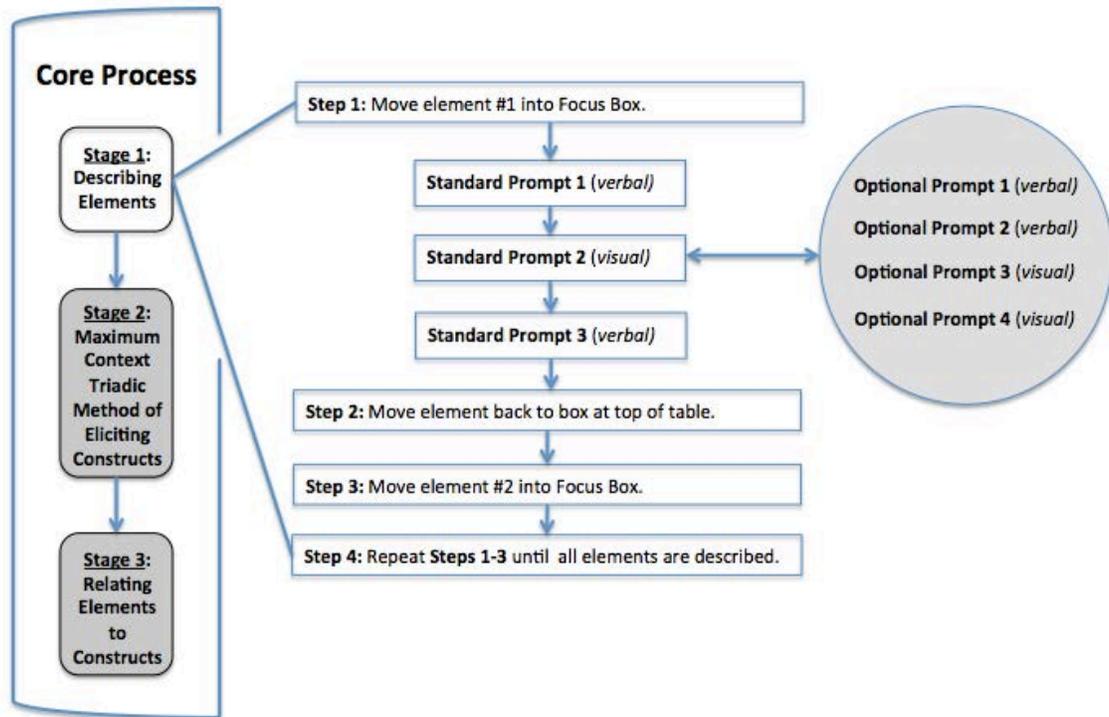
The modified process for constructing repertory grids was divided into three stages: Stage 1: Describing Elements, Stage 2: Maximum Context Triadic Method of Eliciting, and Stage 3: Relating Elements to Constructs.

*Stage 1: Describing Elements.* The first stage of constructing the participant's repertory grid was asking participants to identify and describe elements (people) for their grids. Participants were asked to identify 7 individuals: his or herself, his or her ideal self, a disliked person, an annoying person, a family member, a liked person, and a person with whom he or she would like to be friends. Preparation for this step began before the participant enters the research room. The table was covered in white butcher paper to minimize distraction and help participants focus on the work systems and materials used to create the repertory grids.



**Figure 11:** Stage 1: Describing elements work system

Once the participant had entered the room and greetings had been exchanged, the following process commenced (**Figure 11**) *Note: **Standard Prompts** were used for **each participant every time**; **Optional Prompts** were used as needed on an individual basis at the discretion of the PI and, when used, were documented by the PI for each participant).*



**Figure 12:** Stage 1: Describing elements process

1. **Stage 1, Step 1:** Researcher moves element #1 post-it note into **Stage 1**

Focus Box.

- a. **Standard Prompt 1 (verbal):** Research asks participant: ‘how would you describe X (name of person)?’ – *Note: this verbal prompt is standard and to be used for eliciting descriptions of each element. PI will inform participant he will take notes while participant describes people.*
- b. **Standard Prompt 2 (visual):** After asking participant to describe element (person), the PI will wait silently without additional verbal prompting to provide participant time to process the request,

consider the element, and respond to the request. Waiting in expected silence in this manner, the PI will hold his pen over post-it notepad, providing a visual cue that allows participant to see PI awaiting and expecting his or her response.

- i. **Optional Prompt 1** (*verbal*): In the case that participants provide more physical than psychological descriptors, the PI will say: *'yes, that's fine, but is there also any important way you can describe this person in terms of personality or character?'*
- ii. **Optional Prompt 2** (*verbal*): If PI determines participant appears to be struggling to produce descriptors (e.g., verbalizes struggle, prolonged silence, etc.), the following prompt may be used: *'how else would you describe this person,'* or *'what else can you tell me about this person?'*
- iii. **Optional Prompt 3** (*visual*): If PI determines participant continues to struggle after providing **Optional Prompt 2**, Kidspiration App may be used to help participants visualize descriptions using a computerized, illustrative, concept-map format.
- iv. **Optional Prompt 4** (*visual*): In lieu of using the Kidspiration App, as it may not be the most appropriate/best option for all participants, thought bubbles may be used to help participants write descriptions they struggle to provide/are uncomfortable providing verbally (see Figure 9, page 117).

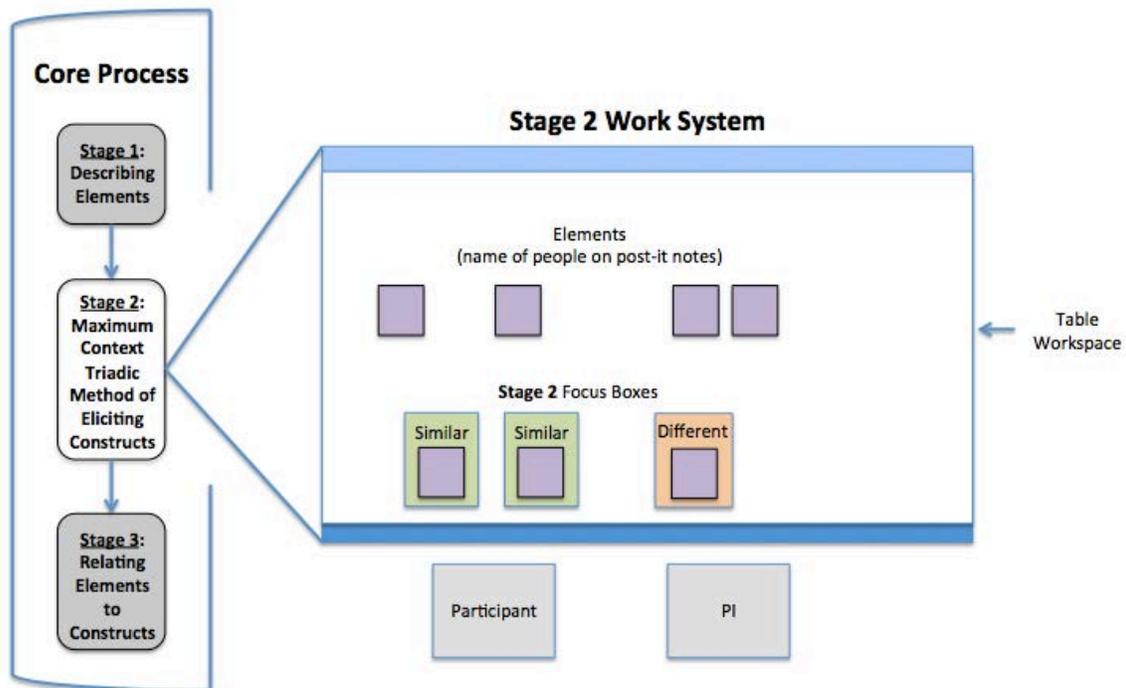
- c. **Standard Prompt 3** (*verbal*): When PI has determined participant is nearing the end of his or her novel descriptions of the element, he will say: *'Is there anything else you want to add?'*
2. **Stage 1, Step 2**: When participant has finished describing element, PI moves post-it note back into its box at the top of the table.
3. **Stage 1, Step 3**: PI moves next element from row of boxes at top of table down into the focus box.
4. **Stage 1, Step 4**: Repeat **Steps 1-3** until all elements have been described by the participant.

**NOTE:** The process of eliciting a repertory grid **is not** a standardized protocol. This is meant to be an open process in which the participant(s) are engaged in dialogue with the administrator as much as possible. Thus, participating in conversational discourse that engages the participant and facilitates their productivity in the process is encouraged (Fransella, Bell, & Bannister, 2004). Once all elements had been fully described, **Stage 1: Describing Elements**, was finished. The participant was allowed take an optional break at his or her discretion, as outlined by the **Order of Operations Work System (Appendix C)**.

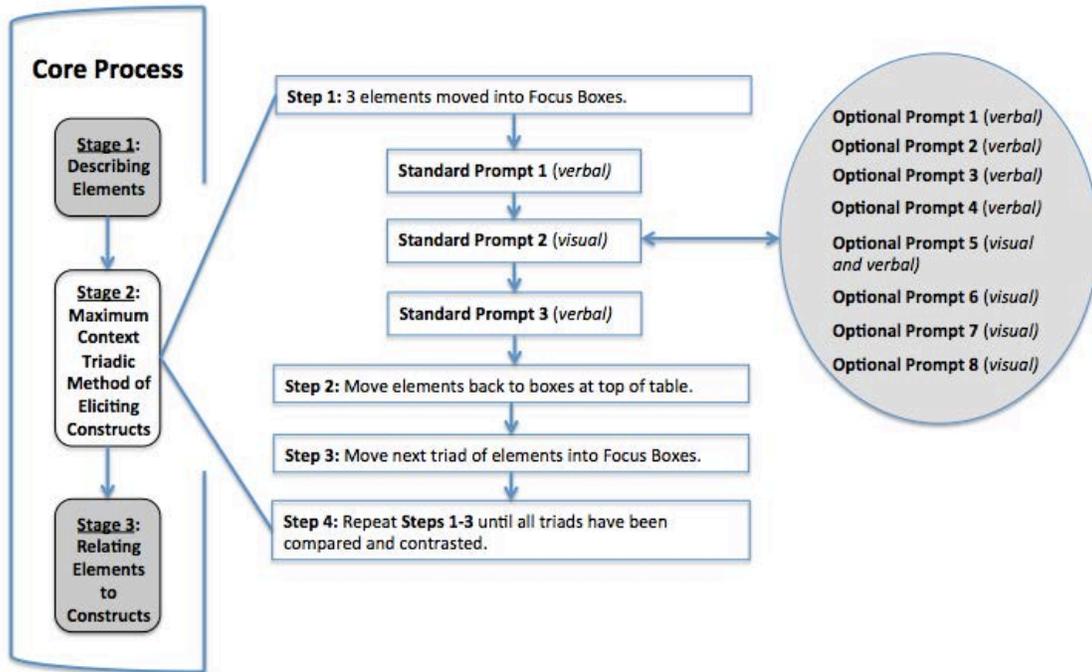
*Stage 2: Maximum Context Triadic Method of Eliciting Constructs.* The second stage of the repertory grid process involved comparing and contrasting elements to elicit participants' constructs. Two elements were compared to establish how they were similar (this provides one pole of a construct), and a third element was contrasted from the way the other two elements were alike (this provides the opposite pole of that construct). Thus, if the participant said two elements are

similar in that that they are *'friendly'*, and the third element, in comparison, was *'very rude'*, the construct of *'friendly*  $\leftarrow \rightarrow$  *very rude'* had been elicited.

Choosing the elements to compare and contrast in a random manner was important: this created random comparisons that, though at times challenging for participants to produce, facilitated deeper reflection on the elements and was more likely to produce core constructs. Core constructs are those that are most fundamental and essential for the participant in his or her construing of people (Fransella, Bell, & Bannister, 2004). Using an online random number generator (Haahr, 2015), the PI pre-selected the elements for triadic comparison prior to the research session.



**Figure 13:** Stage 2: Maximum context triadic method of eliciting constructs work system



**Figure 14:** Stage 2: Maximum context triadic method of eliciting constructs process

**Stage 2** commenced as follows:

1. **Stage 2, Step 1:** Post-it notes of three elements chosen using pre-selected random triad are moved by PI into Stage 2 Focus Boxes.
  - a. **Standard Prompt 1 (verbal):** PI asks participant: ‘tell me a way these two people are similar, and how the third is different from these two.’ PI continues writing notes of participants’ responses on post-it notes, as in **Stage 1**.
  - b. **Standard Prompt 2 (visual):** Wait in expected silence for response.
    - i. **Optional Prompt 1 (verbal):** ‘How are these two similar?’ (wait for response).
    - ii. **Optional Prompt 2 (verbal):** ‘How is this one different from those two?’ (wait for response).

- iii. **Optional Prompt 3 (verbal):** In the case that participants provide more physical than psychological constructs, PI will say: *'yes, that's fine, but is there also any important way in which two of these three people are alike in terms of personality or character?'* (Fransella, Bell, & Bannister, 2004)
  - iv. **Optional Prompt 4 (verbal):** If participant finds all three elements similar, ask: *'What is the opposite of (similarity) to you?'*
  - v. **Optional Prompt 5 (visual and verbal):** If participant is unable to compare and contrast a triad, dyadic comparison is used (compare and contrast one element from another other element, using only two elements).
    - 1. **Visual:** place only two elements in focus box;
    - 2. **Verbal:** Ask: *'how are these elements different from each other?'*
  - vi. **Optional Prompt 6 (visual):** Thought bubbles.
  - vii. **Optional Prompt 7 (visual):** Kidspiration App.
  - viii. **Optional Prompt 8: This prompt is a last resort.** If participant is unable to compare and contrast randomly selected triad, move on to next randomly selected triad.
2. **Stage 2, Step 2:** Elements are returned to top-row boxes.
  3. **Stage 2, Step 3:** Next randomly selected triad of elements moved down into focus box.

4. **Stage 2, Step 4:** Repeat **Steps 1 – 3** until:
  - a. participant can no longer provide new constructs on 2 consecutive triads, **or**
  - b. until participant requests to end the process.

When the participant could generate no new constructs on 2 consecutive triads (or when he/she requested for the process to end), **Stage 2: Maximum Context Triadic Method**, was finished. The participant was allowed to take an optional break at his or her discretion, as outlined by the **Order of Operations Work System (Appendix C)**.

*Stage 3: Relating Elements to Constructs.* To help illustrate the concept of opposites and begin establishing the repertory grid in a manner that allowed the participant to see the grid's construction in concrete-form, visual analogue scales drawn on 3"x11.5" slips of plain white office copy paper were used. Note: typically, participants relate elements to constructs by rating them along construct specific scales using a computer program. This is a standard procedure in the process of eliciting grids. The use of visual analogue scales in this experiment created a visual representation of this for participants in the absence of the computer program (Dagnan & Ruddick 1995). Thus, this step was part of the typical process of creating a repertory grid; it was not a prompt unique to this experiment.

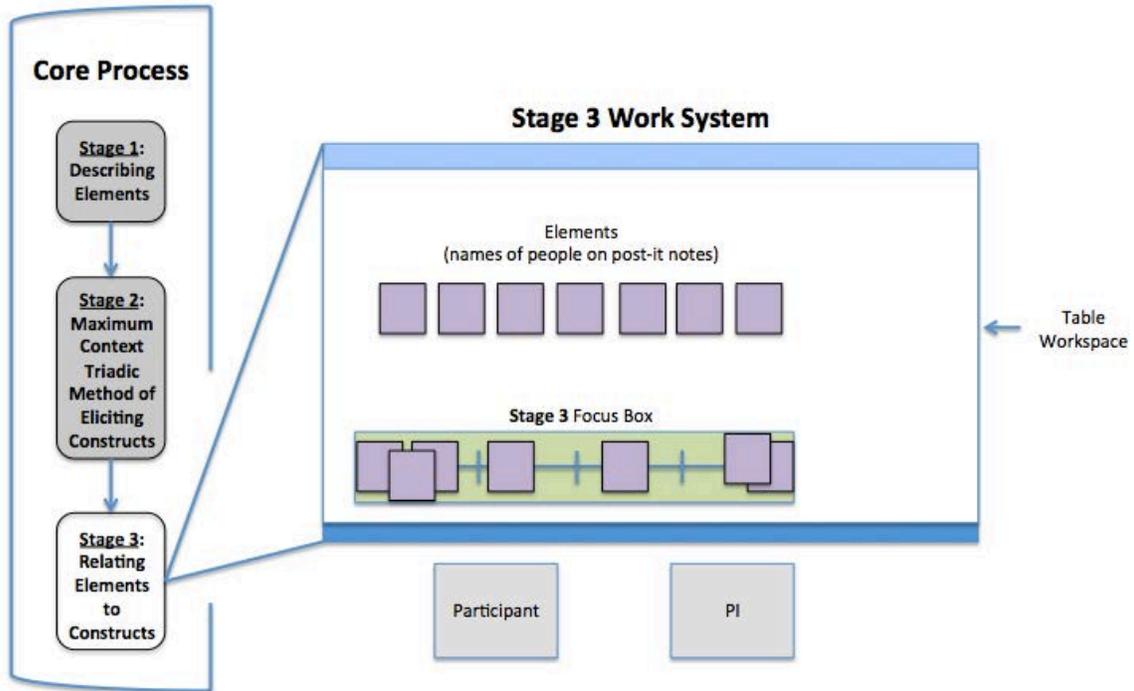


Figure 15: Stage 3: Relating elements to constructs work system

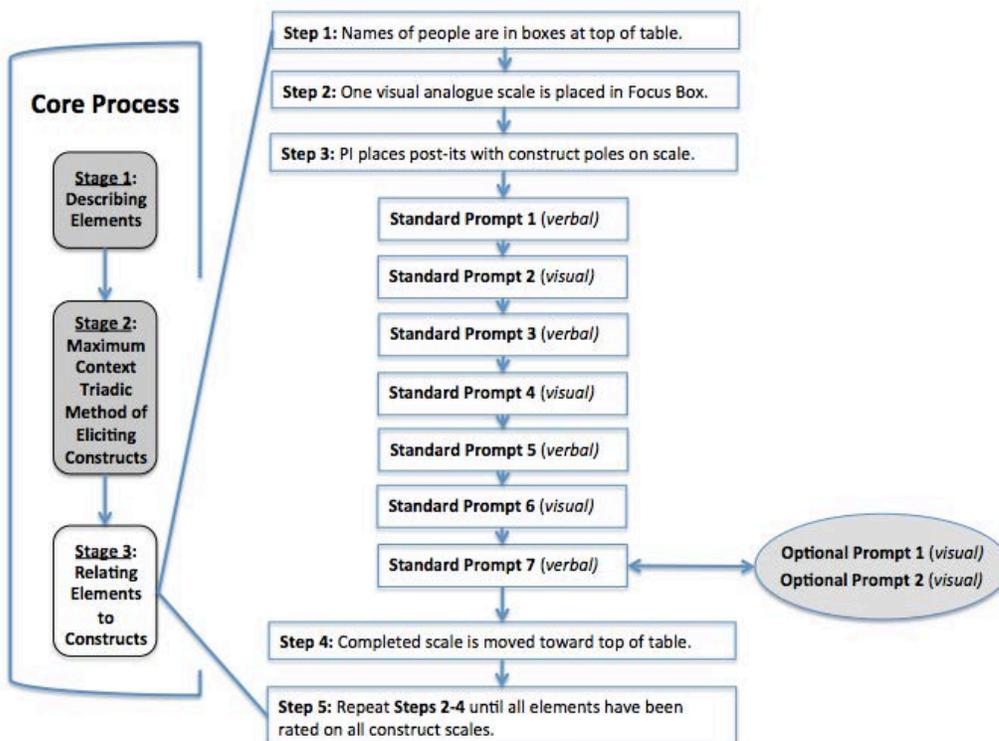


Figure 16: Stage 3: Relating elements to constructs process

**Stage 3** commenced as follows:

1. **Stage 3, Step 1:** Post-it notes of elements are in row of boxes at top of table.
2. **Stage 3, Step 2:** One visual analogue scales is placed in Stage 3 Focus Box.
3. **Stage 3, Step 3:** PI places post-it notes with construct poles at opposite ends of construct scale (see Figure 5, page 88).
  - a. **Standard Prompt 1** (*verbal*): *Now, I'd like you to rate these people on your construct scales. There is more than one way to do this. It could look like this...*
  - b. **Standard Prompt 2** (*visual*): PI sets up one example of element post-it notes placed on construct scale. Then, post-it notes are placed back in boxes so that scale is blank.
  - c. **Standard Prompt 3** (*verbal*): *Or, it could look like this...*
  - d. **Standard Prompt 4** (*visual*): PI sets up a **2<sup>nd</sup> and different** example of element post-it notes placed on construct scale in different orientation. Then, post-it notes are placed back in boxes so that scale is blank.
  - e. **Standard Prompt 5** (*verbal*): *Or, it could look like this...*
  - f. **Standard Prompt 6** (*visual*): PI sets up a **3<sup>rd</sup> and different** example of element post-it notes placed on construct scale in different orientation. Then, post-it notes are placed back in boxes so that scale is blank.

g. **Standard Prompt 7 (verbal):** *'You must place every person on every scale, but you don't have to use each point of the scale.'*

i. **Optional Prompt 1 (visual):** Participants may affix post-it notes to construct scales.

ii. **Optional Prompt 2 (visual):** Kidspiration App

4. **Stage 3, Step 4:** Completed scale is moved toward top of table.

5. **Stage 3, Step 5:** Repeat **Steps 2 – 4** until all elements have been rated on all construct scales.

The PI then discussed the completed repertory grid with participants, verifying the accuracy of representation of participants' constructs, the placement of their selected individuals on poles of the grid, and any other thoughts important to the participants. Once all elements had been rated and verified with participants, **Stage 3: Relating Elements to Constructs**, was finished. The participant was allowed to take an optional break at his or her discretion, as outlined by the **Order of Operations Work System (Appendix C)**.

*Role Category Questionnaire (RCQ) Procedure.* The standard two-person form of *Crockett's (1965) Role Category Questionnaire* was administered to each participant following the repertory grid process.. Participants described, in writing, one liked peer and one disliked peer in a timed (5-minute) response. The response format was modified for participants to allow them to choose to write only descriptive words in a list-format rather than writing complete sentences if they so desired. A score of cognitive complexity (specifically differentiation of the

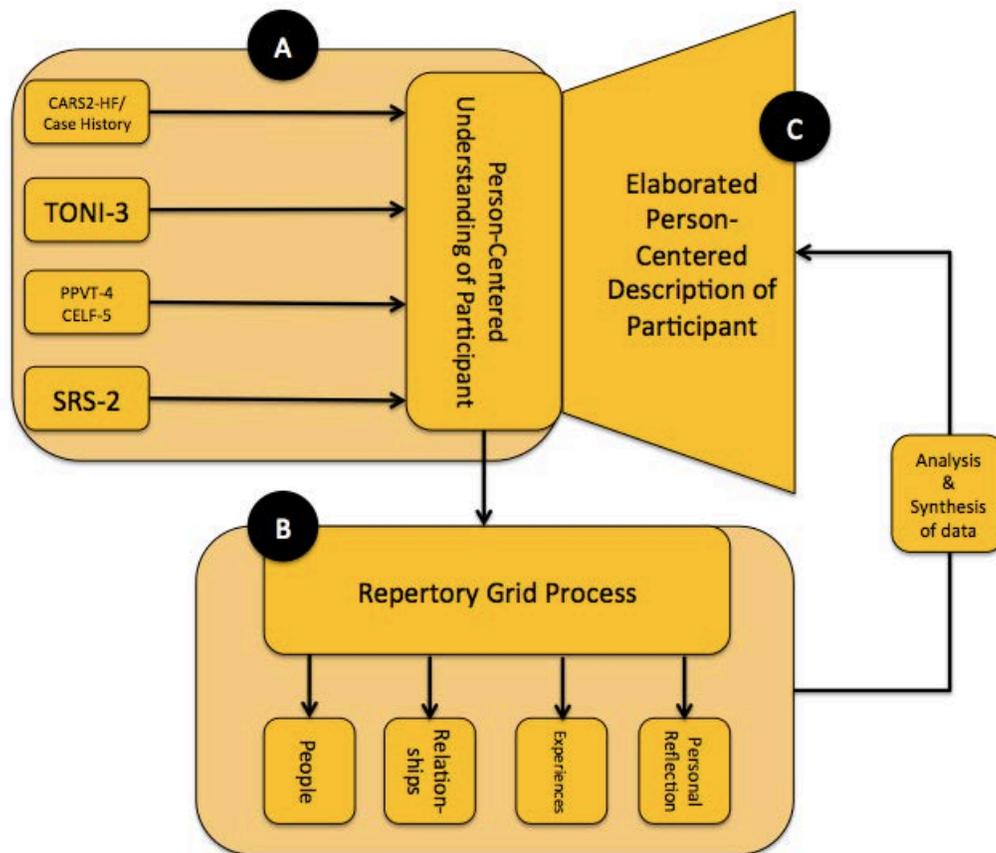
interpersonal construct system) was secured by tallying the total number of constructs provided by participants.

