Virtual Reality Interview Skills Training for Young Adults with a Diagnosis of Autism Spectrum Disorder: Making Employment a Reality

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Authorization to Submit Dissertation

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Abstract

Despite recent advancements in the field of autism, young adults with a diagnosis of ASD continue to struggle working and living independently (Thompson, 2013). Competitive employment is a quality of life indicator (García-Villamisar & Hughes, 2007; García-Villamisar, Wehman, & Navarro, 2002; Hendricks, 2010; Hurlbutt & Chalmers, 2004; Morgan, Leatzow, Clark, & Siller, 2014; Roux et al., 2013). Strong interview skills including impression management behaviors, increase the likelihood of obtaining competitive employment (Bell & Weinstein, 2011; Smith et al., 2014; Smith et al., 2015; Strickland, Coles, & Southern, 2013). High self-efficacy and impression management behaviors influence successful interviewee performance (Huffcutt, Van Iddekinge, & Roth, 2011). This study explored the use of a Virtual Reality–Live Interview Coaching (VR-LIC) intervention package to increase gaze and conversational reciprocity across interviewers and settings with young adults diagnosed with autism spectrum disorder (ASD). The participants demonstrated improvement in impression management behaviors with the introduction of VR intervention. The incorporation of live coaching with multiple interviewers and office settings enhanced performance and increased transfer of skills to future real-world interviews as concluded by high and consistent maintenance probe data. Statements of limitations for VR-LIC intervention package effectiveness include generalization of study results to a larger population, and inability to control for practice effect. The results of this study support the use of virtual reality and live-interview coaching to development and strengthen interview skills for young adults with a diagnosis of ASD. These promising results supports the need for more research exploring VR and interview skill interventions topics and limitations.

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Dedication

I dedicate my dissertation to my family and friends, who have given so much to make this possible. I dedicate my dissertation first and foremost to my husband and love of my life, Jacob Lopez, who tolerated all my long hours of work and provided words of encouragement, love, and an abundance of coffee. I wouldn't have made it this far without him by my side, always understanding.

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Chapter 1: Introduction

Despite recent advancements in autism research, young adults with a diagnosis of autism spectrum disorder (ASD) struggle to work and live independently (Eaves & Ho, 2008; Morgan, Leatzow, Clark, & Siller, 2014). Less than 60% of young people with a diagnosis of ASD experience meaningful employment as compared to 68-93% of their peers with other disabilities and 95% for peers without disabilities (Bureau of Labor Statistics, 2015; Shattuck et al., 2012; Taylor & Seltzer, 2011). Long-term employment outcomes and job attainment is often dependent on strong interviewing skills (Bell & Weinstein, 2011; Smith et al., 2014; Smith et al., 2015; Strickland, Coles, & Southern, 2013). However, because of social interaction differences commonly associated with people diagnosed with ASD, the process of interviewing can be a barrier to successful employment for this population (American Psychiatric Association, 2013; Huffcutt, Van Iddekinge, & Roth, 2011; Huffcutt, Conway, Roth, & Stone, 2001; Mawhood & Howlin, 1999; Strickland et al., 2013).

During the interview process, a skilled interviewee uses effective social-communication to manage the impression an interviewer forms about him or her (Huffcutt et al., 2011). "Impression management" is a term used to define behaviors that influence the mental construct "others" develop about a person during a social interaction (Huffcutt et al., 2011; Leary & Kowalski, 1990; Lievens & Peeters, 2008; Schlenker, 1980). Eye contact and positive reciprocal communication are impression management behaviors that have been linked to increased interviewee performance (Kristof-Brown, Barrick, & Franke, 2002). Eye contact in particular is an impression management behavior that plays a central role in most social communication (Riby, Doherty-Sneddon, & Whittle, 2012; Senju, Kikuchi, Hasegawa, Tojo, & Osanai, 2008). Eye contact is used to initiate, regulate, and terminate conversations and is the primary way to obtain visual information related to social communication (Senju & Johnson, 2009). Limited eye contact (i.e., gaze aversion) can inhibit learning (Riby et al., 2012; Senju et al., 2008) as well as effective social communication, particularly in reciprocal conversations (i.e., staying on topic and answering a question directly).