At the conclusion of the experimental protocol, the primary investigator presented each participant with a \$20 gift card to a retailer of his or her choice. Time was provided to visit with participants and their caregiver(s) at the conclusion of the research session to discuss questions or comments.

***Outcome measures.*** Within-case analyses were performed for each participant, in which data from research sessions was entered into a computer software program, Rep 5 Research Version 1.03 (Gaines & Shaw, 2009), which allowed investigators to analyze relationships between elements and constructs provided by each participant. The grids created in this software program were examined to better understand the participant's individualized process of interpersonal social perception. After completing individual within-case analyses, across-case analyses were performed to identify common themes that transcend the cases (Yin, 2009).

CHAPTER IV  
RESULTS

Data for this qualitative study were collected through a series of five case studies. **Figure 17** offers an organizational framework of the person-centered data collected throughout the research process. This data will be used to answer the research questions.



*Figure 17: Model of the research process*

As delineated in Chapter III: Method, the research process began with qualifying cognitive and language assessments, as well as interviews with participants' parents to complete the CARS2-HF protocol. The CARS2-HF helped the PI learn more about each participant from the view of his or her parent, and the information each parent shared spanned the course of each participant's development from infancy to present day. This information, combined with what was learned about participants' intellectual abilities (as measured by the TONI-3), their language abilities (as measured by the PPVT-4 and CELF-5), and social perceptions of participants (as measured by the SRS-2 from both parent and participant perspectives) provided the PI with a person-centered understanding of each participant (**Figure 17-A**).

Aggregating this information helped guide the PI's process of interacting with each participant during the repertory grid process. During that process, participants shared experiences from their lives with the PI to explain and elaborate upon the personal constructs they provided. They discussed their relationships with the people they chose to represent the elements of their grid, and many participants used this time to reflect on past and present social experiences (**Figure 17-B**).

The degree to which they shared and elaborated about people and relationships varied among participants; however, each shared some unique memories and feelings about their relationships and social experiences while producing elements and constructs for their repertory grids. The PI analyzed and synthesized information from the qualifying assessments with information participants shared during the research process to better understand each

participant's unique process of understanding people through his or her personal constructs. This, in turn, helped elaborate and expand the PI's understanding of each participant and his or her social cognitive processes as illuminated by each completed repertory grid (**Figure 17-C**). Participants' individual processes of creating their repertory grids are presented hereafter as a series of case studies.

### **Case #1: Kristina**

Kristina is a sixteen-year-old female who attends an alternative Midwestern high school. Her mother shared that Kristina was diagnosed with autism in the 'last couple years' by a local psychiatrist. She felt that, even though Kristina was older when she was diagnosed, it was important for her to receive a diagnosis so she would be eligible to receive the supports she would need to be successful in school and life..

Kristina's mother reported that she knew something was "going on" with her from a very young age. Her speech development was unusual. When she started speaking, her speech was totally clear from the very beginning, but when someone would ask her a question, she would echo the question back instead of answering it. Around 2 or 2 ½ years-of-age, her mother noticed that Kristina did not interact with people in a give-and-take fashion. She would never ask questions such as 'what's that'; she never pointed, and she did not pair gestures with words. She did, however, have an incredible memory: she could memorize poems and stories in their entirety after hearing them just a few times from the time she was 3-years-old.

Her mother reported that Kristina has always been able to entertain herself for hours and was content to be alone. As a child, she would occasionally line up her

toys as is sometimes observed with children on the autism spectrum. Kristina had a doll and would engage in some pretend play, but it seemed she started pretending when she was a little older than would be typical.

Her mother commented that she believes that Kristina has become discouraged with her struggles interacting with peers her age. Her mother indicated Kristina had some friends in middle school and they would share stories and develop characters together, but that eventually 'went south'. Kristina always wanted to talk more and tell her story, and she was always looking for a friend that liked everything she liked and shared all the same interests. She would tell her mom: *'I don't wanna go to this group because they don't like the same things I do'*. Being able to enjoy the company of another person who liked something different did not appear to interest her.

Kristina's hearing has always been excellent: so excellent, in fact, that she could hear conversations of people far away. She would often think those distant conversations were about her, and she would respond, even though people were too far away to hear what she said. When she rode in the car, she would sometimes talk to people in other vehicles as though they could hear her, even though the windows in both vehicles were rolled-up.

She had some problems with her vision in 3<sup>rd</sup> or 4<sup>th</sup> grade, and an evaluation revealed visual motor coordination problems. She had neuroelectric feedback therapy, which her mother reported helped with her spelling and some of her 'autistic stuff'. Before this therapy, she would not notice you if you were in the room

talking to her. After the therapy, she paid more attention to others and her interactions in general were better.

As an infant, Kristina liked to be held facing away from the person who held her rather than facing toward the person. She used to make strange movements with her body, her shoulders, make odd mouth postures, and pull at the waistband of pants. Kristina also went through a period of demonstrating a mild aversion to clothing tags and wearing socks. Her mother reported that Kristina used to be really affectionate, but this has dissipated with age. When she was young, she was terrified of mushrooms and refused to walk through the yard. She was also terrified of flushing toilets: she would flush the toilet and then run away. She did not, however, have a fear of strangers. She was very outgoing when it came to other people – a little too outgoing, her mother said.

Kristina has a history of severe meltdowns, and her parents have always wondered why she would tantrum so severely. She would get very upset and start crying, and her parents were unable to calm her down. They often waited for up to ½ hour for her to stop. Her mother said that once she finally stopped it was like nothing ever happened. She would often throw fits in stores, and her parents never knew what caused her to ‘just totally lose it’. Her fits resulted in her being dismissed and prohibited from reengaging in many activities across multiple contexts, including cello lessons, swimming, gymnastics, and vacation bible school.

Her emotional stability and regulation lagged behind her intellectual development, which caused her to be suspended from school several times. Kristina would become upset in class and refused to go to the office, so school officials would

have to go to Kristina's class and remove her. With her recent diagnosis, Kristina has also been medicated for anxiety and behavior problems, which her mother said has saved her from being kicked out of school completely. Though her medication has allowed her to remain in school, she continued to have difficulty completing and submitting assignments in a traditional school setting. Currently, she attends an alternative high school in which all of her assignments revolve around the main character of a book Kristina wrote. Not surprisingly, Kristina chose this character to represent her 'ideal self' for her repertory grid.

Kristina required a verbal prompt from the PI to sit down and start the repertory grid process. She spent the first few minutes of the research session explaining the game she was playing on her hand-held gaming system to the PI. She appeared to enjoy showing the PI her game, smiling and laughing while she shared. The PI had to redirect her to the work system and remind her she had optional breaks during which she could resume playing her game. She was hesitant to begin the process, however, because she felt that making a repertory grid would be a 'judgmental' process. After the PI reassured her she would just be asked to share her thoughts and opinions about people, not necessarily judge them, she agreed to proceed.

During Stage 1: Describing Elements, she required continual prompting (**Table 6**) to describe elements in terms of their personalities rather than physical attributes and/or behaviors. Her need for this prompt declined sharply during the second stage of the process, which may have indicated she had mapped the process and understood that her comparisons and contrasts of people were expected to be

in terms of their personalities. She took full advantage of her first optional break after completing Stage 1.

**Table 6:** *Kristina's Stage 1 prompt hierarchy.*

<b>Stage 1: Describing Elements</b>	<b>OP1</b>	<b>OP2</b>
<b>E1:</b> Kristina (self)	<b>1</b>	<b>1</b>
<b>E2:</b> Gina (ideal self)	<b>4</b>	<b>1</b>
<b>E3:</b> Marc (disliked)	<b>2</b>	<b>1</b>
<b>E4:</b> Jeffery (annoying)	<b>2</b>	<b>2</b>
<b>E5:</b> Mom (family)	<b>2</b>	<b>1</b>
<b>E6:</b> Thunder (liked)	<b>0</b>	<b>1</b>
<b>E7:</b> Mario (want to befriend)	<b>1</b>	<b>1</b>

*OP=optional prompt*

*OP1='Can you describe him/her in terms of his/her personality?'*

*OP2='How else would you describe X?'*

At the beginning of her first break, Kristina bargained with the PI to combine her three 5-minute breaks into one 15-minute break so she could play her video game for longer than five minutes. Her video game was a highly motivating and preferred activity. Congruent with information shared by her mother during the CARS2-HF interview, redirecting Kristina away from a highly preferred activity to a different activity was extremely difficult. Her mother noted that Kristina preferred to complete each activity fully before moving on to something else – this made it difficult for her to stop playing her video game because she was in the middle of some epic battle with a bad guy she spent a long time searching for. Further, her mother mentioned that trying to engage Kristina in activities that were not of high-interest to her is also difficult. The repertory grid process was not of high interest to Kristina, which made the process of redirecting her away from the preferred game and to the non-preferred repertory grid process difficult. The PI reminded Kristina of the agreement she made to reengage her in the research process. Given this, the

PI felt she handled the situation well: she was not always enthusiastic about the research process, but she did cooperate for the most part.

Even though the PI was able to bring Kristina back to task after the break, her motivation to proceed after leaving the video game was very low. So, to keep her going, the PI took advantage of opportunities to relate the information she shared during the repertory grid process back to another topic she enjoyed discussing – the book she wrote about Lazarians. It was helpful that Kristina’s ideal self was the main character of the book she wrote. Though this was helpful, it appeared that Kristina still struggled with some aspects of the process, as evidenced by some of the prompting she required during Stage 2. It is worth noting that all people who participate in the process of making a repertory grid require some degree of prompting. Thus, it is unclear whether the prompting Kristina needed was due to challenges from ASD or if a typically developing teen would have required similar levels and numbers of prompts.

During Stage 2: Maximum Triadic Method of Eliciting Constructs Kristina was unable to compare and contrast triads of elements beyond the initial triad. She required Optional Prompt 5: Dyadic Comparison of two elements to complete the process of eliciting constructs (**Table 7**). It appeared to the PI that her struggle with stage two was at least two-fold: she was lacking motivation for the research process since discontinuing her video game, and, in a rather inflexible interpretation of ‘similar’, Kristina was either unable or refused to consider elements she saw as being very different (e.g., a liked person and annoying person) as sharing any similar personality traits. Thus, Optional Prompts 1 and 2 related to the triadic

method of eliciting constructs were not used with Kristina after the first triadic comparison. Optional Prompts 4 and 5 were used through the remainder of Stage 2.

**Table 7:** *Kristina's Stage 2 prompt hierarchy*

<b>Stage 2: Eliciting Constructs</b>	<b>OP1</b>	<b>OP2</b>	<b>OP3</b>	<b>OP4</b>	<b>OP5</b>
<b>Triad 1</b>	<b>1</b>	<b>1</b>	<b>4</b>	<b>4</b>	<b>-</b>
<b>Triad 2/Dyad1</b>	<b>1</b>	<b>-</b>	<b>-</b>	<b>1</b>	<b>1</b>
<b>Dyad 2</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>1</b>	<b>1</b>
<b>Dyad 3</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>1</b>	<b>1</b>
<b>Dyad 4</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>1</b>	<b>1</b>
<b>Dyad 5</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>1</b>	<b>1</b>
<b>Dyad 6</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>1</b>	<b>1</b>

*OP=optional prompt*

*OP1: 'How are these two similar?'*

*OP2: 'How is this one different from these two?'*

*OP3: 'Can you describe how these two are alike and this one is different in terms of their personalities?'*

*OP4: 'What is the opposite of X to you?'*

*OP5: dyadic comparison: 'How are these two different from each other?'*

Kristina's scores on the CELF-5 were the highest of all participants: nearly one standard deviation above the mean for her core, receptive, and expressive language abilities (**Table 8**).

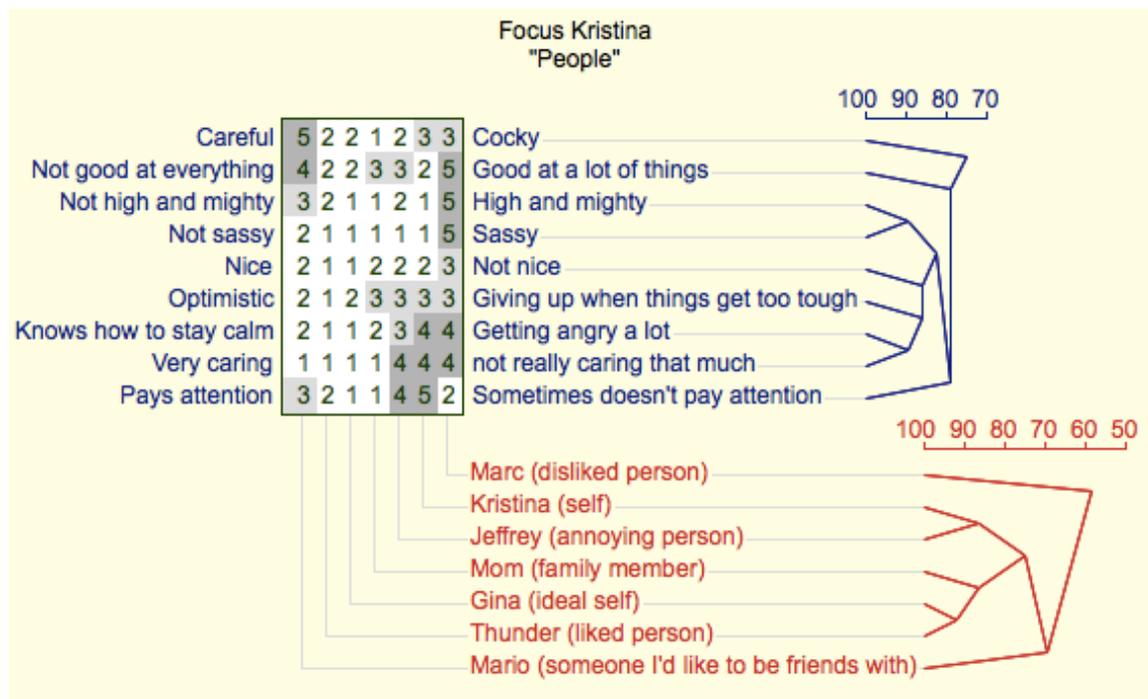
**Table 8:** *Kristina's qualifying assessment scores*

<b>Assessment</b>	<b>Standard Score</b>
TONI-3	115
PPVT-4	110
CELF-5 Core Language	113
CELF-5 Receptive Language	112
CELF-5 Expressive Language	118
CARS2-HF	39

She struggled, however, during the repertory grid process, requiring multiple prompts to describe people in terms of their personalities. She also struggled to compare triads of people and had to revert to contrasting pairs of people instead. Given her proficiency on the qualifying assessments, the struggles she encountered with the repertory grid process was not easily foreseen. When her scores on the CELF-5 are considered on the more detailed level of skills identified by the subtest

scores, her lowest score (though still in the average range) was 10 on the Semantic Relationships subtest. Among other language skills, this subtest measures the subject's ability to make comparisons, interpret relationships between concepts, and recall and use information from orders of events and/or persons.

The repertory grid task of comparing and contrasting individuals based on life experiences calls on one's ability to comprehend the concept of comparing and contrasting individuals on the basis of personality traits and call on personal experiences with persons and events to make comparisons between the elements (people) for the grid. This was Kristina's weakest area of linguistic ability, and it may have foreshadowed the difficulty she had comparing and contrasting elements for the repertory grid process. Though the process was challenging for both Kristina and the PI, she did successfully create a repertory grid (**Figure 18**).



**Figure 18:** Kristina's Repertory Grid

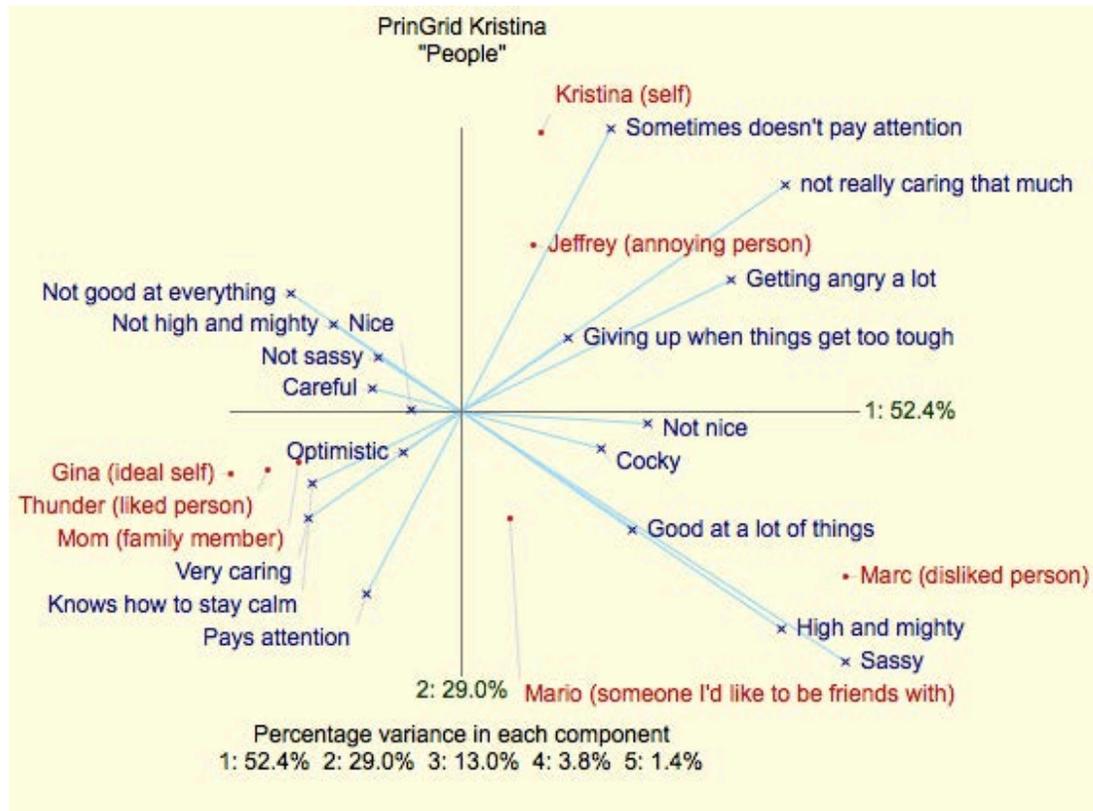
**Constructs.** Kristina produced 9 bi-polar constructs that form into two distinct clusters. The first cluster includes two closely linked constructs, *not high and mighty*  $\leftrightarrow$  *high and mighty*, and *not sassy*  $\leftrightarrow$  *sassy*. The second cluster, though linked somewhat more loosely together, includes 4 constructs, *nice*  $\leftrightarrow$  *not nice*, *optimistic*  $\leftrightarrow$  *giving up when things get too tough*, *knows how to stay calm*  $\leftrightarrow$  *getting angry a lot*, and *very caring*  $\leftrightarrow$  *not really caring that much*. The significance of these clusters relates to the implications they have for Kristina's construing of herself and others. For example, if Kristina interacts with someone who is *nice* to her, she is likely to automatically and unconsciously also attribute the associated traits of *optimistic*, *calm*, and *caring* to that person. Conversely, if she interacts with someone who gets *angry*, she will likely attribute negative poles of the clustered constructs (i.e., *not nice*, *giving up when things get too tough*, and *not caring*) to that person.

When speaking about Thunder (her 'liked person' element), Kristina emphasized how she admired his ability to *stay calm* and be *optimistic*, and that she appreciated how he was always *very caring* and *paying attention* to her. These constructs also emerged when she discussed her relationship with her mother, and when she described her ideal self (whom she named 'Gina'). The closeness of these constructs and her rating of these particular elements on those constructs could imply that she may seek out and value relationships with people she construes as being *very caring*, *optimistic*, people who *know how to stay calm* and *pay attention*.

**Elements.** There are two distinct clusters of elements in Kristina’s repertory grid. In one cluster, Gina (her ideal self) and Thunder (someone she likes) are very closely linked, and those two are somewhat more loosely linked to Kristina’s mother. The second cluster, interestingly, links Kristina with her brother, Jeffery, whom she chose to represent the ‘annoying person’ element for her grid.

When discussing elements individually, Kristina described everyone using the *nice*  $\leftrightarrow$  *not nice* construct. Even the person she disliked was someone who ‘*could be nice sometimes*’. Looking at how she rated elements on this construct, no one was given a rating more severe than ‘3’ (with ‘1’ being *nice*, ‘5’ being *not nice*). Her ratings may suggest she has a personal desire to refrain from considering anyone to be *not nice*, or perhaps an altruistic view that people are generally *nice* more than they are *not nice*. It may also suggest a potential internal conflict of her construct system in which she does not want to see herself as being “judgmental”. This is reflected in how Kristen distances herself from the negative poles of the constructs *sassy*  $\leftrightarrow$  *not sassy*, *high and mighty*  $\leftrightarrow$  *not high and mighty*, and *cocky*  $\leftrightarrow$  *careful*. If she judges people as being *not nice*, then she is being exactly that – sassy, high and mighty, and cocky. Additionally, recall that she hesitated to initiate the repertory grid process as she felt it would place her in the role of being ‘judgmental’ of the people she would discuss. This conflicts with how she sees herself, so instead of risking upsetting her self-view, she rates everyone as *nice*.

**Principal component analysis.** Kristina’s social perceptions of herself and others are more easily seen in her Principal Component Map, displayed in **Figure 19**:



**Figure 19:** Kristina’s Principal Component Map

The clustering of elements and constructs are seen here with a different perspective of distance. As can be seen in **Figure 19**, Kristina positions herself as the polar opposite of her ideal self, ‘Gina’. She idealizes Gina as someone who is *optimistic, calm, caring*, and as someone who *pays attention*, with real role models for this projected view of herself in the forms of ‘Thunder’ (someone she likes) and her Mother. Kristina attributes to herself the traits *sometimes doesn’t pay attention, not really caring that much, getting angry a lot*, and *giving up when things get too tough*. Indeed, Kristina’s interactions with the PI supported her internal construct

system and the traits she attributed to herself. She was easily angered whenever the PI redirected her to the research process and away from her video game, and she was ready to give up more than once.

Importantly, although Kristina's positioning of her 'self' far from her 'ideal self' suggests an impaired sense of self-esteem (Neimeyer, personal communication, September 15, 2015), she is also distanced from the more negative traits she associates with Marc, her 'disliked' person. In fact, Kristina's positioning of her 'self' and 'ideal self' suggests awareness of specific areas of weakness and an understanding that making changes to those areas will positively impact her sense of self and social functioning.