Successful use of impression management behaviors during the interview process is linked to a person's ability to make eye contact, answer questions directly, and stay on topic,

which are often limitations for people with ASD (American Psychiatric Association, 2013; Huffcutt et al., 2001; Kristof-Brown et al., 2002; Strickland et al., 2013). Limitations in impression management behaviors (i.e., eye contact and reciprocal communication) for people with a diagnosis of ASD can be explained by theory of mind and other cognitive-based perspectives.

Cognitive Theories Related to Social Competence and Impression Management

A lack of social competence for people with ASD has been linked to limitations in theory of mind (i.e., the ability of a person to use perceived cue(s) to develop a hypothesis of others' internal states; Baron-Cohen et al., 2000). Executive functioning associated with complex reasoning is often impaired in people with ASD and affects their ability to inhibit socially inappropriate responses (Kana, Keller, Minshew, & Just, 2007). People with ASD also have a propensity to focus on minute details rather than on global cues, especially during social interactions which theoretically is defined as weak central coherence (Morgan, Maybery, & Durkin, 2003). Central coherence theory suggests that humans develop schemas (templates of engagement) that guide social interactions. Weak central coherence limits the creation of social schemas denigrating social interactions. Social interactions that are stilted due to weak central coherence often creates stress (i.e., cognitive load). These cognitive theories are expounded on in chapter 2.

Cognitive load has been defined as the amount of cognitive resources required to process information during an instructional period (Paas, Renkl, & Sweller, 2004). Extended eye contact for people with ASD tends to increase cognitive load resulting in increased gaze avoidance and social discomfort (Riby et al., 2012; Senju & Johnson, 2009). However, when people on the autism spectrum interact with technology-based instruction, eye gaze avoidance and other cognitive load issues that occur with direct human-to-human contact is minimized (Doherty-Sneddon, Riby, & Whittle, 2012; Mineo, Ziegler, Gill, & Salkin, 2009; Riby et al., 2012). Use of technology-based instruction along with standard training formats may be effective in increasing the interview skills of young adults on the autism spectrum who seek employment. Several studies focused on the general population demonstrate that interviewee performance can be enhanced through a training format called "interview coaching" (Harrison et al., 1983; Maurer & Solamon, 2006; Tay, Ang, & Van Dyne, 2006; Tross & Maurer, 2008; Williams, 2012).

Interview Coaching

Interview coaching is a combination of instruction, modeling, and practice with feedback from an instructor (Williams, 2012). The use of interview coaching has been linked to increased self-efficacy (Huffcutt et al., 2011; Macan, 2009; Tay et al., 2006; Tross & Maurer, 2008), a person's perception of how well they are able to perform a task (Wood & Bandura, 1989). Increased levels of self-efficacy have been linked to higher interviewee performance ratings (Tay et al. 2006). Interview coaching may also increase a person's impression management behaviors (e.g., eye gaze and reciprocal communication), which are known to impact interviewee performance ratings (Huffcutt et al., 2001; Strickland et al., 2013).

Traditional interview coaching consists of human-to-human training (e.g., role playing with feedback, scripting, and mock interviews; Bobroff & Sax, 2010; Hillier et al., 2007; Morgan et al., 2014; Wilczynski, Trammell, & Clarke, 2013). For people on the autism spectrum, the face-to-face training used in interview coaching may increase their cognitive load (i.e., stress) to the extent that the training may limit learning of new skills (i.e., acquisition) and performing learned skills with ease (i.e., fluency; Chandler & Sweller, 1991; Mineo et al., 2009; Picard, 2009; Sansosti, Doolan, Remaklus, Krupko, & Sansosti, 2014; Weng, Maeda, & Bouck, 2014).

Interview coaching blended with technology-based instruction may provide an ideal platform for increasing interview skills including impression management behaviors for young adults with a diagnosis of ASD (Smith et al., 2014). Technology-based instruction may improve acquisition and fluency of skills taught (Mitchell, Parsons, & Leonard, 2007; Wainer & Ingersoll, 2011). Once fluency is established through a technology-based interface, generalization of interview performance across employers and real-world settings may be enhanced through live interview coaching (Cooper, 1998; Doherty-Sneddon et al., 2012; Kalyuga, Ayres, Chandler, & Sweller, 2003; Riby et al., 2012).

Technology Training

Electronic screen media is an umbrella term encompassing a wide range of technology-centric evidence-based practices (Mineo et al., 2009). Electronic screen media provides a flexible and responsive mode of instruction tailored to fit the needs of the individual (Picard, 2009; Sansosti et al., 2014; Weng et al., 2014). Moreover, the

characteristics of electronic screen media aids in minimizing cognitive load in neuro-atypical populations by limiting stressful activities (e.g., interpersonal interactions) that correlate with increased cognitive load (Picard, 2009; Riby et al., 2012; Sansosti et al., 2014; Weng et al., 2014).

Electronic screen media encompasses video modeling, computer-aided instruction, and virtual reality. Video modeling provides a video of a given task that can be replayed or paused, allowing for multiple views and learning opportunities (Wong et al, 2014). First person or third person viewpoints are typical video modeling perspectives. Video modeling has been used to teach a variety of skills to a range of age groups and is considered an evidence-based intervention for children and adults with a diagnosis of ASD (Wong et al., 2014). For Moore's (2015) dissertation, the use of video modeling to teach interview skills was explored with promising results; however, further research is needed to know if acquired skills generalize over time and across settings (Moore, 2015).

Computer-aided instruction is the use of electronic screen media that can have video modeling embedded and includes interactive components with the electronic screen media (e.g., using a mouse to select videos or navigate digital pages of information). Computer-aided instruction is a current evidence-based intervention used to target interview skills and supports learning styles associated with ASD (Sansosti et al., 2014; Wong et al., 2014). Limited research has been conducted exclusively using computer-aided instruction to teach interview skills. With advancements in technology, computer-aided instruction is shifting to an increasingly immersive experience when interacting with digital content (e.g., virtual reality).

Virtual reality is implemented successfully in other fields (e.g., military, firefighting, industry, and medicine) to bridge the gap between learning (acquisition) and practicing (fluency) a skill and successfully performing the skill in the real world (i.e., generalization; Querrec, Buche, Maffre, & Chevaillier, 2004; Rothbaum & Hodges, 1999). Mounting evidence supports virtual reality as an appropriate training tool to increase skill development for people with a diagnosis of ASD (Mitchell et al., 2007; Smith et al., 2014; Strickland et al., 2013; Weng et al., 2014). Virtual reality has been used to teach social skills (Hoque, Courgeon, Martin, Mutlu, & Picard, 2013; Mitchell et al., 2007; Parsons, Mitchell, & Leonard, 2004), mathematics (Bouck & Flanagan, 2010), and safety skills (McComas,

MacKay, & Pivik, 2002) to neuro-typical and atypical populations. Yet, research is limited on the use of virtual reality technology as a training tool to enhance interview skills (Wright, Hogard, Ellis, Smith, & Kelly, 2008).

Smith et al. (2014) conducted a randomized control trial exploring the effects of virtual reality software, Virtual Reality Job Interview Training (VR-JIT), on interviewee performance and self-confidence, including self-efficacy. Differences between groups for both interviewee computer generated role-play performance scores and self-confidence measures were found. Smith et al. (2014) measured computer generated performance, yet did not specifically measure impression management behaviors. Future employment outcomes and generalization of interviewee performance to different interviewers and settings were not measured by Smith et al. (2014).

In a follow-up study, Smith et al. (2015) collected 6-month, post-intervention data using a self-report survey to assess participants' engagement in paid or volunteer positions. The treatment group reported a higher acceptance rate of employment and volunteer positions over control group, although actual employment status was not validated by researchers. Additionally, volunteer and employment positions were not reported separately. It is unknown to what extent the treatment group was able to maintain competitive employment, which is linked to success in quality of life outcomes (e.g., mental health and socialization; Morgan et al., 2014; Roux et al., 2013).

Problem Statement

Competitive employment is a quality of life indicator. Strong interview skills including impression management behaviors increase the likelihood of obtaining competitive employment. High self-efficacy and impression management behaviors influence successful interviewee performance. Increasing fluency without increasing cognitive load is essential during interview skills training for young adults on the autism spectrum. Using a virtual reality interface has been demonstrated to effectively teach interview skills. Once skills have been acquired through a technology interface, it is unclear whether the skills developed during training will transfer into real world, employment outcomes. Further, once interview skills are firmly established through technology, the incorporation of live coaching (i.e., practice with feedback) with multiple interviewers and office settings may enhance performance and increase the transfer of skills to future real-

world interviews, a common practice for increasing the probability for generalization (Stokes & Baer, 1977).