It is also significant that 'Marc', the person Kristina dislikes, is positioned in a separate quadrant that emphasizes the traits *not nice, cocky, good at lots of things, high and mighty, and sassy*. These traits suggest that Kristina is sensitive to people whom she perceives as "judgmental" or who act as if they are better than others. It is likely that Kristina may have trouble getting along with peers who project these traits. However, it is possible that Kristina is somewhat open to the possibility of befriending a person that embodies some traits like being *cocky* and *good at everything*, as evidenced by the position of Mario, someone she would like to befriend, on her principal component map. It may be easier for Kristina to engage with such a person if he or she is also able to *pay attention* and be *optimistic*, as she sees Mario being. Similarly, an ideal caregiver for Kristina would be someone who is *optimistic, caring, stays calm, and pays attention* to her, as opposed to someone she

may construe as being *sassy* or someone who appears to be very knowledgeable and could be perceived as *cocky* and *high and mighty*.

### **Case #2: Daniel**

Daniel is a seventeen-year-old male attending a local Midwestern high school. Daniel was diagnosed with Asperger syndrome at six years-of-age by a local developmental pediatrician. His mother commented that she knew Daniel was different in certain ways from a very young age. He would not make eye contact. She also reported that he exhibited some tactile defensiveness; that is, he was particularly sensitive to textures, especially those of clothing. His mother would have to cut out all tags from his shirts. Daniel received services from an occupational therapist to help with this.

His mother indicated that Daniel has always been very curious. He likes to explore, particularly new environments, and does not appear to understand that he should not explore some places. His mother shared her concern that one day he may be confronted by a security guard for being somewhere he is not authorized to explore.

She stated that transitioning can be challenging for Daniel. He likes to make sure whatever he is doing is completely finished before moving onto a new place or activity. This presents him with challenges at school; however, he prefers to follow rules, and he does not like to be tardy. Helping him focus on following rules has helped him with transitions between activities and classes at school.

Daniel tends to keep to himself at school. He's not very social, but he has a small, core group of friends from school he likes to hang out with. Their parents will

drop them off to have dinner and see a movie together, then pick them up at a designated time and place. His mother stressed the importance of Daniel learning to be more independent, and she feels he's learning to do so by hanging out with friends. She also mentioned Daniel is kind of the leader of this group. His friends are a little different, like he is, and they follow Daniel's lead. She questions the group's choice of activities and movies sometimes, as she feels they are below the level of what typical seventeen-year-olds would watch, and she tells Daniel what she thinks. Daniel's mother stressed the importance of making Daniel aware of how he is compared to typical peers his age: she said she is always very honest with him, and that he handles her insights well.

His body language is, she said, rather awkward. His mother shared that she can tell more about his feelings through his eyes and facial expressions than anything else, and that those facial expressions are often exaggerated. She feels he is often unaware of how he looks when he makes different faces, and feels he could use some feedback or some kind of social coaching to help with this. Daniel can 'ping-pong' back and forth during conversation, taking turns and keeping the conversation going as long as it's a topic of interest to him. He often starts talking and others cannot get their turn to speak. His mother said it helps to stop and remind him that someone else may want to comment, ask a question, or have something to say so that he allows the other person to have turns in the conversation.

When the PI first greeted Daniel in the clinic waiting room, Daniel replied by echoing back the PI's greeting word for word, and he looked around at the room

rather than looking at the PI. Immediately the PI wondered if the language skills of a teenager presenting with immediate echolalia would be functional enough for him to understand and participate in the research process. Indeed, Daniel’s scores on the CELF-5 were low in comparison with other participants in the study, but were still within 1.5 standard deviations (one standard deviation being 15 points) of the mean (the mean of 100 points; **Table 9**). The CARS2-HF interview with Daniel’s mother revealed that Daniel is sometimes echolalic in new environments and situations, and that once he becomes relatively familiar with the new setting, the echolalia discontinues. This information is particularly noteworthy because without formal assessment of Daniel’s cognitive and linguistic abilities, it is possible, perhaps even likely, that someone preparing to work with Daniel could discount his abilities based on what initially appears to be severe and nonfunctional immediate echolalia.

**Table 9:** Daniel’s qualifying assessment scores

Assessment	Standard Score
TONI-3	125
PPVT-4	103
CELF-5 Core Language	81
CELF-5 Receptive Language	79
CELF-5 Expressive Language	79
CARS2-HF	38.5

His mother also commented during the CARS2-HF interview that Daniel has always been very formal in conversation, and this was immediately apparent to the PI during the research session. In the treatment room, Daniel told the PI: *“Well, I can tell you one thing for certain: some of this might be interesting, perhaps.”* During the research process, Daniel shared with the PI his future goals of becoming a paleontologist, movie critic, and conservationist. Daniel’s uncharacteristically formal

language often included scripted phrases such as: *'well, very well, then – let us continue; proceed'* and *'and that, my fine friend, is that'*.

It was difficult at times for Daniel to engage in conversation during the repertory grid process. He struggled to form grammatically and syntactically correct sentences during verbal discourse with the PI, and this difficulty was predicted by his results on subtests (Formulated Sentences and Sentence Assembly) of the CELF-5. Contrary to suggestion of another area of weakness identified by the CELF-5, however, he did not appear to experience difficulty comprehending and following auditory directions for the tasks requested of him during the repertory grid process. Daniel's language scores as measured by the CELF-5 were the lowest of all participants – almost 1.5 standard deviations (one standard deviation being 15 points) below the mean (the mean being 100 points). Interestingly, however, he required the least amount of prompting to consider others in terms of their personalities rather than concrete, physical descriptions. He was more flexible than other participants during the maximum triadic method of eliciting constructs, as he worked diligently to produce similarities between people he viewed quite differently in affective terms (e.g., finding a similarity between a liked and disliked person).

During Stage 1: Describing Elements, Daniel did not require additional optional prompts to describe the people he selected to represent his elements (**Table 10**). He described elements in terms of their personality traits without needing any of the optional prompts from the PI.

**Table 10:** Daniel's Stage 1 prompt hierarchy.

<b>Stage 1: Describing Elements</b>	<b>OP1</b>	<b>OP2</b>
<b>E1:</b> Daniel (self)	-	-
<b>E2:</b> Professor X (ideal self)	-	-
<b>E3:</b> Michael (disliked)	-	-
<b>E4:</b> Joseph (annoying)	-	-
<b>E5:</b> Grandpa Elliott Grimshaw (family)	-	-
<b>E6:</b> Isaac Daily (liked)	-	-
<b>E7:</b> Dr. George Nelson (want to befriend)	-	-

*OP=optional prompt*

*OP1='Can you describe him/her in terms of his/her personality?'*

*OP2='How else would you describe X?'*

In lieu of being asked how else he would describe elements, waiting in expected silence appeared to be an effective tool to elicit further elaboration from Daniel. When he finished describing an element, Daniel would say: *'okay, ready for the next one'* or *'okay, I'm good'*, independently rotate the next post-it note into the focus box, and begin describing the next element.

During Stage 2: Maximum Triadic Method of Eliciting Constructs, Daniel often used scripted phrases to lead into his responses (e.g., *"what makes these two similar is..., what makes this one different is..."*), and he often used *'of course'* to fill spaces between thoughts (e.g., *"...so that's what makes us similar, of course, that we're both brothers and we're both in the same family. We're both smart here, of course, and both strong here, of course, although I am the taller one as well..."*). Throughout the process of constructing the repertory grid, it helped Daniel to have long response times to contemplate his responses. He often offered elaborate explanations for his construct poles, providing the PI with detailed examples supporting his chosen constructs (e.g., the opposite of sneaky was *"being loud or upwind – and that entails*

*standing up, because you're much more easy to detect when you are standing up and being loud than when you are not").*

It appeared to the PI that Daniel's need for multiple prompts helping him consider how elements were different (**Table 11**: Optional Prompts 2 and 4) may have been related to difficulty he had construing elements he liked or admired in a negative light. His opposite, non-preferred construct poles were often negative in affect. When an element he liked was in the '*different*' position on the focus box, it was often difficult for him to consider that element in terms of the negative pole of the construct.

**Table 11:** Daniel's Stage 2 prompt hierarchy.

<b>Stage 2: Eliciting Constructs</b>	<b>OP1</b>	<b>OP2</b>	<b>OP3</b>	<b>OP4</b>	<b>OP5</b>
<b>Triad 1</b>	<b>1</b>	<b>2</b>	<b>1</b>	-	-
<b>Triad 2</b>	<b>2</b>	<b>1</b>	<b>2</b>	-	-
<b>Triad 3</b>	-	<b>3</b>	-	-	-
<b>Triad 4</b>	-	<b>2</b>	-	<b>1</b>	-
<b>Triad 5</b>	-	<b>3</b>	-	<b>3</b>	-
<b>Triad 6</b>	-	-	-	<b>4</b>	-
<b>Triad 7</b>	<b>1</b>	-	<b>1</b>	<b>1</b>	-
<b>Triad 8</b>	<b>1</b>	<b>1</b>	-	<b>1</b>	-
<b>Triad 9</b>	-	-	-	<b>2</b>	-
<b>Triad 10</b>	-	<b>2</b>	<b>1</b>	-	-

*OP=optional prompt*

*OP1: 'How are these two similar?'*

*OP2: 'How is this one different from these two?'*

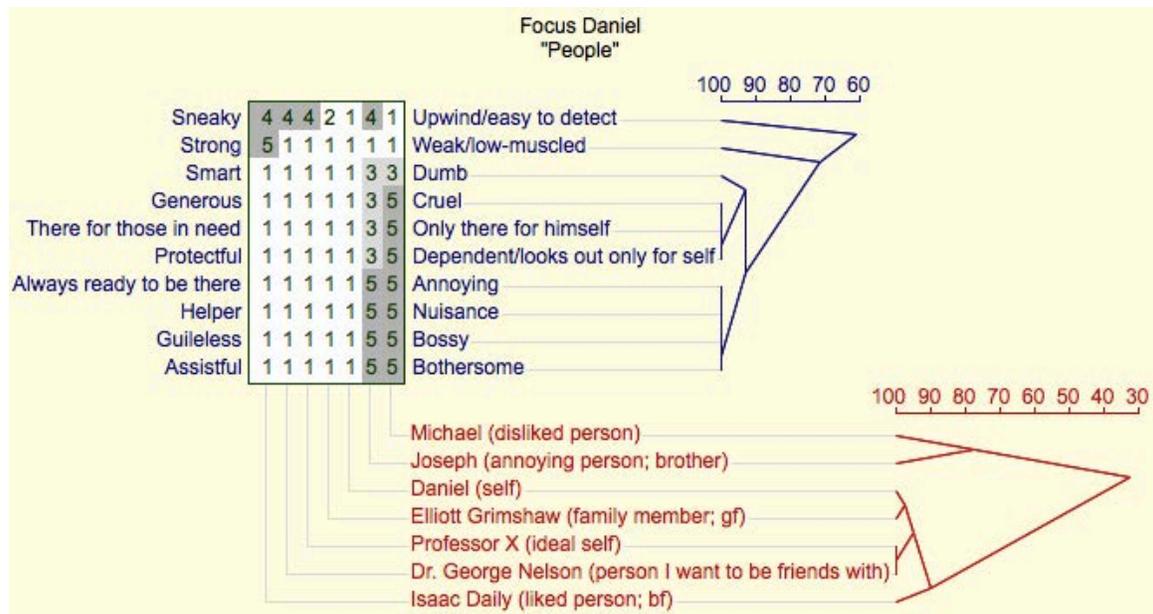
*OP3: 'Can you describe how these two are alike and this one is different in terms of their personalities?'*

*OP4: 'What is the opposite of X to you?'*

*OP5: dyadic comparison: 'How are these two different from each other?'*

During comparing and contrasting Triad 9, Daniel became visibly distraught, yawning, stretching, rubbing his eyes and face, and appearing tired from the process. The PI asked if he was tiring of the process, and he replied '*no, no, of course not – it's just hard for me to think of some of this, but I can think of something for some*

of this, I assure you.’ Overall, Daniel completed 10 triadic comparisons to establish his repertory grid (**Figure 20**).



**Figure 20:** Daniel's Repertory Grid

**Constructs.** Two distinct clusters of constructs emerge from the dendrogram above. The first cluster of three closely linked constructs includes *generous*  $\leftrightarrow$  *cruel*, *there for those in need*  $\leftrightarrow$  *only there for himself*, and *protectful*  $\leftrightarrow$  *dependent/looks out only for self*. Also linked to these three, though somewhat more loosely, is the construct *smart*  $\leftrightarrow$  *dumb*. The second cluster, which is highly correlated and somewhat more loosely linked to the first cluster, includes the constructs *always ready to be there*  $\leftrightarrow$  *annoying*, *helper*  $\leftrightarrow$  *nuisance*, *guileless*  $\leftrightarrow$  *bossy*, and *assistful*  $\leftrightarrow$  *bothersome*. The significance of these clusters relates to the implications they have for Daniel's construing of himself and others. For example, if Daniel encounters someone being *generous*, he is likely to automatically and unconsciously view that person as being *protectful* and *there for those in need* as those constructs are closely linked with the construct *generous*.

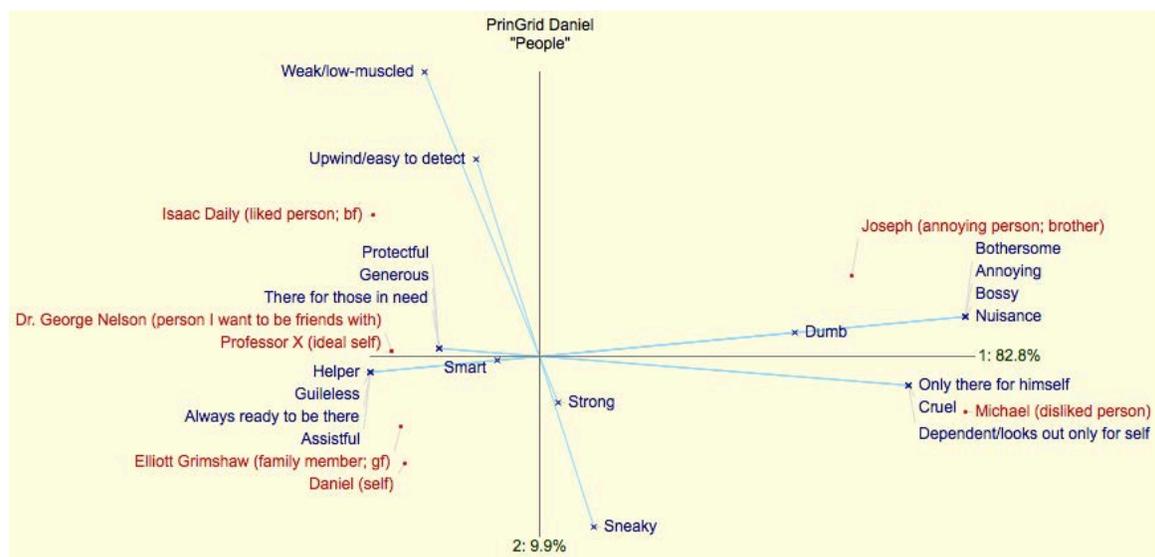
Conversely, if he has an interaction with someone he sees as being *cruel*, he will likely view that person as someone who *only looks out for himself*.

Daniel described his Grandfather as a war hero who foiled his opponents in Korea by being *sneaky*, but in a very positive way. It was clear to the PI from Daniel's description that his Grandfather was a kind of hero to him, too. Indeed, his Grandfather can be found in the repertory grid above at the positive poles of all Daniel's constructs. Daniel emphasized the importance of his Grandfather's qualities of being a *helper*, *assistful*, *guileless*, and *always ready to be there*. One can see from his ratings of other elements his ideal self and, interestingly, his current self, received similar rankings on almost all constructs. This may imply the importance of these personality traits to him and could predict he would gravitate toward those he sees as being *helpful* or *assistful*. Due to the close linkages of these constructs, he may automatically attribute his constructs of *guileless* to people he sees being *helpful* or *assistful*, and he may further assume they are *always ready to be there* for him.

**Elements.** Daniel's grid reveals two distinct clusters of elements. In one cluster, Professor X (his 'ideal self' element) and Dr. George Nelson (someone he would like to be friends with) have been rated exactly the same for all constructs. Apparently, they embody all of his preferred character traits, including being *helpful*, *smart*, *strong* and being *there for those in need*, but they are not *sneaky*, like his idealized Grandfather was in the war. These two elements are very closely linked to Daniel and his Grandfather, and somewhat more loosely linked to Isaac Daily, his friend, and the 'liked person' element of his grid.

It is interesting to note that Daniel rated himself '1' for all constructs – implying that he embodies all of his preferred constructs and none of his non-preferred opposite poles of those constructs. This is particularly interesting considering his construct *sneaky*  $\leftrightarrow$  *upwind/easy to detect*. Recall that he described being sneaky as a good trait when discussing his Grandfather's success during the war. However, he rated his ideal self (Professor X) as someone who would be *upwind/easy to detect*, and he considers Michael (his 'disliked person' element) to be sneaky. The difference in his application of this construct to these elements implies that this construct may be subject to the context of the situation in which the person is considered: in wartime, it was good for his Grandfather to be *sneaky*. In real-time outside of war, however, being *sneaky* may be a negative character trait in Daniel's eyes. Or, it may suggest that Daniel idealizes his Grandfather to the point of wanting to be like him to the extent that he sees himself embodying those traits

**Principal component analysis.** Daniel's social perceptions of himself and others are more easily seen in his Principal Component Map (**Figure 21**).



**Figure 21:** Daniel's Principal Component Map

His principal component of constructs appears to revolve around how helpful people are to him: he needs to know they will be there for him and are ready to protect and assist him. These are the people Daniel will bond the easiest with in his life. Given the closeness of these constructs with *smart*  $\leftrightarrow$  *dumb* and *generous*  $\leftrightarrow$  *cruel*, it is highly likely that Daniel will attribute intelligence and generosity to people who help or protect him in some way. More than 80% of the variance in his construct system is represented by the constructs that make up this first component. The significantly high amount of variance revolving around this rather limited scope of understanding people could make it difficult for Daniel to understand and anticipate other people who do not fall within the range of his construct system.

As can be seen in **Figure 21**, Daniel positions himself in the same quadrant with his Grandfather. This shows that he views himself as being a *generous* person who is *smart*, *helpful*, and *always ready to be there* for others, just like his real-life hero. It is interesting to consider the position of Isaac, his 'liked person' element, in this map. Isaac embodies many of Daniel's preferred character traits of being *there for those in need*, *protectful*, and *generous*. Though he is also *weak/low muscled*, and also more *upwind/easy to detect*, two of Daniel's non-preferred construct poles, Isaac is still someone Daniel likes very much: he described Isaac as being one of his 'very best friends' during Stage 1 of the research process. A potential avenue into elaborating Daniel's social construing might be by exploring the unique characteristics of friends like Isaac, who depart somewhat from his normative representation of positive others by being somewhat more *weak* and *upwind/easier*

*to detect*, but still well-liked (Neimeyer, personal communication, September 15, 2015).

The position of Joseph ('annoying person' element) and Michael ('disliked person' element) at the polar opposites of Daniel's preferred constructs suggests an internal social organization that helps him designate liked and disliked persons using his construct system. Joseph and Michael, embodying traits such as *annoying*, *cruel*, and *only there for himself* suggests Daniel may be particularly sensitive to people who are selfish and inconsiderate of others, and consequently it may be difficult for him to get along with people he sees as possessing some of these character traits. It may be useful to help Daniel expand his social construing to use his highly valued core constructs of *helpfulness* and *generosity* by considering how he might *generously* understand more *annoying* characters or how he might interact with them in a more *helpful* way (Neimeyer, personal communication, September 15, 2015).

### **Case #3: Angela**

Angela is a sixteen-year-old female attending eleventh grade at a Midwestern high school. The PI interviewed Angela's grandmother, who is actually Angela's adopted mother. Her grandmother told the PI that when Angela was young, she thought that Angela was a normal kid. She had multiple ear infections as a child, and she had speech problems because of the infections. She struggled in noisy environments and to this day continues to plug her ears during Fourth of July fireworks displays. She preferred to play by herself quite often as a child, but it did not seem odd to her grandmother initially because for the first four years or so of

her life there were no other kids around for Angela to play with. When Angela was in daycare, however, her grandmother would get reports from daycare that while all the other kids knew and followed the daily routine, Angela would come in and get out a box of toys and just start playing by herself. She wouldn't always notice the other kids, and she would play on her own beside them, but not with them.

She had no fear of strangers as a child. She would approach strangers and start talking to them. When asked by her grandmother if Angela knew the stranger, Angela would reply *'yeah! He said his name is X!'* So, her grandparents worked hard to teach Angela about safety, what it meant to be a 'stranger', and that she should be cautious of strangers. This caused problems when school started, however, because Angela didn't know the teachers initially, which meant they were 'strangers', so she refused to talk to them. This was especially problematic for substitute teachers. Her grandmother commented that it took a long time to help Angela modify her very concrete understanding and application of 'stranger' to be more flexible in situations like school.

Transitions were, and still are, anxiety provoking for Angela. She needs advance notice for any changes in daily routines. She takes medication for anxiety, which she refers to as her 'chill pill'. It calms her down 'just enough' to be able to handle big changes and new environments. The new rooms, schedules, people, and routines that come with each new school year are always difficult for her. Angela's grandmother has made a habit of meeting with the teachers prior to the start of classes to discuss Angela and her special needs. She finds it helps teachers better understand how to interact with Angela to keep her functioning in class and keep

anxiety levels low. Angela draws when she's anxious to calm herself down. Teachers in the past who have taken away Angela's drawings or stopped her from drawing during class have been met with tantrums: Angela would scream and yell trying to get the drawings back from the teacher.

Angela described to her grandmother the challenge her autism presents for her at school as "being in a room where someone turned on a bunch of TV's on different channels, then someone whispers in her ear '*do you hear what I'm saying?*'" It is difficult for Angela to filter out all the distractions and focus on what is important. Major changes are big sources of anxiety for Angela. Teachers often comment they do not know whether or not Angela is listening because she does not always look at them when they talk to her – she might be looking around or drawing. If she gets anxious or upset with someone, Angela needs to fully explain to that person exactly why she is upset. This sometimes happens with teachers at school. If a teacher cuts her off when she is trying to explain herself, she gets further upset and angry. Her anger then builds continually to a point where she completely shuts the teacher out. Her grandmother mentioned that if a teacher makes her very angry, Angela loses trust in that teacher and then it's all over – there's no going back.

Angela's grandmother said that Angela tries to interact with others and make friends – she will initiate interactions with others. Her grandmother has always feared that Angela would be "submarined" by fake friends who would take advantage of her and get her into trouble. Most of Angela's friends have their own issues – not necessarily disabilities, but they are peers who are outcasts. Her friends who have siblings with autism understand Angela better and are better friends to

her. Taking turns in conversation is challenging for Angela, and many of her friends share this problem. They may start out taking turns talking about the same topic, but eventually each of them ends up talking about their own subject and listening to themselves rather than listening to one another and sharing the topic of conversation – a habit often noted with individuals with autism.

Though Angela’s scores on the qualifying cognitive and language assessments were within the average range (**Table 12**), the PI noticed definite qualitatively autistic differences in Angela’s social exchanges during the research process.

**Table 12:** *Angela’s qualifying assessment scores*

Assessment	Standard Score
TONI-3	96
PPVT-4	99
CELF-5 Core Language	95
CELF-5 Receptive Language	104
CELF-5 Expressive Language	87
CARS2-HF	38.5

Just as her grandmother described during the CARS2-HF interview, she was extremely sensitive to noises in the environment; she was easily distracted by sounds from the surrounding clinic treatment rooms. When discussing the work system for the process, Angela repeatedly interrupted the PI to ask clarifying questions regarding the schedule, asking the PI to define the tasks listed on the work system. Considering the advice her grandmother gave him during the interview – that cutting her off increases her anxiety levels – the PI answered Angela’s questions fully regardless of their often abrupt presentations in the middle of his conversational turns. In what appeared to be attempts to help herself better anticipate what the research tasks entailed, she verbally compared the tasks to

references and experiences familiar to her. She did this not in the form of questions to the PI, but rather as statements to no one in-particular, followed by pauses that permitted the PI to confirm or disconfirm her comparisons. For example, when referencing the Role Category Questionnaire on the work system, Angela asked if it was like role-playing: something she was familiar with from her interests in anime. When referencing the repertory grid process, she said: *'oh, it's like critiquing food, but this time you're critiquing people'*. This process of referencing familiar experiences to better understand and anticipate the tasks for the research process appeared to help Angela manage anxiety related to not knowing what would be expected of her. This would be a standard strategy used by someone when encountering new situations, but typically one would outwardly verbalize it. So, essentially, she appeared to be drawing on established constructs to better understand moments within this new situation (i.e., the research process).

Angela watched herself in the mirror whenever she spoke rather than visually referencing her conversational partner, the PI. Her prosody was flat overall, with occasional loud, rising intonation at the ends of phrases, which she apparently used for dramatic effect when telling stories. Her word choice was simple and sometimes odd (e.g., referring to herself as a 'lone-wolf') for a seventeen-year-old girl and void of slang terms one would expect an adolescent to use, especially when talking about her friends. It is plausible that some combination of her unique prosody, atypical nonverbal actions (e.g., odd/inconsistent visual referencing), simplistic conversation topics, word choices, and frequent interruptions during others' speech could contribute to challenges making and keeping friends her age.

Angela quickly established a number of repetitive routines during the research sessions: she circled the numbers of the elements *'so they (wouldn't) get mixed up'*, she counted on her fingers during the qualifying assessments to remember the directions, questions, and number of words the PI spoke, and she incessantly un-capped and recapped her pen: capping the pen after writing each element, just to uncap the pen to write the next element, rather than leaving the pen uncapped knowing she would be writing more.

Angela described herself as *'an overactive woman who wants to please people, but because of her being more of a lone-wolf, she can't; and she always fears, because she's almost more than 200 lbs., when she tries to sit on her boyfriend's lap, she'll break him.'* She continued describing herself, mentioning traits she liked about herself including her *'big boobs, dimply cheeks, and big, flashy eyelashes.'* When asked to describe herself in terms of her personality, she commented that it varied, like when she was *'on her menstrual cycle, she was super grouchy, but when (she's) normal with a few friends, (she's) one of the happiest persons ever.'* She went on to say that she tended to *'get a little annoying repeating a lot of stuff, but ...not very often.'* When prompted to see if there was anything else she wanted to add about her current self (element #1 for her repertory grid), she commented that she *'was born an accident: mother 18, dad left (her) at 2 days – so, yup, adopted by grandmother, happy life.'*

She described her ideal self (element #2) as being *'mostly the same as Angela, only just physical traits different. I personally love my personality,'* she said. *'I like being bubbly and happy, but I personally think that if I didn't have a big bulgy chin, big ears, this much weight, and such big bones, I think I might be better for a relationship.'*

The majority of differences she preferred between her current and ideal selves were physical in nature – her weight, being ‘big boned’ and ‘easy to pick up’ (literally – easy to be lifted off the ground by her boyfriend, who *‘only weighs about 170 lbs.’*). She required verbal prompting for all elements to consider them in terms of their personalities instead of their physical attributes (**Table 13**).

**Table 13:** *Angela’s Stage 1 prompt hierarchy*

<b>Stage 1: Describing Elements</b>	<b>OP1</b>	<b>OP2</b>
<b>E1:</b> Angela (self)	<b>1</b>	<b>1</b>
<b>E2:</b> Nina (ideal self)	<b>1</b>	-
<b>E3:</b> Macy (disliked)	<b>1</b>	-
<b>E4:</b> Allen (annoying)	<b>1</b>	-
<b>E5:</b> Mom (family)	<b>1</b>	-
<b>E6:</b> Christian (liked)	<b>1</b>	-
<b>E7:</b> Allison (want to befriend)	<b>1</b>	-

*OP=optional prompt*

*OP1=‘Can you describe him/her in terms of his/her personality?’*

*OP2=‘How else would you describe X?’*

When discussing her ideal self, Angela mentioned she would like to be ‘less sensitive’ in terms of *‘how she receive(d) things.’* She said anything that *‘doesn’t sound right or feel right just sends (her) into a panic.’* When asked to elaborate, she provided a tactile sensory example, of running fingers along certain types of materials that give her shivers.

Angela’s grandmother mentioned that Angela is brutally honest and will tell you exactly how she sees things. She said Angela is not always aware that a topic she discusses with you may be inappropriate or something you’re not interested in discussing. This was quickly apparent to the PI during the research process. Angela appeared completely comfortable describing her relationship with her boyfriend to the PI, sharing that they *‘never had, you know (while making hand gestures that suggested sexual relations), and yet we’ve been together for six years’,* but still her

grandmother was wary about letting Angela spend time with her boyfriend alone (which appeared to perplex Angela). She appeared to care what the PI thought, watching him after her comment to see how he would react, but she appeared unaware that this topic may be inappropriate to discuss with a man she'd known for only a few hours, or perhaps the PI would not care to discuss her intimate relations (or lack thereof) with her boyfriend in the research setting. This is noteworthy, especially when considering the Sociality Corollary of Kelly's theory of personal constructs, which states that the degree to which a person can construe another's process of construing, they can play a role in that person's social world. Angela was apparently unable to understand or predict the PI's construct system and consider the possibility that her discussion topic could be deemed inappropriate by the PI, which in turn could ostracize her from being able to play a role in his social world – regardless how brief her appearance in his social world may be. An interesting piece of this was that Angela did indeed show interest in what the PI was thinking about what she said, showing some degree of Theory of Mind by considering the thought process and reactions of the PI to what she was saying, but she did not appear to be able to get as far as predicting what his reaction to her comments would be before she spoke. Further, discussion of such a topic from a typically developing adolescent could be seen as an attempt to get a reaction out of someone for the sake of getting a reaction. For Angela, however, it appeared that she was using the opportunity to discuss experiences from her life that she has been unable to discuss with others, perhaps in an attempt to make sense of or give meaning to these events.

Angela described her mom (who is, in actuality, her grandmother), as *'one of the best womens'*, noting that while other moms would get annoyed and tell their children just to *'go to their rooms'*, her mom *'actually takes time to listen'*. Angela mentioned that she feels as though her mom is *'overprotective'*, and, further, she feels it is *'because of (her) autism that she thinks (Angela) can't handle (things: e.g., going shopping, seeing her friends, and cooking).'* Angela has noticed that people much younger than her do things she is not allowed to do (like cooking), and is upset by this. In this way, she is protected by her mother much like a young child is protected by his or her parents. Interestingly, some aspects of her descriptions of elements are much like that of a younger child: very concrete and physical in nature versus more abstract descriptions of character traits and personality (unless prompted by the PI). Additionally, her focus of descriptions and interests are also youthful in nature (e.g., anime, games she plays with friends – 'Johnny, Johnny, Appleseed', a playground game involving chasing playmates around four poles in a modified game of 'tag'). It is unclear whether she presented these childlike attributes because she is indeed overprotected by her grandparents, or whether her grandparents overprotect her because she presents with these childlike attributes.

During Stage 2 of the research process, Angela initially compared and contrasted elements (people) on the basis of physical traits. She actually labeled people as only being similar or different in *'physical attributes'*. The PI had to prompt her to consider people in terms of their personalities (**Table 14**) for 10 of 11 triadic comparisons. Her rather odd conversational topics continued into the second phase of the research session when she was presented with the first triad of

two female elements to consider in terms of similarities and one male element to consider as different. She informed the PI the similarity between the women was that they have to *'bear the children'*, and the difference for the man was that he would just *'bang and run'*. After this comment and the PI's prolonged silence, she politely said *'no offense, no offense'* in what appeared to be an attempt at excusing the PI from her stereotype.

**Table 14:** Angela's Stage 2 prompt hierarchy

<b>Stage 2: Eliciting Constructs</b>	<b>OP1</b>	<b>OP2</b>	<b>OP3</b>	<b>OP4</b>	<b>OP5</b>
<b>Triad 1</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	-
<b>Triad 2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	-
<b>Triad 3</b>	-	-	<b>2</b>	<b>1</b>	-
<b>Triad 4</b>	<b>1</b>	-	<b>2</b>	-	-
<b>Triad 5</b>	<b>3</b>	-	<b>2</b>	-	-
<b>Triad 6</b>	-	-	-	-	-
<b>Triad 7</b>	-	-	<b>1</b>	-	-
<b>Triad 8</b>	<b>1</b>	<b>1</b>	<b>1</b>	-	-
<b>Triad 9</b>	<b>1</b>	<b>1</b>	<b>1</b>	-	-
<b>Triad 10</b>	-	-	<b>1</b>	<b>2</b>	-
<b>Triad 11</b>	<b>2</b>	-	<b>1</b>	-	-

*OP=optional prompt*

*OP1: 'How are these two similar?'*

*OP2: 'How is this one different from these two?'*

*OP3: 'Can you describe how these two are alike and this one is different in terms of their personalities?'*

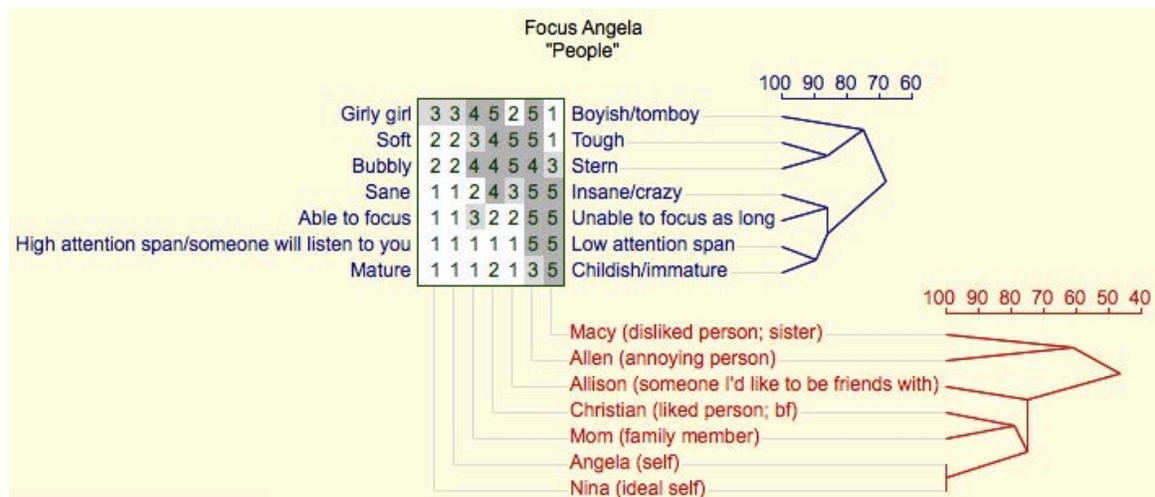
*OP4: 'What is the opposite of X to you?'*

*OP5: dyadic comparison: 'How are these two different from each other?'*

When the randomized triads of elements were arranged so that two people she saw quite differently were to be considered in terms of their similarities (i.e., her 'liked person' and her 'annoying person' elements) and contrasted with a third person (i.e., 'someone she wants to befriend') to be considered in terms of differences, she would inform the PI that he needed to switch the elements so that two preferred elements were considered similar and a non-preferred element was considered different if he *'wanted her opinion on it'*. She did this repeatedly,

regardless of how many times such a pattern occurred, and required prompting from the PI to proceed with the triad as it was presented. OP1 and OP2 were often used in this case. The PI acknowledged that some comparisons and contrasts were difficult for Angela, and he continually assured her that she was doing a good job with the research process.

**Constructs.** After successfully comparing and contrasting 11 triads, Angela rated all elements on each construct scale to complete her repertory grid (**Figure 22**).



**Figure 22:** Angela's Repertory Grid

Two distinct clusters of constructs emerge from the dendrogram above. The cluster containing two linked pairs of constructs includes *high attention span/someone will listen to you*  $\leftrightarrow$  *low attention span*, which is closely linked with *mature*  $\leftrightarrow$  *childish/immature*. This pair is linked to her constructs *sane*  $\leftrightarrow$  *crazy/insane*, and *able to focus*  $\leftrightarrow$  *unable to focus as long*. The significance of these constructs being linked closely together lies in how Angela is likely to construe and anticipate people using these constructs. For example, if Angela

interacts with someone who *listens to her* fully without cutting her off, it is highly likely she will view that person as *mature*, someone who is *able to focus*, and is *sane*. Since those constructs are so closely linked to one another, when she attributes one of those qualities to a person, it is likely she will automatically and unconsciously attribute the other closely linked constructs to that person as well. Conversely, if, for example, a teacher cuts her off when she is speaking to him or her (which we know from the interview with her Grandmother makes her very angry), she is likely to attribute the opposite construct pole to that person and see them as having a *low attention span*, and it is likely she will also see that person as being *unable to focus as long, immature, and crazy*.

The second cluster includes the constructs *tough*  $\leftrightarrow$  *soft*, and *stern*  $\leftrightarrow$  *bubbly*, and these construct pairs are loosely linked to *girly-girl*  $\leftrightarrow$  *boyish/tomboy*. She rated herself as having a *high attention span/someone who will listen* and *mature*. Another pair of closely linked constructs includes *soft*  $\leftrightarrow$  *tough*, and *bubbly*  $\leftrightarrow$  *stern*. Angela rated herself as being relatively *soft* and *bubbly* on these constructs. Though she construes herself in this way, she expressed how she admires people who can be more *tough, stern, and boyish*.

**Elements.** One of the most distinct clusters of elements in Angela's repertory grid is that of her current self and her ideal self, Nina. It is interesting that they occupy the exact same position on all of her personal constructs, indicating she sees little to no difference in who she is and who she would like to be, in terms of her personality, as measured by the constructs she provided. This high degree of congruence between her current self and ideal self implies that Angela enjoys high

self-esteem, seeing herself as unique rather than in some way peculiar (Neimeyer, Personal Communication, September 15, 2015). Indeed, Angela shared with the PI during the research process that she has autism, and that she is higher-functioning than many of her other friends who have autism. It is interesting to note some of the constructs she values and prefers, especially having a high attention span and being able to focus. The salience of themes concerning focusing and attention as valued qualities is notable, inasmuch as high functioning autism is often characterized by considerable capacity to focus on tasks and details that could be less likely to hold the attention of someone without autism (Neimeyer, Personal Communication, September 15, 2015).

The only differences between her current self and ideal self she discussed with the PI were physical traits: *"I'd like me better if I didn't have a chin, less weight, and thinner bones."* She shared with the PI that she felt changing physical traits would make her better for a relationship. She feared that: *"Because I'm big-boned, it affects the relationship – I just want to look good and be easy to pick up."* Her reference here to being 'picked up' was meant literally: she was referring to her body being physically lifted off the ground by her boyfriend. She did say her ideal self would not be *'super sensitive in how (she) received things'*. Initially, it sounded as though she meant that she is emotionally sensitive. Though that may be the case, when she elaborated about being sensitive, she did so in terms of tactile sensitivity, mentioning fabrics that she cannot stand to touch. Nina would also be married, she said, though she is still deciding whether or not she'll have kids. She assured the PI he would never know the pain of childbirth. Connected a bit more loosely with her



The clustering of elements and constructs are presented here with a different perspective of distance. The clustering seen in the grid is seen here as well, with Angela's current and ideal selves occupying the exact same position on the grid, but in a quadrant occupied solely by these two elements. She construes her current and ideal selves as being *able to focus*, more *sane*, and a bit more *bubbly* than the other elements in her grid. Christian and Allison are seen here as being *boyish/tomboy* and *mature*. She also construes her mother as being *mature*, having a *high attention span*, and being *someone who will listen to* Angela. She construes Allen, the 'annoying person' element, and Macy, the 'disliked person' element, as being *insane*, *childish*, *unable to focus as long*, and having *low attention spans*, occupying extreme opposites of her preferred construct poles. She also construes Christian, Allison, and her mother as all having the more *tough* and *stern* qualities she admires in others. Interestingly, Angela commented that she could not think of any similarities between her mom and Christian (her boyfriend); yet, she rated them similarly on multiple constructs, such that it can be seen in her principal components grid they are relatively close to each other in the same quadrant.

Considering the quadrants occupied by Allen (her 'annoying person' element) and Macy (her 'disliked person' element), one can see that it may be difficult for Angela to interact with people she sees as having *low attention spans* and are *unable to focus* for very long. She may automatically and unconsciously see people she views in this way as also being *immature* and *crazy*. Indeed, Allen and Macy embody all of these non-preferred construct poles. Thus, in a therapeutic setting focused on improving social interactions, it may be ideal to initially pair

Angela with a peer who is *able to focus* and will *listen to her*. Additionally, perhaps these qualities could be capitalized upon in intervention to help Angela *focus* on *listening to others* who are different from her, peers she may see as embodying some of her non-preferred constructs, to begin a process of expanding her social construing to include more varied personalities in a more positive light.

#### **Case #4: Casey**

Casey is a seventeen-year-old male attending a local Midwestern high school. He was diagnosed with autism at 3 years-of-age by a local developmental pediatrician. His mother reported during the CARS2-HF interview that at 2 years-of-age, Casey was not speaking and would not make eye contact with other people. He would not answer to his name, though he seemed to hear other sounds in the environment.

As a child, Casey enjoyed playing with toy cars, but the way he played with them was not normal. His mother reported that he would organize the cars by color, then mess them all up, then organize them by model, and mess them up, and reorganize them, and he continued playing in this way. He would also arrange the cars in what his mother called ‘intricate patterns’, his favorite of which was a ‘wagon wheel pattern’. His sisters really enjoyed Disney movies, and Casey became fixated on Snow White and the Seven Dwarfs. At four years of age, he would line up figurines of the dwarfs in the order in which they marched in the movie. He would notice if someone messed them up – moved them, changed their order – and he would put them back in their original order.

His mother did not recall Casey ever engaging in imaginary or symbolic play as a child. She said he has, however, always been very good at building things like Legos and Transformers. He enjoys building very intricate Lego creations. He only likes to build things that come with directions, and he follows the directions precisely: he has never created something original using the Lego sets – only what is prescribed by the directions that came with the set.

After discovering he had ‘glue ear’ (otitis media with effusion) at 2 ½ years-of-age which prevented him from hearing what his mother called ‘soft’ speech sounds (/h/, /k/), they had tubes put in his ears. At 3 ½ years-of-age, he was enrolled in speech-language therapy. His mother reported he was very sensitive to noise at that time, especially loud noises, and he would become easily startled. His sensitivity to noises continued as he grew older, and for many years he was unable to view movies in large theatres with surround sound.

Casey’s mother reported that his body use was always unusual. She said he walks ‘very disjointed’, has bad posture, and his head is always kind of forward of the rest of his torso. He could never run ‘correctly’, he would ‘kind of lope’. He has always been very uncoordinated, she said, which persists to this day. She reported he never exhibited any self-stimulatory characteristics of autism like hand flapping, toe walking, or spinning. He did, however, exhibit some tactile sensory issues. When he was little, he did not like tags in his shirts. He would hold the tag of a shirt he was wearing in his hand and back up against his mom, which was his way of communicating to her that he wanted her to cut off the tag. His mother said Casey will not go to someone and let them know if he is hurt or in pain. She said he does

not appear to be extra-sensitive in any physical way. She feels he may be less sensitive to pain than his peers. He kind of craves touch, and with people he likes he will often pat them on the back and give lots of hugs. In elementary school he had a 'banana' he would crawl into when he was stressed that provided deep sensory input, and the compression would help calm him.

Casey has never had problems or thrown tantrums when transitioning between activities and places, his mother reported. He does, however, become very upset if he feels his privacy has been violated: if someone gets into his things or takes something of his, like his Game Boy, he becomes very upset and will yell and try to take it back. His reactions, she says, are a little excessive in these instances.

If he's in a space without specific directions in which he does not know the process or what is expected of him, he 'turns inward'. In such a space, Casey will talk to himself; his mother said this helps him to tune out distracting noises and other things. She also reported that he does a pretty good job on his own in school, picking up on information he needs and sorting out distractions. She also said other people may think Casey is not paying attention because he appears to be 'staring off into space', but he does indeed listen, even if he is not visually focusing on the person speaking.

His mother reported that Casey speaks in monologues when he talks about something he likes. He can tell others what he needs and wants, and he can answer questions. He does occasionally engage others just to be social when he is happy. If he is unhappy or hurt, however, he will not initiate conversation. He does not have many friends at school. He is involved in 4H, but more because his father told him he

would be involved rather than him participating of his own volition. He enjoys seeing other kids at 4H having fun, but he tends to hang on the periphery rather than engaging in activities with the other kids.

Casey is very empathetic and highly sensitive to others' emotions. If he sees something come on television, like those commercials for the humane society where the animals look really sad and a sad Sarah McLaughlin song is playing, he has to get up and leave the room. He will become very upset if he sees other people being very upset. He hates when people argue and fight, and he feels others' pain very deeply. This concerns his mother, although she reported that he is able to remove himself from the situation independently if it gets too bad.

His verbal communication, she reports, is very labored. He will say 'I can't talk' when he has difficulty finding words he wants to say or putting words in the order he wants to say them. His speech is not free flowing at all. His mother reports that he has never been echolalic or used scripts when communicating verbally, and that it's easier for him to speak more fluently when discussing familiar topics than when expressing original thoughts. The PI noticed that, during the research session, Casey's responses were often very short and concise. He occasionally hesitated when responding, appearing to search for the word he wanted to say or struggling to speak. His scores on the qualifying cognitive and language assessments were within 1.5 standard deviations of the mean (with a mean of 100 and a standard deviation of 10) (**Table 15**).

**Table 15: Casey's qualifying assessment scores**

Assessment	Standard Score
TONI-3	115
PPVT-4	107
CELF-5 Core Language	95
CELF-5 Receptive Language	94
CELF-5 Expressive Language	91
CARS2-HF	38.5

Casey did not independently engage the PI in conversational exchange at any point during the research process. Casey sat in silence indefinitely without responding until the PI prompted him. He developed a repetitive routine with the pen, twisting the cap of the capped pen around in circles, uncapping and recapping the pen, and occasionally using the table to press the pen cap back onto the pen. Consistent with his mother's report, Casey exhibited some difficulties communicating verbally with the PI. His speech was riddled with occasional neologisms (i.e., 'working harking', which the PI clarified (and Casey agreed) meant 'hard working') abrupt, stunted pauses, then increased speed and volume toward the ends of phrases when he spoke. He often shrugged his shoulders, rolled his head in circles, and tilted his head quite far toward one shoulder or the other, such that his ear nearly touched his shoulder. He smiled throughout most of the session, and he often looked at the PI while the PI was talking, and before and after responding to the PI.

When asked to describe his current self, Casey said he was 'someone who's pretty nice to people if they nice at (him)', and 'someone who's pretty smart sometimes'. He also said he 'likes to be alone a lot'. He described his ideal self as someone who is 'cooperative to other people' and who 'tries as hard as (he) can'.

Casey provided no elaboration for any of his responses, and each individual response required a prompt from the PI. Casey offered no descriptions without first being prompted (**Table 16**).