Purpose

The purpose of this research was to investigate the use of computer-aided instruction, virtual reality training, and live interview coaching on (a) specific impression management behaviors, gaze and conversational reciprocity; (b) interviewee performance scores generated through virtual reality training software; and (c) self-efficacy ratings of young adults with a diagnosis of autism spectrum disorder (ASD). This research extended the Smith et al. (2014) investigation on interviewee performance scores generated through virtual reality training software and self-efficacy scores with young adults diagnosed with ASD by: 1) adding a live interview coaching component; 2) examining impression management behaviors (i.e., gaze and conversational reciprocity) assessed through an ABCA single subject design; 3) collecting social validity data; and 4) probing for generalization of impression management behaviors across different interviewers and settings.

Self-efficacy was assessed at pre- and post-intervention. Social validity was assessed by having interviewees rate the interventions' perceived usefulness to increase their interview skills and ease of use.

Research Questions

1. What influence does the implementation of virtual reality training have on interviewee impression management behaviors (i.e., gaze and conversational reciprocity) following baseline levels of performance?
2. What influence does live interview coaching (LIC) following virtual reality training have on interviewee impression management behaviors?
3. What influence does the Virtual Reality–Live Interview Coaching (VR-LIC) intervention package have on generalized impression management behaviors across interviewers and settings?
4. To what extent does the virtual reality training influence interviewee performance scores of young adults diagnosed with ASD?
5. Does VR-LIC intervention package have an overall effect on self-efficacy?

6. What influence does the Virtual Reality-Live Interview Coaching (VR-LIC) intervention package have on social validity?

Chapter 2: Literature Review

The purpose of this research is to investigate the use of computer-aided instruction, virtual reality training, and live interview coaching on (a) specific impression management behaviors, gaze and conversational reciprocity; (b) interviewee performance scores; and (c) self-efficacy ratings of young adults with a diagnosis of autism spectrum disorder (ASD). This research extended the Smith et al. (2014) investigation on interviewee performance scores generated through virtual reality training software and self-efficacy scores with young adults diagnosed with ASD by: 1) adding a live interview coaching component; 2) examining impression management behaviors (i.e., gaze and conversational reciprocity) through an ABCA single subject design; 3) collecting social validity data; and 4) probing for generalization of impression management behaviors across different interviewers and settings.

In this chapter, the research literature relevant to the purpose of the study is reviewed, beginning with an outline of general characteristics associated with ASD, followed by cognitive theories and neurological functioning related to specific deficits that impact employment interviews. Next, the literature related to cognitive load theory and the associated impact on individuals with ASD is summarized. General information on interviewee performance and interview training is provided along with transition and employment outcomes. Finally, literature on interviewee performance and training related to individuals with ASD is discussed, followed by a summary and significance statement.

Characteristics Associated with ASD

Autism spectrum disorder (ASD) was originally introduced to the scientific community in the 1940s under the label of autism (or Asperger's disorder), a term describing a specific group of people exhibiting unique social/behavioral characteristics (Frith, 1991; Kanner, 1943). Autism grew to become a household name with evolving theories, labels, and definitions (Wolff, 2004). Currently, ASD is defined as a neurodevelopmental disorder characterized by a dyad of behavioral differences, social–communicative interactions and repetitive and stereotyped behaviors, that fall along a continuum of adaptive functioning (American Psychiatric Association, 2013). Neurodevelopmental differences associated with ASD are manifested neurologically, cognitively, and behaviorally.