**Table 16:** Casey's Stage 1 prompt hierarchy

<b>Stage 1: Describing Elements</b>	<b>OP1</b>	<b>OP2</b>
<b>E1:</b> Casey (self)	-	<b>4</b>
<b>E2:</b> Architect (ideal self)	<b>2</b>	<b>3</b>
<b>E3:</b> Jeremy (disliked)	-	<b>2</b>
<b>E4:</b> Scott (annoying)	-	<b>1</b>
<b>E5:</b> Carolyn (family)	<b>1</b>	<b>2</b>
<b>E6:</b> Nick (liked)	<b>1</b>	<b>3</b>
<b>E7:</b> Andrea (want to befriend)	<b>1</b>	<b>1</b>

*OP=optional prompt*

*OP1='Can you describe him/her in terms of his/her personality?'*

*OP2='How else would you describe X?'*

Casey struggled to compare and contrast triads of elements (people) during Stage 2 of the research process. Thus, all comparisons he made were dyadic (**Table 17**).

*Table 17: Casey's Stage 2 prompt hierarchy*

<b>Stage 2: Eliciting Constructs</b>	<b>OP1</b>	<b>OP2</b>	<b>OP3</b>	<b>OP4</b>	<b>OP5</b>	<b>*Vis</b>
<b>Triad 1</b>	<b>1</b>		<b>1</b>			
<b>Dyad 1</b>				<b>1</b>	<b>1</b>	
<b>Dyad 2</b>					<b>1</b>	
<b>Triad 2</b>	<b>1</b>	<b>1</b>			<b>1</b>	
<b>Triad 3</b>	<b>1</b>					
<b>Dyad 3</b>						<b>2</b>
<b>Dyad 4</b>					<b>2</b>	<b>1</b>
<b>Triad 4</b>	<b>2</b>	<b>2</b>	<b>1</b>			
<b>Dyad 5</b>				<b>1</b>	<b>1</b>	
<b>Dyad 6</b>				<b>1</b>	<b>1</b>	
<b>Triad 5</b>	<b>1</b>					
<b>Dyad 7</b>					<b>1</b>	<b>2</b>
<b>Dyad 8</b>			<b>1</b>	<b>1</b>		<b>2</b>
<b>Triad 6</b>	<b>2</b>	<b>1</b>		<b>1</b>		
<b>Dyad 9</b>						<b>1</b>
<b>Dyad 10</b>			<b>1</b>			<b>1</b>
<b>Triad 7</b>		<b>1</b>				
<b>Dyad 11</b>		<b>1</b>				<b>1</b>
<b>Dyad 12</b>				<b>1</b>		<b>1</b>
<b>Dyad 13</b>				<b>1</b>		<b>1</b>
<b>Dyad 14</b>						<b>1</b>
<b>Dyad 15</b>						<b>2</b>
<b>Dyad 16</b>						<b>1</b>
<b>Dyad 17</b>						<b>2</b>
<b>Triad 8</b>		<b>2</b>	<b>1</b>			

*OP=optional prompt*

*OP1: 'How are these two similar?'*

*OP2: 'How is this one different from these two?'*

*OP3: 'Can you describe how these two are alike and this one is different in terms of their personalities?'*

*OP4: 'What is the opposite of X to you?'*

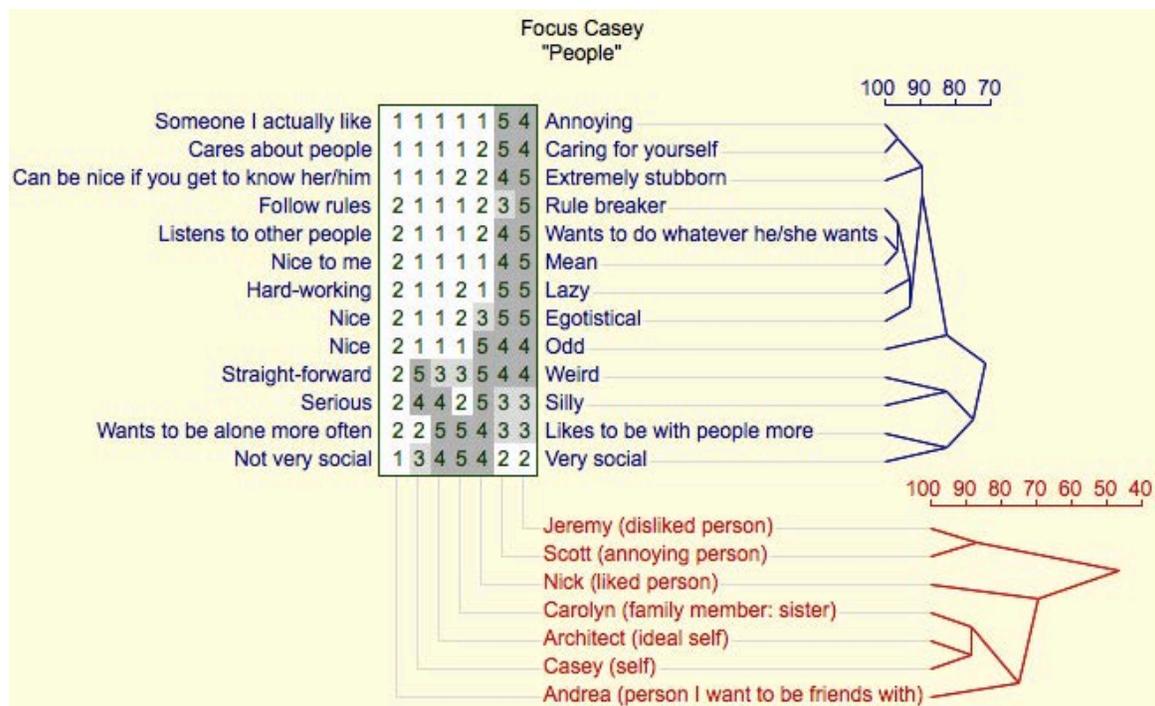
*OP5: dyadic comparison: 'How are these two different from each other?'*

*\*Vis: Casey independently engaged in dyadic comparisons using the focus box visual prompt*

It was difficult for Casey to produce constructs using the triadic method of elicitation. He would often respond: *"there is nothing similar about these two"*. The PI worked with Casey to elicit constructs using the dyadic method of elicitation (OP5) to contrast 17 dyads of elements. After contrasting two dyads, Casey began independently contrasting elements in the focus box before the PI could provide a

verbal prompt. The \**Vis* code in Table 2 represents those dyadic contrasts for which the visual prompt for OP5 (focus box: see Method, **Figure 13**, pg. 122) facilitated Casey's ability to contrast elements without verbal prompting.

Casey's completed repertory grid is presented in **Figure 24**.



**Figure 24:** Casey's Repertory Grid

**Constructs.** A core cluster of constructs emerges from Casey's repertory grid, which includes the constructs *follow rules*  $\leftrightarrow$  *rule breaker*, *listens to other people*  $\leftrightarrow$  *wants to do whatever he/she wants*, and *nice to me*  $\leftrightarrow$  *mean*. These constructs are linked somewhat more loosely to *hard-working*  $\leftrightarrow$  *lazy*, and *nice*  $\leftrightarrow$  *egotistical*.

Though there is some semantic redundancy in his grid (e.g., 'nice' appearing as the preferred pole of three constructs), the opposite poles for each of these constructs appear to represent distinct character traits to Casey: *mean*, *egotistical*, and *odd*. The PI suspects that perhaps Casey's use of the word 'nice' for the poles of

these constructs was related to his communicative difficulties when speaking, choosing words, and perhaps lack of vocabulary to provide different words to represent the opposite of the negative attributes he provided. It should be noted, however, that the key to naming construct poles is that they are meaningful labels to the participant. This is always the rule that is followed and it is an important rule, as the clinician cannot name constructs for the participant because the clinician does not have all the information. So, in this case, Casey clearly implies different meanings for the label “*nice*” depending on how he has contrasted this pole with the opposite pole. Though it may appear his use of the word *nice* to contrast multiple poles may be redundant, it does not in any way invalidate his constructs.

Considering the clustering of Casey’s constructs, if he encounters a person he sees *following the rules* (at school, for example), it is highly likely he will automatically and subconsciously attribute his constructs closely linked to rule-following to that person, and see him or her as someone who is *hard-working, listens to others people*, and will be *nice to him*. If, on the other hand, he sees someone breaking rules, perhaps while playing a game or participating in an activity at school, he will most likely assume that person is *mean and lazy*, which may make it difficult for Casey to work with or be around that person. In his assessments of other people, he may react to people he sees breaking rules as though they are mean and egotistical, whereas if he sees someone being nice to him and others, he may assume they also follow rules, are hard working, and nice.

Casey rated himself as *someone he actually likes who cares about people and can be nice if you get to know him*. He also construes himself as a *hard-working*

individual who *follows rules* and *listens to other people*. He *likes to be with people* more than *being alone*. He shared with the PI that he likes to be *silly* because it makes other people smile, especially his sister Carolyn. Considering the closeness of the relationship between Casey's core cluster of constructs, the most salient choices for him to make in a given situation might be that he makes sure to *listen* and *be nice to other people*, *work hard*, and *follow the rules*.

**Elements.** There are two distinct clusters of elements in Casey's repertory grid, which contains his current self, his ideal self (Architect), and his sister (Carolyn). These three elements are also linked loosely with Andrea, a person he wants to be friends with. Casey construes himself, his ideal self, and his sister as people who are *nice*, *listen to other people*, are *hard-working*, and *follow the rules*. The closeness of these constructs and his rating of these particular elements on these constructs could imply that he may seek out and value relationships with people he construes as being *nice*, *listening to others*, *working hard*, and *following the rules*. Conversely, he may avoid relationships and social interactions with people whom he construes as being *egotistical*, *stubborn*, *mean*, *lazy*, that *break the rules* and *do whatever they want*.

Casey's social perceptions of himself and the other elements in his grid are more easily seen in his Principal Component Map, displayed in **Figure 25**:



would like to be friends with) being straight-forward, to Carolyn (his sister) who is nice and hard-working, much like himself and his ideal self (the Architect), to Nick, who can be silly and weird. These preferred people in his life all share the quality of being 'nice', especially being nice to him, following the rules, being hard working, and listening to others. His mother mentioned in the CARS2-HF interview that Casey does try to engage others socially sometimes, and it is likely that he would be more motivated to engage people who embody these constructs than people more like Scott (his 'annoying person' element) and Jeremy (his 'disliked person' element).

The way Scott and Jeremy are positioned on Casey's grid is appropriate, considering his dislike of both these people: they are polarized toward his non-preferred construct poles. During the repertory grid process, Casey shared his dislike of these individuals stemming from their *laziness*, and their tendency to *break the rules*. It appeared that, especially due to these two behaving in this way, Casey viewed them as *caring only for themselves* and *doing whatever they want*, which makes him see them as being *egotistical*, and more likely to be *mean* to Casey and to others. Therefore, in social situations, it is highly likely that if/when Casey encounters people *breaking rules* or being what he considers *lazy*, he will attribute the same such characteristics of *mean*, *egotistical*, and believe they are likely to *care only for themselves*. One might hypothesize that Casey tends to characterize people in rather global and evaluative terms, and many in terms of their overt behavior rather than attempting to 'mentalize' and see people in more subtly descriptive ways from a psychological standpoint.(Neimeyer, Personal Communication, September 15, 2015).

### **Case #5: Beau**

Beau is a seventeen-year-old male attending eleventh grade at a local Midwestern high school. He was diagnosed with autism at four years-of-age by a developmental pediatrician in Okinawa, Japan. During the CARS2-HF interview, his mother shared with the PI that Beau showed some common signs of autism as young as 18 months-of-age: he had developed a few words but lost them and he would not make eye contact with her. He would not allow different types of food to touch each other: if they did, he would not eat them. Beau would often wake up in the middle of the night and clean his room. If something were out of its designated place, he would notice very quickly.

His play with toys was also somewhat unusual. He liked to play with cars: lining them up front-to-back, end-to-end. Occasionally he would play with them like they were actual cars, but lining them up was his favorite way of playing. His mother commented she did not recall him ever engaging in any kind of imaginary play, nor pretending an item could represent something else in play (e.g., a block of wood could be a car, a hairbrush could be a microphone, etc.).

She remembered Beau always being physically well coordinated. She did not recall him engaging in any physical self-stimulating activities commonly associated with autism such as hand flapping, toe walking, spinning, etc. She did enroll him in physical therapy and sensory therapy throughout his childhood, however, noting that Beau did have some sensory issues as a child, which were mainly around clothing. He would only wear t-shirts, and the t-shirts could not have clothing tags on the collar. He preferred wearing pants with elastic waistbands rather than pants

with a zip-up fly and buttons. He did not like to be dirty. If he or his environment were dirty, he would cry, scream, and throw a fit.

As a child, Beau would run out into the street, and he would sleep walk at night and try to leave the house to go outside. They had to put up barricades in the house to keep him inside and away from the doors. When he would accompany his mother to the grocery store, Beau was constantly afraid that other people in public would try to eat him. This fear lasted for a year, even after repeated exposure to public environments in which Beau's fears were not realized. Anti-anxiety medication eventually helped Beau to overcome this fear.

Beau's current special interest, perhaps not surprisingly given his love of playing with them as a child, is cars. He can tell anyone how to fix body parts of many different types of cars. If he is explaining that process to someone, however, he may not pick-up on that person not understanding his explanation of the process solely based on his conversational partner's nonverbal cues. Beau's mother commented that his voice is particularly monotone, and his vocal inflections and prosody rarely change, even when he is excited or emotionally aroused. She said that, in those cases, Beau's body language may become more animated, but his voice would most likely remain monotone. It appears that however monotone his voice may be, when Beau is upset, the volume of his voice definitely shifts. His mother commented that if Beau feels singled-out or mistreated, he will scream and yell. The reaction, she shared, is a little much for his age. Beau is unable to independently calm himself when he becomes upset; his parents have to help calm him down.

His mother shared that she does not know if he understands the concept of 'love'. He has a girlfriend who is younger than him: she is a sophomore. Chronologically, they are at different stages; intellectually, however, mom says they are on the same level. Mom shared that she often tells Beau she loves him, but he has never said 'I love you' in return. Beau is not one to initiate conversation for the purpose of socializing with others. He can reciprocate in conversation, taking turns to keep the conversation going, as long as the topic interests him. If he is uninterested in the conversation, he simply stops talking.

Beau constantly needs to know his mom's whereabouts. He needs to know that if she says she will be somewhere at a specific time, he can depend on her to be there on time. If something in his daily routine will be different, he needs to know the change ahead of time. For example, if he has a doctor's appointment, he needs to be reminded about the appointment the night before, and he needs to be reminded again of that appointment the morning of the event.

At school, Beau sometimes needs help to focus on relevant information in his classes. If he does not know the information he is receiving at any given moment is particularly important, he will be out in 'la-la land'. This causes problems in his classes, and he has accommodations written into his Individualized Education Program (IEP). He has paraprofessional support in English and Math, and is in special education classes for Social Studies and Science. He takes a lower grade level of Math, and the paraprofessional supporting him is supposed to constantly check-in with him to make sure he understands what is going on. His mother reported that he often says he does not need help, when in fact he often does, and he has been told to

ask for help when he needs it. Mom said Beau feels like he is too old to have the assistance of others. When it comes to math, though, Beau is aware that the subject matter is quite difficult for him and he willingly accepts it in that class.

Mom commented that Beau's voice is still monotone and that he often mumbles. Sometimes, she says, it is necessary to ask him to repeat himself so she can understand him. He was in speech therapy for many years growing up, but he does not receive services anymore. Beau's voice was indeed very monotone during the research session, and he occasionally mumbled when speaking. Beau sat so that he propped his chin on his right hand, which kept his right hand positioned in front of his mouth for the initial fifteen minutes of the session. Beau appeared to misarticulate sometimes when he spoke, and the PI wondered if perhaps Beau was self-conscious about his misarticulations and monotone voice, and propped his hand in such a way as to hide his mouth. He struggled to pronounce certain words (e.g., ethic, sexist). He frequently used 'um' as a lead-in to his phrases and responses, and 'crap' to fill space when he was not sure how to respond to the PI's questions. The PI also noticed that Beau seemed to keep his jaw closed when speaking – his upper and lower teeth rarely parted when he spoke. His scores on the qualifying assessments were in the average range (**Table 18**).

**Table 18: Beau's qualifying assessment scores**

Assessment	Standard Score
TONI-3	98
PPVT-4	102
CELF-5 Core Language	93
CELF-5 Receptive Language	88
CELF-5 Expressive Language	93
CARS2-HF	38.5

Beau would answer the PI's questions during the research process and during conversational exchanges, but he did not reciprocate the conversation. He described himself as 'loud but sometimes quiet'. He said he likes hanging out with his friends, and doesn't get annoyed by a lot of things. He likes having fun and feels he is smart and different. Much of Beau's descriptions of himself were related to things he likes to do. Interestingly, however, he described others more in terms of their personalities, and he did so without much prompting from the PI (**Table 19**).

**Table 19: Beau's Stage 1 prompt hierarchy**

Stage 1: Describing Elements	OP1	OP2
<b>E1:</b> Beau (self)	-	-
<b>E2:</b> Dad (ideal self)	-	-
<b>E3:</b> Carl (disliked)	-	-
<b>E4:</b> Kevin (annoying)	<b>1</b>	-
<b>E5:</b> Justin (family)	<b>1</b>	-
<b>E6:</b> Hannah (liked)	<b>1</b>	<b>2</b>
<b>E7:</b> Garth Brooks (want to befriend)	<b>1</b>	<b>1</b>

**OP**=optional prompt

**OP1**='Can you describe him/her in terms of his/her personality?'

**OP2**='How else would you describe X?'

Beau described every element in terms of the volume of their voices and/or being monotone or not monotone. Virtually every element was described as being 'loud' or 'quiet', and some of them were described as being both 'loud' and 'quiet'.

For some, but not all, of the elements, Beau designated that he or she could be ‘loud’ at some times, but sometimes ‘quiet’.

During Stage 2: Maximum Triadic Method of Eliciting Constructs, Beau was able to provide similarities between elements with minimal prompting from the PI. Prompting did, however, help Beau to consider how the third element of the triad was different from the way the other two elements were similar (**Table 20**).

*Table 20: Beau’s Stage 2 prompt hierarchy.*

<b>Stage 2: Eliciting Constructs</b>	<b>OP1</b>	<b>OP2</b>	<b>OP3</b>	<b>OP4</b>	<b>OP5</b>
<b>Triad 1</b>	-	-	<b>1</b>	<b>1</b>	-
<b>Triad 2</b>	-	<b>1</b>	-	-	-
<b>Dyad 1</b>	-	-	-	<b>1</b>	<b>1</b>
<b>Triad 3</b>	-	<b>1</b>	<b>1</b>	-	-
<b>Triad 4</b>	-	-	-	-	-
<b>Triad 5</b>	-	-	-	<b>2</b>	-
<b>Triad 6</b>	-	-	-	<b>1</b>	-
<b>Triad 7</b>	-	-	-	<b>1</b>	-
<b>Triad 8</b>	-	-	-	<b>1</b>	-
<b>Triad 9</b>	-	<b>2</b>	-	-	-
<b>Triad 10</b>	-	-	<b>1</b>	<b>1</b>	-

*OP=optional prompt*

*OP1: ‘How are these two similar?’*

*OP2: ‘How is this one different from these two?’*

*OP3: ‘Can you describe how these two are alike and this one is different in terms of their personalities?’*

*OP4: ‘What is the opposite of X to you?’*

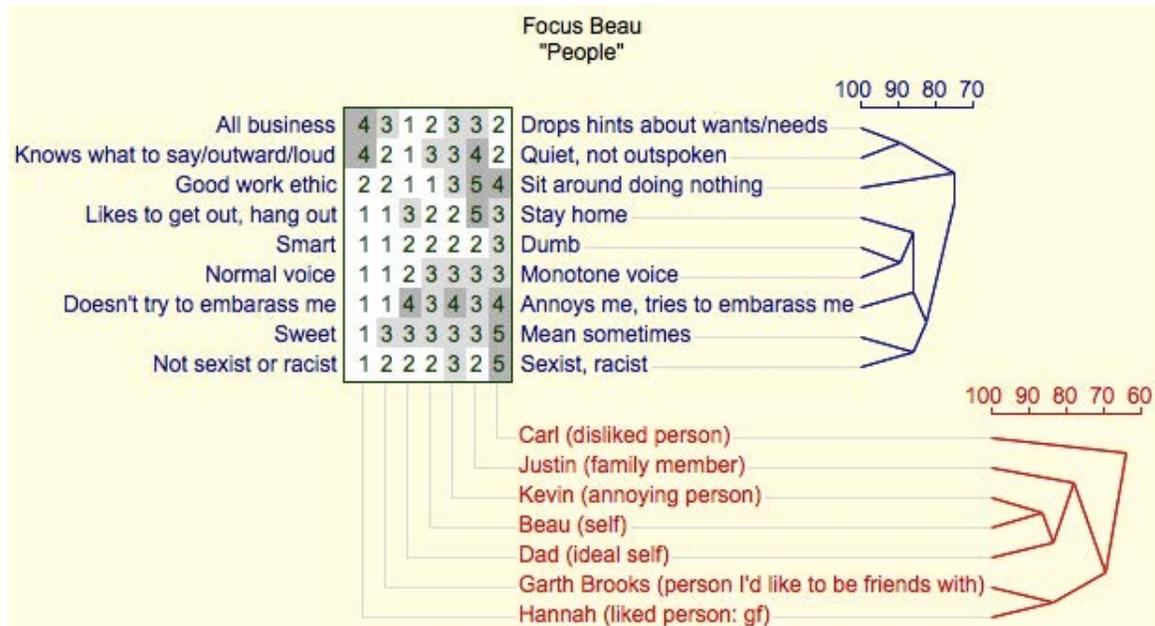
*OP5: dyadic comparison: ‘How are these two different from each other?’*

Beau did not appear to struggle significantly with the repertory grid process.

The second triad, which compared a ‘disliked person’ with ‘someone he would like to be friends with’ was the most difficult comparison for Beau, and Beau commented on that difficulty, saying it was hard to compare personalities of people he did not know personally (Garth Brooks) and someone he did not know well (Carl). Beau did not present overt characteristics commonly associated with autism, save his near total lack of reciprocal conversation and infrequently visually referencing the PI

during conversational exchanges. His mother shared with the PI, however, that Beau’s medication helps him manage anxieties that make transitioning and anticipating unknown events problematic for Beau.

Overall, Beau completed 9 triadic comparisons and 1 dyadic comparison to complete his repertory grid **Figure 26**.



**Figure 26:** Beau’s Repertory Grid

**Constructs.** A core cluster of Beau’s most highly linked constructs emerges from the dendrogram above. This cluster includes the constructs *smart*  $\leftrightarrow$  *dumb*, *normal voice*  $\leftrightarrow$  *monotone voice*, *likes to get out/hang out*  $\leftrightarrow$  *stay home*, *sweet*  $\leftrightarrow$  *mean*, *not sexist or racist*  $\leftrightarrow$  *sexist, racist*, and *doesn’t try to embarrass me/annoys me, tries to embarrass me*. Within this cluster, *smart*  $\leftrightarrow$  *dumb* and *normal voice*  $\leftrightarrow$  *monotone voice* are the two most highly correlated constructs. This is particularly significant considering his high level of concern for describing people in terms of their voices. It may also be worth exploring, perhaps in treatment, his experiences with speech-language therapy throughout his childhood. This clustering

of constructs has further significance for Beau in the implications they have for how he construes others. Given how highly correlated these constructs are, it is likely that Beau will see people who have *normal voices* as being *smart*. Further, he may see such people as also being *not sexist or racist* and as people who *like to get out/hang out* and *won't try to embarrass him*. It is likely that he may automatically and unconsciously attribute closely linked constructs to people who Beau sees as embodying any one of these constructs. Conversely, if Beau encounters a person being *sexist or racist*, it is highly likely (due to the close linkages of these constructs) that he will believe that person is *dumb* and may *try to embarrass him*.

Another closely linked pair of constructs, though quite loosely connected to Beau's core cluster, includes *all business*  $\leftrightarrow$  *drops hints about wants/needs* and *knows what to say/outward/loud*  $\leftrightarrow$  *quiet, not outspoken*. Beau's ideal self, his Dad, embodies Beau's preferred poles of these constructs, *all business* and *knows what to say/outward/loud*.

**Elements.** There is one distinct cluster of elements in Beau's repertory grid, which, interestingly, links his current self most closely with Kevin, the person he chose to represent the 'annoying person' element in his grid. Together, Beau and Kevin are somewhat more loosely linked to Beau's ideal self: his Dad. It appears that Beau construes himself and Kevin as being relatively *smart, liking to get out/hang out, sometimes quiet/not outspoken*, and yet *mean sometimes*, though not overtly *sexist or racist*. He appears to construe himself and his Dad, his 'ideal self', as *smart* individuals with *good work ethic*, who can also be *mean sometimes* though *not sexist or racist*. From his ratings of his Dad (ideal self), Hannah (liked person; girlfriend),

and Garth Brooks (person he would like to be friends with), it appears that he values people who have *normal voices*: voices that are not *monotone*, who *always know what to say*.

The propensity to seek out or avoid relationships with people who embody his constructs has implications for Beau's interactions with people. For example, if Beau is forced to work with someone who tries to embarrass him, and due to the clusters of his constructs he further construes this person as being dumb, sexist, and racist, it may be difficult for him to work with this person on a daily basis.

Beau's social perceptions of himself and the other elements in his grid are more easily seen in his Principal Component Map, displayed in **Figure 27**.



**Figure 27:** Beau's Principal Component Map

**Principal component analysis.** The configuration of Beau's Principal Component Map reflects a highly complex, differentiated construct system, as can be seen in the fairly even distribution of elements (people) and constructs around the axes that resemble the spokes of a bicycle wheel. This distribution is created by his

ratings of elements in a subtle, non-polarized manner (e.g., elements were not all rated at extreme poles of his constructs). In this map, one can see that Beau differentiates people largely in terms of their activity levels (*likes to get out/hang out, all-business, good work ethic*) communicative traits (*knows what to say, is outward or loud, has a normal voice*), and even from their social views and how they treat others (*not sexist or racist, sweet*). Interestingly, when Beau described himself during Stage 1, he did so largely in terms of activities he enjoys. When describing others, however, he did so using more psychologically descriptive traits. Beau's ratings of himself, which position him centrally in his Principal Component Map above, imply a lack of self-definition. His ratings of others who are not centrally located within the map, however, implies he has well-established constructs that facilitate his understanding of their social roles in his life.

His Dad (Beau's ideal self) embodies Beau's preferred traits of *knowing what to say, has good work ethic, and is all business*. Garth Brooks (someone Beau would like to be friends with) shares his father's *good work ethic*, but appears to be less likely to *try to embarrass* Beau, even if it's all in good fun, as in the cases wherein his Dad tries to embarrass him. Beau often made subtle distinctions when providing his constructs, noting that *'just because (someone) is dumb sometimes doesn't mean they're always dumb'* and that even though his dad and some friends could *'be mean and embarrass him sometimes, it was all in good fun, so it's okay sometimes'*. Further, when talking about Carl, the person he chose to represent his 'disliked person', he made it a point to clarify that, while in the past Carl was someone he did not like largely because he was *sexist and racist* and always commenting about other people

inappropriately, it was possible that Carl had become a better person and is perhaps no longer sexist, nor racist.

There are definite character traits Beau is averse to, and he may avoid people he sees as embodying these constructs (e.g., people who speak in *monotone* voices, *sit around and do nothing*, and make *sexist and racist* remarks about others). Beau's construct system, however, does appear to have a certain flexibility of construing that allows him to see potential in others, such that people he sees as being closer to his non-preferred construct poles need not be forever resigned to be disliked, as is the case with Carl. This hypothesis is further supported by the close linkage of his current self to Kevin (his 'annoying person' element), as was seen in his repertory grid dendograms. This flexibility in his construing may facilitate the ability for him to elaborate his construct system so that he can make sense of and anticipate a wider variety of people and their unique character traits, and it may also allow him to be more open to changing his views of people he may initially not like.

Although Beau's construct system appears to be highly complex and differentiated, it is worth noting that virtually none of his self-ratings on his personal constructs are polarized, suggesting that Beau may not have a well established sense of self. This could be a potential starting point for intervention for him, in such a way that his strengths and preferences could be more deeply explored and worked with to help him develop a stronger sense of who he is. Further, it may allow him to better identify himself with others, finding similarities in their personalities and his, and help him to expand his circle of friends.

## Research Questions

The research questions will be presented in the following order and answered using data from the case studies:

1. How do interpersonal cognitive complexities of adolescents with ASD compare to adolescents described in the literature?
2. What modifications are needed to successfully elicit constructs for adolescents with ASD in the repertory grid process?
3. What do personal constructs of adolescents with ASD tell us about their interpersonal relationships and how they form?
4. How is information gained from a repertory grid different from that of a standardized test of social skills?

### **Research question 1: How do interpersonal cognitive complexities of adolescents with ASD compare to adolescents described in the literature?**

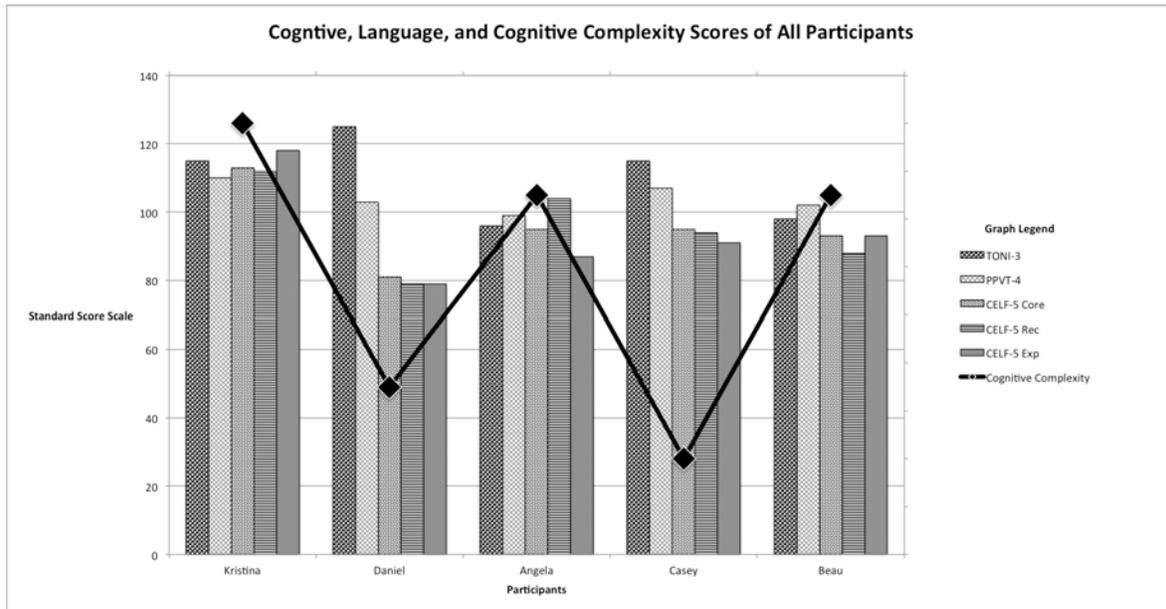
Cognitive complexity scores of the participants as measured by the RCQ were as follows:

*Table 21: Cognitive complexity scores by participant*

Participant	Grade Level	Cognitive Complexity Score
Kristina	12 <sup>th</sup>	18
Daniel	12 <sup>th</sup>	7
Angela	11 <sup>th</sup>	15
Casey	12 <sup>th</sup>	4
Beau	12 <sup>th</sup>	15

Cognitive complexity scores for these participants appear to be valid. The RCQ has been found repeatedly to be unaffected by potentially confounding factors such as general intelligence, verbal intelligence, loquacity, verbal fluency, and

narrative writing skills (Burlison & Caplan, 1998). In keeping with what has been reported for cognitive complexity in the literature, no consistent pattern between participants' qualifying assessment scores and cognitive complexity scores was observed (**Figure 28**).



**Figure 28:** Cognitive, language, and cognitive complexity scores of all participants

Zhang, Xin, and Lin (2012) reported average ranges of cognitive complexity of typically developing adolescents as measured by the Role Category Questionnaire (RCQ). Average scores for 7<sup>th</sup> graders were 8.59 ( $\pm$  3.14), 8<sup>th</sup> graders 9.84 ( $\pm$  3.40), 9<sup>th</sup> graders 9.20 ( $\pm$  3.63), 10<sup>th</sup> graders 11.89 ( $\pm$  3.53), and 11<sup>th</sup> graders 16.00 ( $\pm$  4.88).

As can be seen in **Table 22**, the cognitive complexity scores for Kristina, Angela, and Beau as measured by the RCQ in this study fall within what has been documented in the literature as an average range of cognitive complexities for

typically developing adolescents. Daniel’s score falls within the average range of 7<sup>th</sup> to 9<sup>th</sup> graders, and Casey’s score was below the average range for 7<sup>th</sup> graders.

**Table 22:** *Cognitive complexity scores by participant*

Participant	Grade Level	Cognitive Complexity Score	Average TD Cognitive Complexity Score
Kristina	12 <sup>th</sup>	18	16.00 ± 4.88
Daniel	12 <sup>th</sup>	7	16.00 ± 4.88
Angela	11 <sup>th</sup>	15	16.00 ± 4.88
Casey	12 <sup>th</sup>	4	16.00 ± 4.88
Beau	12 <sup>th</sup>	15	16.00 ± 4.88

**Research Question 2: What modifications are needed to successfully elicit constructs for adolescents with ASD in the repertory grid process?** In the process of creating repertory grids, the modifications used by all of the participants included the following:

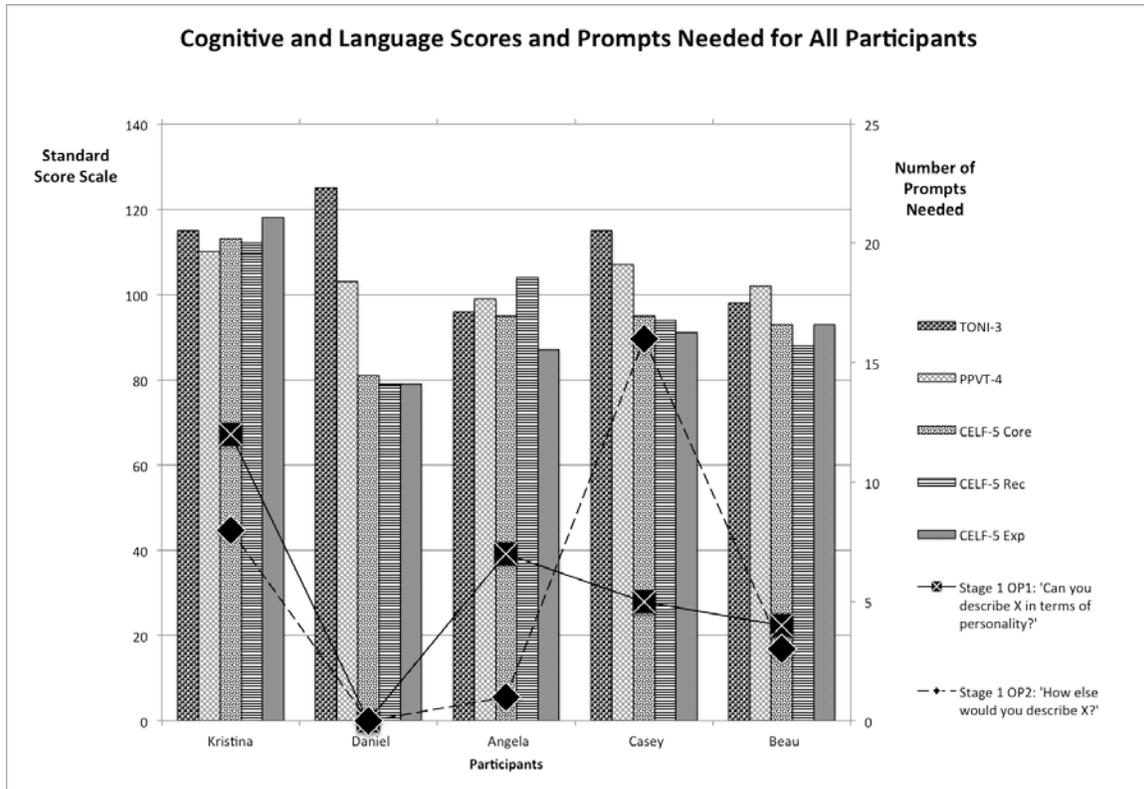
1. Post-it notes for writing names of people to represent the elements for their grids
2. A focus box during Stage 2: Maximum Triadic Method of Eliciting Constructs to compare similarities between two elements and contrast differences from a third element
3. Visual analogue scales to rate elements for each construct

Optional modifications that were not used by any participants included:

1. Thought and/or speech bubbles to aid participants’ in describing elements and producing constructs
2. Kidspiration App to assist with producing constructs

To check whether the use of modifications was related to participants’ cognitive and language profiles, the levels and numbers of prompts needed throughout the

experimental protocol and results of participants' cognitive and language scores for the repertory grid process are compared in **Figure 29**.



**Figure 29:** All participants' cognitive and language assessment scores compared with type and number of prompts during the repertory grid process

Differing levels and frequencies of prompting were provided to participants as needed on an individual basis to facilitate their successful creation of repertory grids. There does not appear to be a clear relationship between participants' scores on qualifying assessments and the level and number of prompts required in the research process.

**Research Question 3: What do personal constructs of adolescents with ASD tell us about their interpersonal relationships and how they form?**

***They think about social constructs.*** As evidenced in the participants' case studies, each of them shared social experiences from their past and present. It was

clear they had thought about those social experiences and used them to understand others and to understand personality traits of others they like and dislike. All participants were easily able to consider and rate their chosen elements along all of their construct scales, which indicated they did indeed consider people's personalities in light of their personal construct systems, therefore validating their constructs.

***Their construct systems related to social relationships are complex.***

Participants' repertory grids show that these adolescents with high-functioning autism have well organized, complex construct systems related to social relationships. The construct poles provided by participants make sense in relation to the social roles they indicate. It appears the ways in which participants in this study construe people to form and navigate interpersonal relationships differs to some degree on an individual basis. The semantic representations in the forms of words and phrasing participants used to describe people and the constructs they use to understand people were unique to each participant, which is consistent with observations from repertory grids completed by typically developing individuals (Neimeyer, 1993). Participants were able to provide the PI with descriptive examples from events in their lives of how each element they chose embodied the constructs they provided during comparison and contrasting of those elements. This process they followed to describe elements and constructs aligns with Kelly's (1955) Theory of Personal Constructs, suggesting that people create, modify, and expand their construct systems based on experience using their systems in the world in their daily lives.

Principal Component Analyses represented on the Principal Component Maps revealed structural similarities among participants and aspects unique to individual participants. The arrangement of elements on the principal component maps suggests the participants utilize organization methods of construing people in their lives similar to that of typically developing adolescents. This similarity is illustrated by the grouping of disliked and annoying persons toward non-preferred poles of personal constructs, and conversely the grouping of liked and ideal individuals around preferred construct poles. In this way, these adolescents with ASD appear to have structural systems of personal constructs for understanding and anticipating other people that are similar to their typically developing peers.

***Their construct systems are organized in a way one would expect from individuals who understand social roles.*** For example, participants demonstrated an understanding of differences in social roles by their placement of liked and disliked individuals relative to positive and negative construct poles. This can be most clearly seen in participants' principal component maps. This is how one would expect a typically developing adolescent's principal component map to be organized. For example, Daniel located his 'disliked' and 'annoying' elements to quadrants located at the non-preferred poles of his constructs (**Figure 21**), indicating those elements were *bothersome, annoying, cruel, and bossy*, among other traits he does not like. As one would expect, located at the preferred poles of his constructs are people he likes whom he sees as being *generous, helpful, and always ready to be there* for him. To contrast how one would expect a complex, organized

construct system to appear, consider someone with more simple social constructs and a less-clear understanding of social roles.

***Additional Brief Case Study: Justin.*** A local speech-language pathologist referred Justin, a sixteen-year-old male diagnosed with autism, to participate in the study. Due to Justin’s scores on the qualifying assessments, however, he was excluded from the study (**Table 23**).

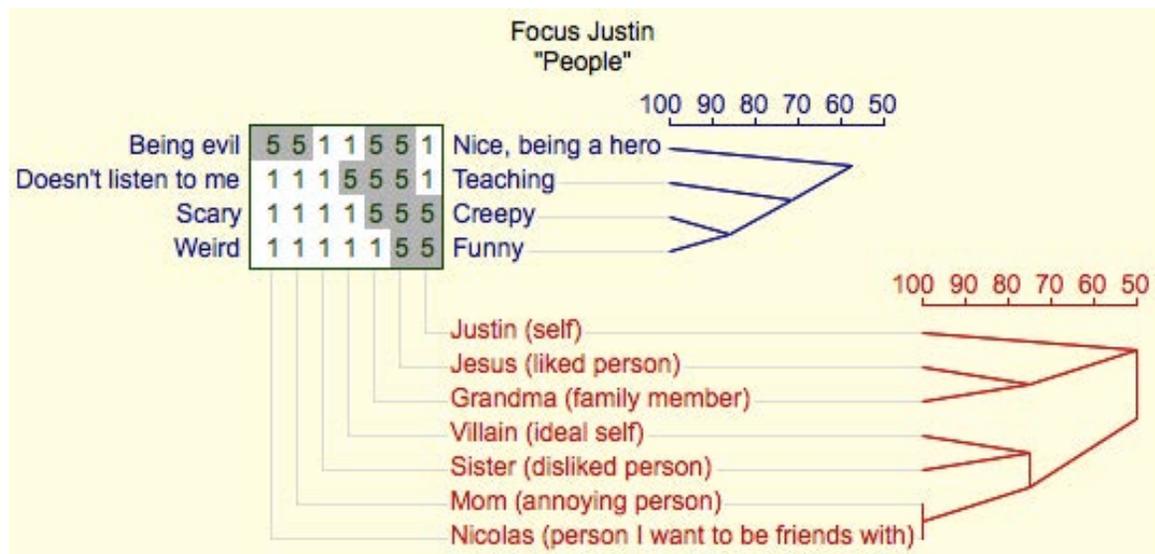
***Table 23: Justin’s qualifying assessment scores***

Assessment	Standard Score
TONI-3	78
PPVT-4	60
CELF-5 Core Language	43
CELF-5 Receptive Language	48
CELF-5 Expressive Language	59

Justin’s scores on all qualifying assessments were more than 1.5 standard deviations below the mean (with a mean of 100 and one standard deviation equaling 15 points). Based on the results of the tests administered in the qualifying assessment process, it appeared that Justin had significant receptive and expressive language impairments. The challenges he demonstrated in the receptive and expressive language areas assessed would likely impact his ability to follow directions, understand information presented verbally, formulate responses, create and express single and multiple sentences verbally, and to understand and use vocabulary appropriately and effectively (e.g., words with multiple meanings, relationships between words, best word choice). It is likely he would encounter those challenges in multiple environments.

Justin did indeed struggle during the research process. He often became frustrated with directions the PI presented for describing elements and eliciting

constructs (the same directions provided to participants who qualified for the study based on their assessment scores), which made it difficult for him to engage in the process. Though it was difficult for him to describe the elements he chose and compare and contrast them in terms of their personalities, Justin did create a repertory grid (**Figure 30**), from which a principal component map (**Figure 31**) was established.



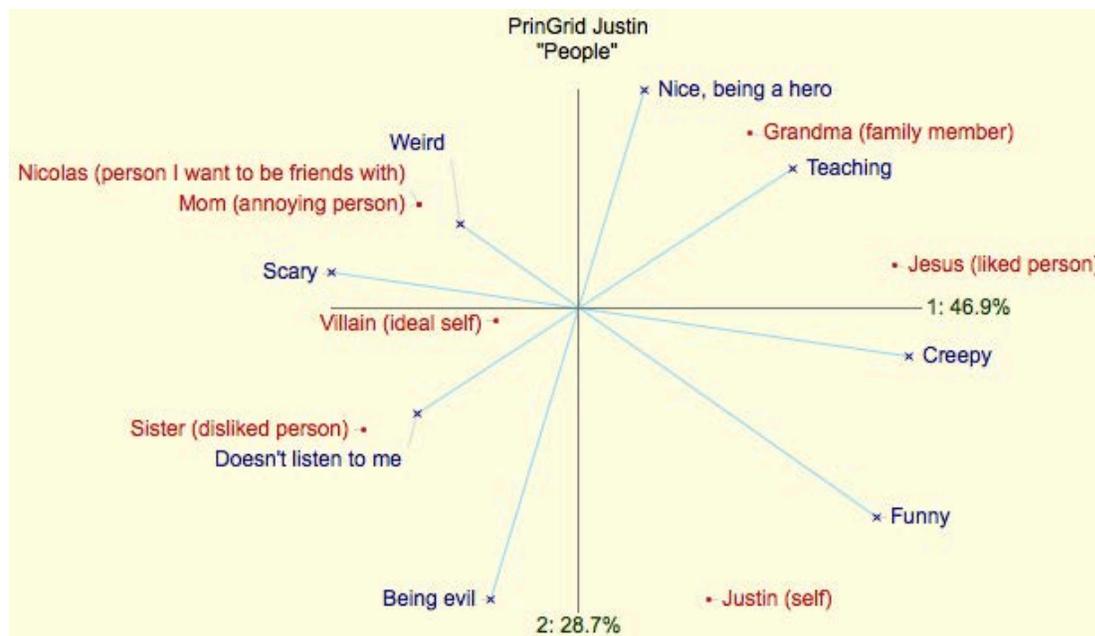
**Figure 30:** Justin's Repertory Grid

Justin's repertory grid and principal component map appear quite different than those created by the other participants in the study.

*Constructs.* In terms of constructs, he produced an unusually small number of personal constructs in the same time and with the same structures and supports in which other participants produced at least double the number Justin provided. It is unclear whether his contrasting poles truly represent opposites to Justin (e.g., the opposite of *scary* being *creepy*), and he was unable to elaborate with enough detail and examples in the process for the PI to feel confident that he did indeed consider the poles to represent opposites. Considering his scores on the qualifying

assessments, it is possible Justin did not fully understand the concept of opposites, and/or lacked the semantic repertoire to provide opposite descriptions for some of his construct poles. One can also see there are virtually no closely linked constructs (none correlated higher than about 85%) in his repertory grid.

*Elements.* Similar to a lack of highly correlated constructs, Justin’s grid also lacked closely linked elements (none correlated higher than about 75%). Oddly, his mother (whom he chose to represent the ‘annoying person’ element for his grid) and Nicolas (someone he would like to be friends with) are rated exactly the same on all of Justin’s personal constructs. One would not expect to see a participant considering someone annoying and someone they would like to be friends with as embodying the exact same degree of all personality traits described by his or her personal constructs.



**Figure 31:** Justin’s Principal Component Map

*Principal component analysis.* Recall that Beau’s principal component map implied a level of cognitive sophistication that could be seen by the arrangement of

the map appearing like the spokes of a bicycle wheel in terms of how constructs and elements are arranged. For Beau, this arrangement is presumable due to his subtle differentiations between the people he rated on his construct poles. Though at first glance Justin's map also appears in a similar arrangement, it may actually represent a less sophisticated, more randomized cognitive process. This impression is reinforced by the very few constructs he provided, the globally evaluative quality of several of them (e.g., *weird*  $\leftrightarrow$  *funny*, *scary*  $\leftrightarrow$  *creepy*, *nice*  $\leftrightarrow$  *evil*), and the improbable placement of figures in construct space (e.g., the ideal self near the construct poles for *scary*, *weird*, and *not listening to him*; and Jesus, nominated as the liked person, as the embodiment of *creepiness*; Neimeyer, Personal Communication, September 15, 2015). This pattern reflects one associated with small children's grids rather than those completed by adolescents, and suggests little if any access to a sophisticated and effective system of personal constructs (Neimeyer, Personal Communication, September 15, 2015). These results should be interpreted with caution. Justin's repertory grid is only one example of how a grid of someone with a less clear understanding of social roles and a less complex organization of personal constructs could look.

***Their social constructs are based on their abstracting experiences in social situations.*** It is clear from participants' repertory grid processes that participants drew upon information from their social experiences to establish their personal construct systems. It was also clear they use these construct systems to make sense of people in their social worlds. All participants shared specific memories and situations with people to describe their personal constructs. Angela's

case study provides the clearest example of this process, as she readily shared many memories to describe her constructs to the PI. For example, she provided rich descriptions of experiences with her sister, whom she chose to represent her 'annoying person' element, that involved her sister stealing games from Angela, lying when being confronted for stealing those games, and asking repetitive questions, among other annoying experiences. Her method of describing experiences with her sister and other people she described to create her repertory grid was similar to other participants: they all called upon social experiences to relate their personal constructs to the PI. This process of using experiences with people to establish their personal constructs is in-line with Kelly's (1955) Experience Corollary: a person establishes a construct system in a given domain (social, for this study) based on his or her experiences in that domain.

***They could successfully describe both poles of elicited social constructs.*** The participants' ability to do this demonstrated their understanding of the dimensions of social constructs. The PI elicited one pole of each construct using the maximum context triadic (or dyadic) method of eliciting constructs, and then participants provided the opposite pole. Their ability to do this indicates they understand the construct in its full scope of meaning – they were aware that they internally contrasted the trait elicited by the PI in their process of understanding and comparing people. Further, participants were able to explain what their construct poles meant to them and apply the constructs consistently across elements (which organized their grids in a manner one would expect to see, as mentioned

previously). This clearly indicates their constructs were meaningful and applicable to the people in their lives.

***They attempt to construe the construct systems of others.*** Kelly's Sociality Corollary suggests that to the degree a person is able to construe another's process of construing, he or she can play a role in that person's social world. All participants chose a person from their past to represent a 'disliked person' element for their grids. All disliked persons had either been mean to the participant, or they had been mean or degrading toward other people. Participants were able to clearly explain to the PI why they disliked the people they chose to represent this particular element. They also, however, explained to the PI that even though their disliked persons had acted badly in the past, it was possible those people could have changed over time and become better people. Further, participants suggested it was possible that, if those disliked people had indeed changed, perhaps it would be possible for them to be friends now.

For example, Beau identified himself with his 'annoying person' element, as can be seen in his principal component map. Beau rated himself rather ambiguously, embodying no extreme preferred or non-preferred poles of his personal constructs. Interestingly, when he discussed his 'disliked person' and 'annoying person' elements, he made sure to explain to the PI that the degree to which these people were disliked and annoying varied and could change over time. Further, he elaborated that just because he disliked or was annoyed by certain aspects of these people's characters did not necessarily mean that all of their character traits were annoying or unlikeable. His ability to construe others so flexibly implies a level of

social cognitive sophistication one might not expect to see in an adolescent with autism.

In a similar fashion, many participants used the repertory grid process as a venue to understand why these people behaved in such ways, which indicated they were attempting to understand others' processes of construing. Some participants, like Beau, went as far as to say that the person they disliked in the past could potentially be a friend to them now. Daniel shared with the PI that the bully from his past has become his friend in the present, sharing a Chinese proverb that bullies changed into friends would be friends for life. This trend in participants' construing disliked persons potential to change suggests they are empathetic toward others, even people who have been mean to them in their past. This implies that the participants in this study attempted to construe how these people they disliked are thinking and feeling now, not just projecting their past negative feelings associated with people they disliked in the past.

***They recognize what social behaviors they would improve to move toward an ideal self.*** This is also in-line with Kelly's (1955) sociality corollary. All participants were able to quickly and effortlessly provide the PI with an 'ideal self' to represent who they would like to be if they were to change aspects of their current selves. Participants were aware of aspects of themselves they would readily change if given the opportunity, and they would change those aspects to better align themselves with the people they like and admire in their lives. For example, Kristina located herself on a set of constructs, the poles of which connect 'liked' (positive poles) and 'annoying' (negative poles) elements. Kristina identified her current self on the

negative poles of these constructs, while identifying her ideal self on the positive poles of these same constructs. Her ability to describe her current self as embodying her annoying constructs, and her ideal self as embodying all of the personal constructs she prefers, indicates considerable self-awareness: she knows there are aspects of herself she would like to change and she has a vision for how she would be if she were able to change those particular aspects. The constructs she used to describe her current and ideal selves are separate from those she identified as related to her 'disliked' element. Consequently, when working with Kristina, development of behaviors that make up the positive poles of the 'liked/annoying' constructs would be most beneficial rather than working on behaviors that are reflected in her disliked constructs, as she would see those as essentially irrelevant to her.

It was also interesting that the characters participants chose to represent their 'ideal self' elements (with exception to Beau, who chose his Dad as his 'ideal self') were fictitious, usually with super-human powers or abilities. The ease with which participants provided elements to represent their idealized selves appeared to have been considered by them previous to this experience. Further, it seemed that they have given enough thought that they could discuss how they would change if given the opportunity and how those aspects would come together and represent a whole persona, be it superhero (like Daniel's Professor X and Kristina's Gina of Lazaria) or real-life hero (like Beau's Dad).

**Research Question 4: How is information gained from a repertory grid different from that of a standardized test of social skills?** To facilitate

exploration of this question, the Social Responsiveness Scale, 2<sup>nd</sup> Edition (Constantino & Gruber, 2012) was administered to all participants. The SRS-2 was chosen because it was designed specifically for individuals with ASD. Scores of 59T and below on the SRS-2 are generally not associated with clinically significant autism spectrum disorder (Constantino & Gruber, 2012). Scores of 60T to 65T are considered in the mild range, indicating deficiencies in reciprocal social behavior that are clinically significant and may lead to mild to moderate interference with everyday social interactions. The moderate range includes scores of 66T to 75T, which indicate deficiencies in reciprocal social behavior that are clinically significant and lead to substantial interference with everyday social interactions. Scores in this range are typical for individuals with ASD of moderate severity. The severe range includes scores of 76T or higher, and indicate deficiencies in reciprocal social behavior that are clinically significant and lead to severe and enduring interference with everyday social interactions. Such scores are strongly associated with a clinical diagnosis of ASD (Constantino & Gruber, 2012). Participants' scores, both those reported by themselves and those reported by their parents, are presented in **Table 24**.

**Table 24:** *SRS-2 self and parent report T-scores for all participants.*

Participant	SRS-2 Self Score	SRS-2 Parent Score
Kristina	65	63
Daniel	50	62
Angela	76	56
Casey	67	70
Beau	55	66

*Note: T-scores are scaled with a mean of 50 and SD of 10*

It is interesting to note the difference between participants' self-report scores and the scores obtained from their parents' observations. Congruency can be seen for Kristina, with scores from her self-report (65) and the score from her mother's observations (63), which placed her in the range of mild social impairment. Daniel's self-report score (50) placed him within normal limits of social responsiveness, while his mother's report score (62) placed him in the mild range of social impairment – which is interesting considering his anxiety-provoked immediate echolalia, lack of reciprocal conversational skills, and his tendency to elope in multiple environments, all of which may be considered to be more than mild impairments to social interaction. The most dramatic difference between self-report and parent report scores were those of Angela and her mother. Angela's self-report score (76) placed her in the severe range of social impairment, while her mother's score (56) placed her within normal limits of social responsiveness. Both Casey's self-report score (67) and his mother's observational report score (70) placed him in the moderate range of social impairment. Beau's self-report score (55) placed him within normal limits of social responsiveness, but his mother's observational report score (66) placed him in the moderate range of social impairment.

Information gained from the SRS-2 compared to that gained from the repertory grid process differs in three key aspects.

**1.) *The product provided by the SRS-2 is a number.*** The SRS-2 gives numbers as a final product that can be used to compare the participant to a normed

population of same-aged peers. This is clearly different than the highly detailed and qualitative information derived from the repertory grid process.

**2.) Differences in design.** As mentioned above, the SRS-2 is designed to compare subjects with a normative population sample to establish degrees of severity of autistic symptoms. Scores can be used in the process of diagnosing ASD. The process of administration of the SRS-2 entails providing an adult observer (e.g., parent, teacher, etc.) a score form to rate the observer's opinions of the subject.

In contrast, the information from the repertory grid is all person-centered. The repertory grid is a person-centered process not designed to be compared to a normative sample. It is designed to gain an understanding of the unique social cognitive processes of the subject, and it does so from their perspective. In this way, it is much more person-centered for adolescents with ASD than is the SRS-2. The repertory grid provides a platform for respondents to discuss the contexts of their social experiences and make sense of the roles people play in those experiences. Examples from this study include Angela discussing her relationship with her boyfriend that she does not discuss with her mother, and sharing her feelings about being sheltered from engaging in activities her peers are able to enjoy. Also, Kristina discussed many situations with peers from school who were quite different than her; yet, she tried to understand their social motivations and had construed her ideal self, based on traits she would change that would make her a better friend to others.

Both assessments aim to evaluate social cognition of the subjects. The SRS-2 has subscales for social cognition (see Method). The authors, however, caution that

the available evidence supporting the use of the SRS-2 does not support the individual interpretation of the subscales. Clearly, means of understanding respondents' social cognitions in the SRS-2 are underdeveloped. In the process of the repertory grid, participants are engaged in discourse that allows administrators to graph aspects of social cognition and discuss them with participants to clarify their personal social cognitive processes.

**3.) *Self-reporting.*** The SRS-2 does provide a self-report form the subject can complete. The form, however, is only valid and norm-referenced for subjects aged 19 years and older. Thus, for adolescents under the age of 19, this test provides no person-centered information. Adolescents under the age of 19 must be rated by an observer (parent, teacher, etc.). The phrases to which scorers rate subjects on the SRS-2 have potential to be context-dependent; however, it is impossible to know the context the reporter is considering when completing the scales. For example, the SRS-2 asks the observer to rate how often the phrase 'He/she feels self-confident when interacting with others.' There are many contexts in which this can be considered, and it is possible the degree to which subjects feel self-confident interacting with others could change depending on the context. Consider, too, that an *observer* is determining whether or not the subject feels self-confident when interacting with others, as opposed to the subject (unless the subject is 19+ years-of-age). This process fails to consider the unique life experiences of the subject and how those experiences inform and shape his or her social cognitive processes. In the repertory grid process, contrastingly, the contexts in which participants are framing their responses are discussed with the administrator. Additionally, the subject is

directly relating his or her experiences with the administrator. In this way, there is opportunity to clarify respondents' meanings and better understand their responses in the contexts of their social experiences.

To exemplify the importance of understanding the respondent's context, consider Angela. Angela scored herself very high on the SRS-2 (recall that the higher the score on the SRS-2, the more severe the symptoms of autism). When considering that information in conjunction with her repertory grid process, it became apparent that Angela is aware of how she is different because of autism, and she perceived those differences as strengths in her character, which she is happy with and proud to embody. In this way, the PI has come to believe that a holistic approach to assessing social skills that includes standardized assessments such as the SRS-2 in conjunction with more qualitative, nonstandardized assessments, such as the repertory grid and RCQ, may provide clinicians and caretakers with a richer, more comprehensive understanding of the adolescent and his or her social cognitive processes and abilities. Further, such an understanding has potential to help clinicians identify a starting point for intervention, and inform the therapy process in a much more person-centered manner.

The lack of a self-report option for adolescents under the age of 19 years may be rooted in an assumption that these subjects are incapable of self-reflection and insight into their own social processes. Evidence from participants in this study, however, suggests otherwise. One can see from the repertory grids created by these adolescents that they think about social constructs. They have established complex personal construct systems related to their social relationships, and those systems

are organized in a way one would expect from individuals who understand social roles.

Participants created their construct systems from abstracting information from their social experiences, and they were able to describe their social constructs providing multiple examples from those experiences. Further, they attempted to understand and predict the social processes of the people in their lives to better understand and predict social interactions.

No interaction with a clinician is required or prescribed by the SRS-2 administration manual. The repertory grid process is more interactive than the SRS-2. Conversation between the PI and participants provided a venue for participants to express their personal thoughts and feelings about themselves and significant others in their lives. They were also able to talk about and explore their social experiences, their thoughts about those experiences, and the roles people in their lives played in those experiences in ways that perhaps they have not been able to do in other environments, and definitely not in the process of standardized assessments of social skills.

## **CHAPTER V**

### **DISCUSSION**

A thorough review of the literature found no studies exploring person-centered assessments of social cognition for high-functioning adolescents with ASD. It is suggested in the literature, however, that results of interventions based on current assessments of social skills for high-functioning adolescents with ASD are inconsistent, and generalization of skills is poor (McMahon & Solomon, 2015; McMahon, Lerner, & Britton, 2013; Wong et al., 2015). The current research explored the use of the repertory grid and Role Category Questionnaire to explore personal constructs and cognitive complexities of high-functioning adolescents with ASD.

The results from this study challenge to some degree assumptions made by prominent theories of ASD as presented in the literature. Theory of Mind (Baron-Cohen, Leslie, & Frith, 1985) suggests that adolescents with ASD are unable to mentalize – a process of representing mental states (such as beliefs and intentions), both their own and the mental states of others. Participants in this study provided multiple examples of representing their own and others' mental states, especially when discussing individuals they disliked, their ideal selves, and people they would like to be friends with. It should be noted, however, that their abilities to represent others' mental states would still be considered atypical when compared to their typically developing peers. Further research using person-centered strategies may provide us with a better idea of different levels of proficiency mentalizing by adolescents with ASD.

Executive function theory (Ozonoff, Pennington, & Rogers, 1991) suggests adolescents with ASD have fundamental impairments in processes involving memory and attention, especially in the social domain, which inhibits successful social interactions. Adolescents in this study were able to recall and explain memories of social experiences in detail, their processes of forming impressions of people in their lives, and how they assigned those people to social roles. They did struggle with aspects of executive functioning, however, especially problem solving how to modulate their social interactions to improve their quality. Further, they compared and contrasted those people and how those people behaved in social experiences to establish their repertory grids.

According to the theory of weak central coherence (Frith & Happé, 1994; Happé & Frith, 2006), adolescents with ASD struggle to focus on important details, filter out extraneous information, and use pertinent information to establish an understanding of a bigger picture. Participants in this study demonstrated that they could, in fact, focus on important details and filter out extraneous information as represented by their numerous constructs and their complex, well organized, and appropriate construct systems. Kelly (1955) suggested that constructs are formed by abstracting relevant information from the flow of experience: noting how things are alike and yet different from others. The participants in this study clearly were able to do this in relation to social roles and behaviors.

Although participants in this study were able to draw upon detailed memories to discuss people in their social experiences, were able to mentalize to some degree, could describe personal constructs, and even describe how they would

change themselves to align themselves better with their preferred personal constructs, they were unsure how to put all the pieces together to make those changes they thought would improve their social experiences. In this way, they exhibited some difficulty with executive functioning (i.e., problem solving) and weak central coherence (i.e., putting the pieces together to make a plan to change themselves).

Results from this study support Proctor's (2001) suggestion that considering ASD from a constructivist viewpoint would allow others to understand and relate to people with ASD in a way that emphasizes their experiential lives. From their repertory grids, principal component maps, and the case descriptions of their processes, it is apparent that participants' social cognitive processes are indeed channeled by how they understand and anticipate others, just as Kelly (1955) suggested. Participants' personal construct systems were highly individualized (in-line with Kelly's Individuality Corollary), constructed from their social experiences (in-line with Kelly's Construction and Experience Corollaries), and organized in ways that helped them understand other people and anticipate their social behaviors (in-line with Kelly's Organization Corollary).

Because these participants are able to understand social roles through their personal construct systems, interventions based on information from grids could potentially help these participants further elaborate their personal construct systems. Specifically, some participants' construct systems showed restricted ranges of constructs (a challenge related to Kelly's Range Corollary), which presumably could make it difficult to understand and anticipate people and their social

behaviors not explained by the individual's limited range of constructs. In turn, personal construct systems with limited range provide fewer social choices for an individual; which, in turn, promotes a cycle of making choices that reinforce the limited range, thus limiting choices, etc., and the cycle continues.

In summary, results of this study suggest that some high-functioning adolescents' profiles of strengths and challenges, as explained by prominent theories of ASD, vary on an individual basis. Their deficits pose challenges for their social interactions and offer general explanations, from the standpoint of identifying deficits, for those challenges. Considering participants from a constructivist perspective in this study has identified areas of challenge for participants on an individual basis. It offers more insight than prominent theories in the literature, however, in that it also provides a view of participants' strengths and unique understanding of others in the social domain. The information gained from viewing ASD from this perspective offers a more comprehensive understanding of individuals with ASD and emphasizes the importance of considering abilities of members of this population on an individual basis.

### **Cognitive Complexity**

**Summary.** All participants were able to successfully and independently complete the two-person form of the Role Category Questionnaire (RCQ). The results of the RCQ are difficult to interpret given the variation between participants, with some presenting with typical scores while others were well below age-level. For those participants who scored in the typical range, the RCQ results support the

findings from the repertory grids that suggest that these individuals have complex and well-organized systems of constructs related to social interaction.

The cognitive complexity scores for these participants suggest that, although taking the perspective of others is often impaired for individuals with autism (Baron-Cohen, 1995), this is not the case for all individuals with autism (Bowler, 1992; Frith & Happé, 1994; Ozonoff, Rogers, & Pennington, 1991). For example, when discussing elements, Kristina provided rich, detailed descriptions of the thought processes of the people she chose to represent her elements. Angela was constantly checking the PI for his reactions relative to the experiences she shared with him, and even apologized for one that she thought may have been offensive – suggesting she was considering his perspective. Beau’s descriptions of other people, rich with subtle differentiations of their personalities, made for the most sophisticated of all repertory grids. Considering these cases, it is possible their scores of cognitive complexity do indeed indicate they have some degree of functional communication skills and that they consider the perspectives of other people.

Consistent with the literature for ASD, and the very label itself that emphasizes a spectrum of severity levels, it appears that some individuals with ASD have more functional cognitive representations of social roles and the perspectives of others than what they may be considered to have. The very process of building these interpersonal constructs entails being interested in others, observing, and abstracting other people’s social processes – all of which have been suggested to be

difficult for people with ASD (Baron-Cohen, 1995; Baron-Cohen, Leslie, & Frith, 1985; Flavell, 2004).

The cases of the two participants who scored below their age related peers on the RCQ (Casey and Daniel), however, suggest both methodological and performance interpretations. The method of administration for the RCQ did not allow for the PI to prompt participants through the process. During the repertory grid process, Casey required many prompts to describe elements and produce constructs. Given those conditions, he was able to produce a large number of constructs. Perhaps with prompting (e.g., 'what else can you say about him', 'what else do you like about him', etc.) Casey may have produced more constructs than he was able to do independently for the RCQ. Conversely, Daniel required little prompting during the repertory grid process, so it is possible that prompting for the RCQ may not have helped him produce a greater number of constructs.

The discrepancy in the number of constructs elicited by the RCQ and repertory grid for both Casey and Daniel might also be related to subtle differences in the focus of the instruments. Cognitive complexity has been positively associated with functional communication skills, person-centered communication, persuasive communication abilities, and perspective taking abilities (Burleson & Caplan, 1998; Burleson, Delia, & Applegate, 1995). These are all functional communication skills that may or may not be reflected in the more global construct system description derived from the repertory grid process. Consistent with social communication challenges described in the literature (Baron-Cohen, 1995; Frith & Happé, 1994; Ozonoff, Rogers, & Pennington, 1991), Casey's communicative interactions with the

PI were atypical and riddled with many autistic characteristics including a complete lack of attempts to initiate conversation and poor conversational turn-taking skills. Daniel also presented significant social communicative impairments, which can be explained by his autism, especially the way in which he shared information in the form of extensive monologues during which he offered the PI no conversational turns. These apparent skill deficits suggest impaired perspective-taking ability, and are not functional for social communicative exchanges. Interestingly, the participants who scored higher on the RCQ did not display (or only mildly displayed) these functional communication deficits in their interactions with the PI.

**Strengths and limitations.** It appears that the RCQ measure of cognitive complexity is accessing a slightly different aspect of social interaction than the repertory grid process. In addition, the RCQ scores for the participants in this study aligned with their functional communication performance during the testing process – a distinction that the repertory grids did not make. Consequently, it may be a useful complementary tool to use in addition to the repertory grid. The traditional administration of the RCQ (i.e., with no use of prompting) may underestimate the complexity of the construct systems related to social cognition of individuals with autism, and should be used with caution if not paired with a more comprehensive assessment such as a repertory grid.

**Future directions.** In the future, perhaps administering the RCQ with high-functioning adolescents with ASD and providing prompts would allow us to better understand if this level of assistance would aid participants in producing more constructs. Additionally, categorizing constructs produced on the RCQ by high-

functioning adolescents with ASD and age-matched peers may provide us with information regarding the levels of sophistication of their constructs. This could help us better understand potential qualitative differences in cognitive complexities of adolescents with ASD compared to their age-matched, typically developing peers.

### **Repertory Grid**

**Summary.** The repertory grid process can be modified and used to successfully elicit personal constructs of high-functioning adolescents with ASD. Cognitive and linguistic assessments may help to identify individuals with ASD who may be successful, or conversely unsuccessful (as in the case of Justin), in producing a repertory grid, as well as challenges individuals may have completing this process. Assessing participants' cognitive and language abilities, combined with the parent interview to learn about participants' histories, helped the PI to make accommodations during the research process. It was also helpful that the PI had a strong understanding of the nature of autism to work effectively with participants in the study.

In addition, the repertory grid process appeared to access abilities that both theoretically and anecdotally were assumed beyond adolescents with ASD. The process resulted in complex, well-organized, and socially appropriate construct systems being constructed for all participants. Subsequent analysis of these grids provided a more elaborated, person-centered understanding of these individuals' social cognitions than could be gained through traditional interviews and standardized tests alone.

**Strengths and limitations.** Prompting is a standard support used in the repertory grid process for typically developing individuals (Fransella, 2003; Fransella & Bannister, 1977); however, it is typically used in a manner more flexible than in this research process. With the idea that across-case analyses would provide researchers with patterns or themes across participants, a prompting hierarchy for the study was established. The semantic and syntactic structures of the prompts were required to be the same for each participant to allow for such comparison. Participants' cognitive and language profiles established by the qualifying assessments were heterogeneous. Thus, during the research process the PI became aware that the rigidity of the prescribed prompting hierarchy limited the flexibility with which he could prompt individual participants. Given the heterogeneity of participants' cognitive and linguistic profiles established by the qualifying assessments, different prompts, or at the very least different semantics and syntax considering the participant's abilities, may have been more conducive to the process of eliciting constructs.

Using a structured, regulated prompt hierarchy, as administered in this study, could be helpful for clinicians who are unfamiliar with the theoretical foundations of the repertory grid and the process of administering the assessment. In this investigation, however, the use of such a rigid prompt hierarchy prohibited the PI from making adjustments to the prompts that could have potentially helped some participants better engage in repertory grid process. For clinicians who are familiar with grid theory and administration, the flexible application of prompts tailored to the participant rather than structured to be similar to other participants,

could make the clinician better able to address the unique strengths and weaknesses of a participant to help optimize his or her success in establishing a repertory grid.

Regardless of the challenges presented by the prompt hierarchy, the modifications used did indeed allow participants to successfully build repertory grids. The grids they produced make sense and are organized and structured, as one would expect to see. Though this process was more structured than a typical repertory grid assessment would be, individual differences and options still preserved the person-centered nature of the approach. For example, it is well documented in the literature that work systems and visually structured tasks help individuals with autism to engage and succeed in a variety of endeavors (University of North Carolina Medical Center, 2014). To help participants in the study, the PI provided work systems and focus boxes (as a means of visually structuring tasks) for participants during the repertory grid process. The literature suggests that helping people with autism know what work there is to be done, when it is finished, and what comes next helps them to anticipate the process, reduces anxiety and their cognitive load, allowing them to better engage in the task at hand (Paxton & Estay, 2007; University of North Carolina Medical Center, 2014). All participants appeared to benefit from the work system, checking-off tasks as they were completed and checking-in with the work system regularly to see what task was coming next and how much work remained before the process was complete.

Many of the participants used the focus boxes without question. This was not the case with all participants, however. For example, Kristina informed the PI she

did not need the focus boxes to complete the tasks. So, the PI offered her the option of not using the focus boxes. This is a prime example of how the PI offered flexibility to participants to respect their unique individual differences, aware that individuals on the autism spectrum differ in the level of supports they need. The whole purpose of providing structure for individuals with autism is for them to use it as needed. The repertory grid is not a standardized process and it is not intended to be used in such a way. Thus, the scaffolds presented were used at participants' discretions.

The repertory grid process in its entirety is time consuming. All participants in the study completed the process within two hours. This may be too much time for clinicians to devote to an assessment, and without supports for individuals with ASD, it may be difficult for those participants to complete the process. The repertory grid process is also complex in terms of understanding the theoretical foundations, the understanding of which allows the administrator to apply the tool flexibly. Thus, these aspects of the process may be considered weaknesses in terms of the assessment being adopted by clinicians.

**Future directions.** As previously mentioned, the results of participants' repertory grids and principal component maps appeared to mirror the structure of what one would expect to see in the grids and maps of typically developing adolescents. As was the case for the participants in this study, higher-functioning adolescents with ASD are often not assessed for language and cognition based on academic performance – or, if they are, their test scores place them within 1.5 standard deviations of the mean, which is commensurate with their academic performance as measured by their grades, and does not qualify them for services.

One can see, however, from the repertory grid assessment of social cognition, that for adolescents with ASD whose social cognitions mirror that of their typically developing peers, yet their social performance does not, that a need for intervention is present and services are warranted. Such interventions may entail professionals in addition to speech-language pathologists who may provide social coaching, facilitate social groups, etc., depending on the individual's needs. Thus, the information gained from repertory grids could be helpful to parents and service providers in providing evidence of the need for intervention and initiating service provision for adolescents with ASD.

**Clinical implications.** As previously mentioned in the results, information from participants' repertory grids can be used as a starting point for therapeutic intervention, with the ability to target specific constructs that the individuals themselves have identified as important to them achieving an "ideal self". A potential future direction would be to involve these participants in another study that explores interventions for social skills using information gained from their repertory grids. Additionally, information from their cognitive and linguistic qualifying assessments could be used to provide appropriate supports for their social intervention programs they may not currently receive.

## **Conclusion**

It is clear from results of this study that the repertory grid assessment can be used to gain information about the social cognitive processes of high-functioning adolescents with ASD directly from the source. The repertory grid provided researchers with a structure of participants' individualized processes of perceiving,

understanding, and anticipating others in social environments. It is evident that the high-functioning adolescents with ASD in this study have structural systems of personal constructs they use to understand and anticipate other people that are similar to their typically developing peers. They have an understanding of social roles and are aware of others' personality traits they prefer and those they dislike. Further, they use their awareness of these traits to categorize and determine whom they do and do not like, and they use this information in their processes of forming relationships.

Still, however, their social communication abilities are qualitatively different than those of their typically developing peers. It may very well be, then, that their ability to access and operationalize their personal construct systems to successfully communicate and interact with others in social arenas online – in the moment – is compromised by challenges presented by autism. Initially, the PI believed that perhaps qualitative methods of assessing social cognition, such as the repertory grid and the RCQ, would be better suited to understanding social differences of individuals with autism rather than a standardized test of social skills. It was found, however, that information gained from the SRS-2 about participants' perspectives of themselves, and their parents perspectives of them, provided the PI with information that proved to be valuable during the repertory grid process and has the potential to be valuable in social skills interventions. Therefore, perhaps an approach that integrates person-centered assessments (i.e., the repertory grid & RCQ) with standardized assessments (i.e., the SRS-2) would provide a richer, more

comprehensive understanding of adolescents assessed, and inform their subsequent intervention plans in a way that caters more specifically to their unique needs.

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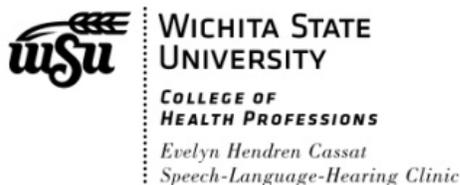
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## **APPENDICES**

## APPENDIX A

### PARENT CONSENT FORM



#### Parent Consent Form

##### **INTRODUCTION**

We are doing research at Wichita State University (WSU), and we support protection for people participating in research. Please read this information about a study we are doing with teenagers who have Autism Spectrum Disorder (ASD). We would like to tell you more about the project and hope you will be interested in being a part of it. Your participation is voluntary, and you are free to stop being in it at any time. At the end of this letter is a place for you to sign if you agree to let your child be in it. If you do not want your child to be in the study, do not sign the form. If you sign the form, you can change your mind later and take your child out of the study at any time. If you choose not to participate, your relationship with WSU and/or the department of Communication Sciences and Disorders (CSD) will not be affected in any way.

##### **PURPOSE: WHAT DO WE WANT TO LEARN IN THIS STUDY?**

We are interested in finding out how teenagers with ASD think about other people. We want to make the process fun, and we will use two tools: the repertory grid and the Role Category Questionnaire (RCQ).

##### **PROCEDURE: WHAT DOES THE STUDY INVOLVE?**

If your child participates in the study, we will meet a total of three times at the Wichita State University Evelyn Hendren Cassat Speech-Language Hearing Clinic on three separate days. The first meeting is with you only: we will set up a time to meet with you for a 30-60 minute interview to talk about the study, get to know you and your child, and give you time to ask us questions about the study. Then, we would schedule **Day 1 – First Session** (this is the first session we meet with your child: see below) to meet with your child at the Wichita State University Evelyn Hendren Cassat Speech-Language Hearing Clinic.

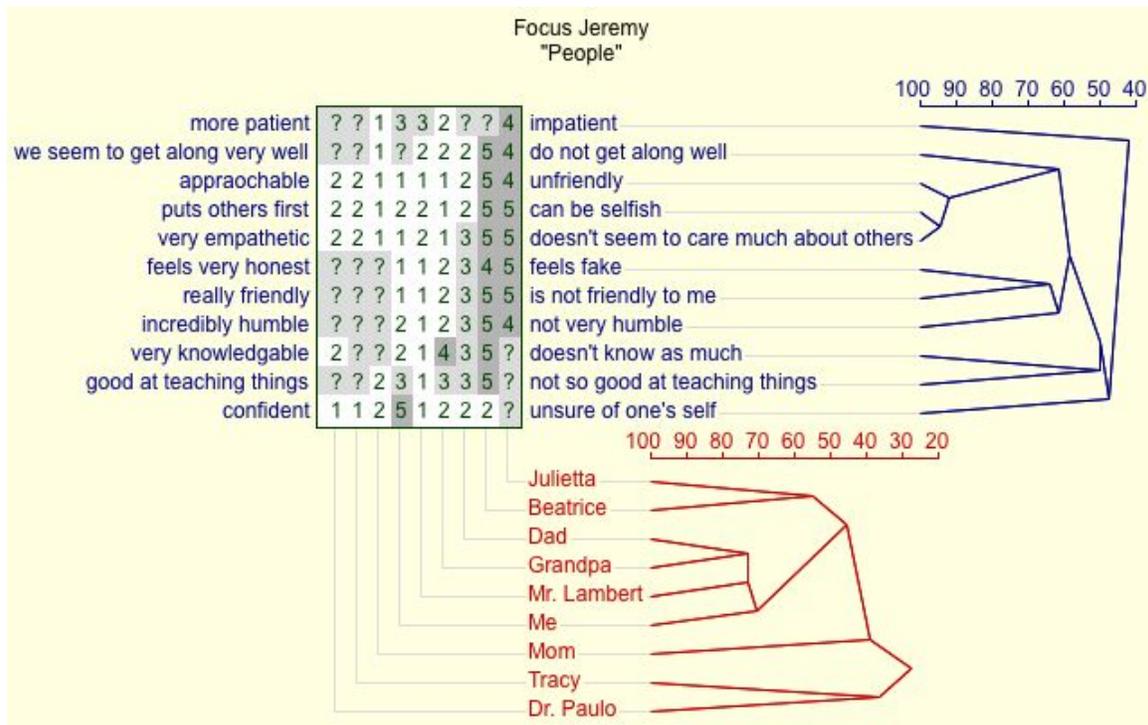
**Day 1 – First Session**

On the first day, your child will take cognitive and language tests at the Wichita State University Evelyn Hendren Cassat Speech-Language Hearing Clinic to qualify for the second day of the study. It may take 1.5-2 hours for your child to complete the tests. If your child’s scores meet the criteria we need for the study, we will set up a time to meet with him or her for **Day 2** (see below). If his or her scores do not meet the criteria we need, we will set up a time to meet or call you to explain the test scores and give you a gift card to give your child for participating.

**Day 2 – Potential Second Session**

If your child comes for the second day, we will meet at the Wichita State University Evelyn Hendren Cassat Speech-Language Hearing Clinic. We will work with your child to make a repertory grid and complete a Role Category Questionnaire (RCQ) on this day. It may take 1.5-2 hours for your child to complete the repertory grid and RCQ. The repertory grid is a kind of rating scale that lets us see how your child thinks about people he or she knows. Each person in the study will make a unique grid based on personality traits they like and do not like about people. There is an example of repertory grid on Page 2 of this letter. Making a grid will be what we do for most of the session. Then, your child would do the RCQ. To do this, he or she will be asked to write for five minutes about someone he or she likes and someone he or she does not like. If your child participates in the second session, we will give you a gift card for him or her at the end of that session.

Here is an example of a completed repertory grid:



If your child participates, we will help him or her to make a grid like this. To do this, we will ask your child to think about how some people in his or her life are similar and different. These similarities and differences will be listed on the right and left sides of the box with the numbers in it in the picture above. The people he or she compares will be listed on the bottom.

We will analyze the information in the grid to see how your child thinks about other people. A man named Jeremy made the grid you see above. In his grid, we can see that being 'approachable,' 'putting others first', and being 'very empathetic' are important character traits he looks for in other people. We can also see that he prefers not to spend much time with people he feels are 'unfriendly', 'can be selfish', and 'don't seem to care much about others'.

### **PARTICIPANT SELECTION**

Your child can be in this study because he or she is between 16 and 18 years old and has ASD or Asperger's. If it is okay with you for your child to do the study, he or she will need to sign an assent form. Your child can do this at home, where he or she can take time to talk with you and make a decision. If your child wants to do this, we will talk to him or her as we go along to make sure your child is doing okay and wants to keep going. There will be 5 participants in this study.

### **DISCOMFORT/RISKS**

There may be some risk of discomfort for your child if you allow them to participate in this study. In the study, your child will be asked to talk about people he or she likes and does not like. This could make your child uncomfortable. If this happens and your child needs to talk to someone, we recommend your child see their regular physician or professional they normally see for their ASD/Asperger's Syndrome. If they do not have a regular professional they see, we can provide services through the WSU Psychology Clinic at no charge to you. The clinic can be reached by calling (316) 978-3212, and is located in Room 412 of Jabara Hall on Wichita State University's main campus: 1845 Fairmount, Wichita, KS, 67260. If you have questions or concerns, you can tell us at any time. You are free to take your child out of the project at any time without penalty with WSU or your relationship with WSU.

### **BENEFITS**

There could be many benefits from this study. Your child will help us understand how teenagers with ASD think about other people. That will help us make better ways to help kids with ASD talk about people and social events. It will also help us provide better support to kids with ASD. We would like to publish the results of this study (protecting your privacy and leaving out any personal identifying information) so that other universities, clinics, and other institutions can benefit from your child's work with us.

### **CONFIDENTIALITY: HOW WILL WE PROTECT YOUR PRIVACY?**

Your child's name will not be used with the information collected in this study. We will use a number instead of his or her name on all forms and files to protect his or her privacy. The DVDs will be locked in a faculty member's private office in the CSD department. All participant data, including the video recordings, will be kept in a locked filing cabinet in the primary investigator's office with access by project staff only. We will keep data for 3 years after the study. Then, we will destroy all files.

By signing this form, you are giving the research team permission to share information about you with the following groups:

- \_Office for Human Research Protections or other federal, state, or international regulatory agencies;
- \_The Wichita State University Institutional Review Board.

### **REFUSAL/WITHDRAWAL**

Participation in this study is voluntary. If you do not let your child be in the study, it will not affect your child's future with WSU or CSD. If you agree to let your child be in this study, you can take him or her out of the study at any time without penalty.

### **COMPENSATION OR TREATMENT**

WSU does not provide medical treatment or other reimbursement to people injured as a result of or in connection with participation in research activities conducted by WSU or its faculty, staff, or students. If you believe your child has been injured because they were in this study, you can contact the Office of Research and Technology Transfer, Wichita State University, Wichita, KS 67260-0007, telephone (316) 978-3285.

### **PAYMENT TO SUBJECTS**

At the end of the study, we would like to give you (the parent) a \$20.00 gift card for your child to a store he or she chooses. Study payments are taxable income. Therefore, the gift card will be given to you and you will be asked to complete a W9 form, which requires your name, address, and social security number in order for you to receive study payments. A Form 1099 will be sent to you and to the Internal Revenue Service if your payments are \$600 or more in a calendar year.

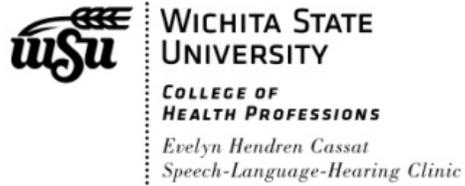
### **CONTACT**

If you have any questions about this research, you can contact: Sean Hess, Doctoral Student, Wichita State University, Department of Communication Sciences and Disorders, (316) 518-8972, or Trisha Self, Associate Professor, Wichita State University, Department of Communication Sciences and Disorders, (316) 978-6810, or Tony DiLollo, Associate Professor, Wichita State University, Department of Communication Sciences and Disorders, (316) 978-3319. If you have questions pertaining to your rights as a research subject, or about research-related injury, you can contact the Office of Research and Technology Transfer at Wichita State University, 1845 Fairmount Street, Wichita, KS 67260-0007, telephone: (316) 978-3285.



APPENDIX B

PARTICIPANT ASSENT FORM



**Participant Assent Form**

I have been told that my parents (mom or dad) said it's okay for me to participate, if I want to, in a project about learning what teenagers think about other people. I know that I can stop at any time I want to and it will be okay if I want to stop.

---

Name

Date

APPENDIX C

VISUAL WORK SYSTEM FOR QUALIFYING ASSESSMENTS

\_\_\_\_\_’s Work System

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- Test of Nonverbal Intelligence
- Break!**
- Peabody Picture Vocabulary Test
- Break!**
  
- Word Classes
- Following Directions
- Formulated Sentences
- Recalling Sentences
- Break!**
- Understanding Spoken Paragraphs
- Word Definitions
- Sentence Assembly
- Semantic Relationships

You have finished **Day 1!** Time to **go home** 😊

## APPENDIX D

### VISUAL WORK SYSTEM FOR EXPERIMENTAL PROTOCOL

\_\_\_\_\_’s Work System

- Review Work System
- Repertory Grid: People
- **Break**
- Repertory Grid: Make Rating Scales
- **Optional Break**
- Repertory Grid: Putting People on Scales
- **Optional Break**
- Repertory Grid: Putting it all together
- **Break**
- Role Category Questionnaire

You have **finished** session 2! Time to go home. You have completed the research process. Thank you for participating!







## APPENDIX F

### RCQ: ADMINISTRATOR'S SCORING FORM

The core assumption is that persons **make sense of other persons** (perception and understanding) through systems of **personal constructs**. Constructs are the cognitive templates or stencils we fit over “reality” to bring order and familiarity to chaos and novelty. In this case, constructs are the categories we apply to other people to perceive and understand them.

Personal constructs are generally thought to exist as sets of opposing terms (smart-dumb, attractive-unattractive, etc.). Researchers use the CRQ to estimate the level of **differentiation** people use in **perceiving others**. The more personal constructs a person uses, the greater their differentiation of other people is likely to be—and hence, the higher the person’s level of cognitive complexity is thought to be.

To score the level of differentiation (or cognitive complexity in personal perception):

Add up the number of **different descriptions** used to describe the 2 people the participant wrote about.

- **\_As a rule of thumb, treat each new term as an additional personal construct**  
If the participant described someone as both “sharp” and “intelligent” count that as 2 points. If the participant described someone as “hurried” and “never on time” count that as 2 points
- **\_Adjectives and adverbs that merely modify the extent of a characteristic do not count as an additional construct**  
If the participant described someone as “totally and completely sincere” count that as 1 point. If the participant described someone as a “good ole boy” count that as 1 point
- **\_Skip over any physical description (like tall or pretty) or any demographic labels (like Irish or Hispanic)**  
If the participant described someone as “a hunk” or “Mormon” or “white” or “black” do not count that. Ignore physical or demographic descriptions

The **combined score** of both of the participant’s descriptions is **an index** of his or her **personal construct differentiation level**.

- **\_Scores generally fall between 3 and 45**. Typical adult populations generally average between 20 and 25
- **\_Research has shown that CRQ scores are independent of IQ, writing ability, and most personality traits** like empathy or extroversion/introversion

## APPENDIX G

### PARENT LETTER



Dear Parent,

We are researchers at Wichita State University. We are interested in finding out how teenagers with ASD think about other people. We want to make the process fun, and we will use two tools: the repertory grid and the Role Category Questionnaire (RCQ). Your child may be able to be in this study because he or she is between 16 and 18 years old and has ASD or Asperger's syndrome. If your child wants to participate, and if it is okay with you for your child to do the study, he or she will need to sign an assent form. We can give you the form so that your child can do this at home, where he or she can take time to talk with you and make a decision. If your child participates, we will talk to him or her as we go along during the study to make sure he or she is doing okay and wants to keep going.

If your child participates in the study, we will meet a total of three times at the Wichita State University Evelyn Hendren Cassat Speech-Language Hearing Clinic on three separate days. The first meeting is with you only: we will set up a time to meet with you for a 30-60 minute interview to talk about the study, get to know you and your child, and give you time to ask us questions about the study. Then, we would schedule **Day 1 – First Session** (this is the first session we meet with your child: see below) to meet with your child at the Wichita State University Evelyn Hendren Cassat Speech-Language Hearing Clinic.

#### **Day 1 – First Session**

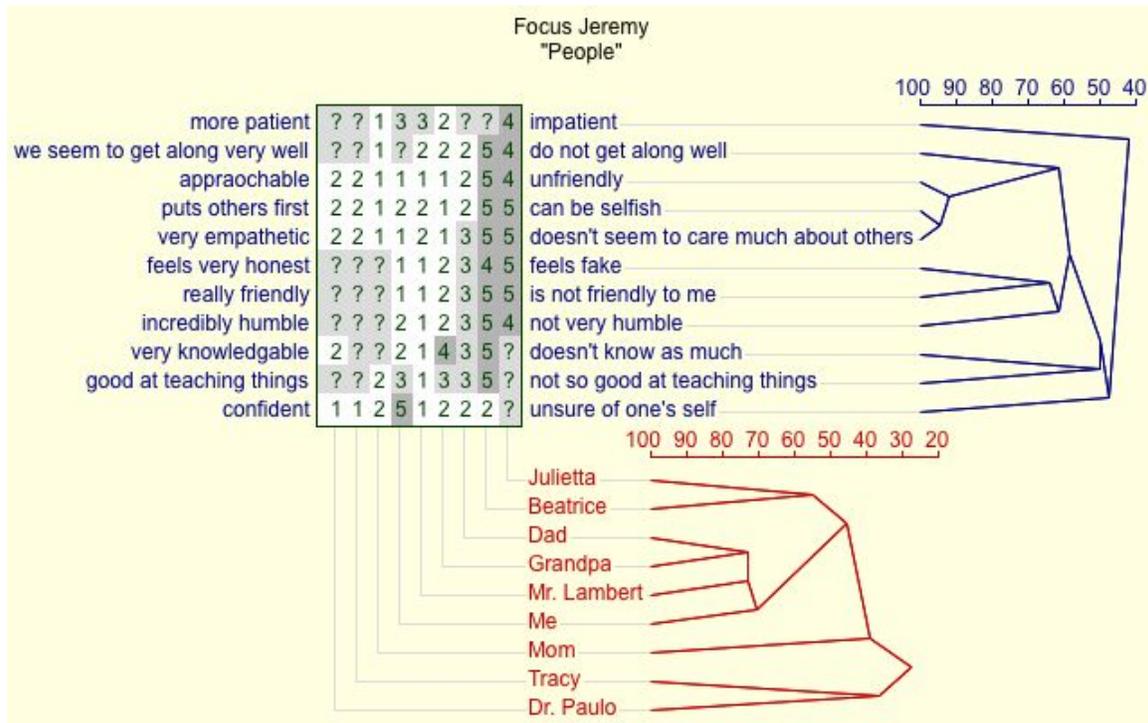
On the first day, your child will take cognitive and language tests at the Wichita State University Evelyn Hendren Cassat Speech-Language Hearing Clinic to qualify for the second day of the study. It may take 1.5-2 hours for your child to complete the tests. If your child's scores meet the criteria we need for the study, we will set up a time to meet with him or her for **Day 2** (see below). If his or her scores do not meet the criteria we need, we will set up a time to meet or call you to explain the test scores and give you a gift card to give your child for participating.

#### **Day 2 – Potential Second Session**

If your child comes for the second day, we will meet at the Wichita State University Evelyn Hendren Cassat Speech-Language Hearing Clinic. We will work with your child to make a repertory grid and complete a Role Category Questionnaire (RCQ) on this day. It may take 1.5-2 hours for your child to complete the repertory grid and RCQ. The repertory grid is a kind of rating scale that lets us see how your child thinks about people he or she knows. Each person in the study will make a unique grid based on personality traits they

like and do not like about people. There is an example of repertory grid on Page 2 of this letter. Making a grid will be what we do for most of the session. Then, your child would do the RCQ. To do this, he or she will be asked to write for five minutes about someone he or she likes and someone he or she does not like. If your child participates in the second session, we will give you a gift card for him or her at the end of that session.

Here is an example of a completed repertory grid:



If your child participates, we will help him or her to make a grid like this. To do this, we will ask your child to think about how some people in his or her life are similar and different. These similarities and differences will be listed on the right and left sides of the box with the numbers in it in the picture above. The people he or she compares will be listed on the bottom.

We will analyze the information in the grid to see how your child thinks about other people. A man named Jeremy made the grid you see above. In his grid, we can see that being 'approachable,' 'putting others first,' and being 'very empathetic' are important character traits he looks for in other people. We can also see that he prefers not to spend much time with people he feels are 'unfriendly,' 'can be selfish,' and 'don't seem to care much about others'. This is the kind of information we are trying to get from this study. We hope it will help us to see how teenagers with ASD and/or Asperger's syndrome think about other people.

Thank you for taking the time to read about our study. Please let us know if your child would be interested in participating and if you feel comfortable letting them participate. You may contact the primary investigator, Sean Hess, by email ([sehess@wichita.edu](mailto:sehess@wichita.edu)) or by

phone (316) 518-8972, with any questions you have and to let him know what you and your child decide. Thank you for your time and consideration.