Social-communication competence. One of the main behavioral characteristics typically associated with ASD are differences in social-communication interactions (Carter, Davis, Klin, & Volkmar, 2005 Mason, Rispoli, Ganz, Boles, & Orr, 2012). Social-communication skills focus on interpersonal interactions and the use of functional communication (Carter et al., 2005; Sansosti & Powell-Smith, 2008). Although language deficits are linked to ASD, language disorders are not a distinguishing feature from other neurodevelopmental disabilities (Carter et al., 2005; Surian, 1996). Some language differences while interacting with a communicative partner (i.e., reciprocal conversations) have been associated with people on the autism spectrum (Carter et al., 2005; Landa, Klin, Volkmar, & Sparrow, 2000). For example, increased use of narrowly focused speech (i.e., pedantic speech; Burgoine & Wing, 1983), limited use of semantic speech, and non-verbal communication such as gaze aversion (Tager-Flusberg, Paul, & Lord, 2005) commonly occur during conversations with a person diagnosed with ASD.

Reciprocal conversations. Although social–communication skills vary depending on the individual and environmental factors (e.g., degree of intervention, type of communication, differing recipients, and settings; Bernard-Opitz, 1982; Tager-Flusberg et al., 2005), researchers have identified a common pattern of limitations (i.e., terseness, semantic drift, pedantic speech, perseveration, and pausing/ no response) for people with a diagnosis of ASD (Capps, Kehres, & Sigman, 1998; Ghaziuddin & Gerstein, 1996; Paul, Orlovski, Marcinko, & Volkmar, 2009). Capps et al. (1998) studied the communicative behaviors of 15 matched pairs of children with a diagnosis of ASD and children with a diagnosis of developmental delay. The researchers reported terseness and perseverations at significantly higher rates in children with a diagnosis of ASD than children within the comparison group (Capps et al., 1998). Increased rates of pedantic speech among people with a diagnosis of ASD was reported by Ghaziuddin & Gerstein (1996) and Paul et al. (2009). Additionally, Paul et al. (2009) reported topic switching and perseveration rates for the 29 adolescents with a diagnosis of ASD was significantly higher than the comparison group of 26 adolescents with typical development.

***Gaze*.** Differences in eye gaze is a social-communication behavior associated with a diagnosis of ASD (American Psychiatric Association, 2013; Dawson, Webb, & McPartland, 2005). Limited use of typical eye gaze patterns affects many areas of nonverbal social–

communication (e.g., social orienting, joint attention, imitation, response to others' nonverbal emotions, and face recognition; Carter et al., 2005). People with a diagnosis of ASD show delayed gaze-direction processing (i.e., joint attention) compared to match-aged peers (Grice et al., 2005). The association of limitations in face recognition and ASD has also been reported by researchers Klin, Sparrow, De Bildt, Cicchetti, Cohen, and Volkmar (1999) and others (Dawson et al., 2005; Schultz, 2005).

Cognitive Theories and Neurological Evidence

Cognitive theories related to social-communicative differences among people with ASD (e.g., reciprocal communication and gaze) crucial to successful interviewee performance are 1) cognitive load theory, 2) theory of mind, and 3) gaze models. Neurological studies provide evidence of differences in brain circuitry associated with ASD and social behaviors. Cognitive theories and neurological evidence aid in the explanation of differences in behavioral expressions of reciprocal communication and gaze associated with ASD.

Overview of central coherence. Central coherence is a cognitive theory describing the propensity to process information globally; using details to create a larger narrative of information (Morgan et al., 2003). Weak central coherence—a cognitive process usually associated with ASD—indicates local processing of information leading to a detail-focused orientation and limited construction of a global context (Happé & Frith, 2006). Neurologically, central coherence differences (i.e., WCC) have been found in left-lateralization of the parietal and premotor areas of the brain (Manjaly et al., 2007) consistent with visual-spatial/perceptual skills versus social cognition and behaviors.

Central coherence is associated with the creation of schemas and scripts (Loth, Gómez, & Happé, 2008). The creation and flexibility of schemas and scripts allow humans to successfully interact socially with limited cognitive load (Leonard, 2015). Inflexible or undeveloped scripts and schemas, typically associated with ASD and WCC, could lead to increased cognitive load or stress (Landa et. al, 2000; Leonard, 2015).

Overview of theory of mind. Theory of mind (ToM) is a cognitive theory describing the ability of a person to use perceived cue(s) to develop a hypothesis of others' internal states (e.g., thoughts, feelings, and beliefs; Baron-Cohen et al., 2000). ToM development depends on the ability of the perceiver to identify and interpret others' gaze

and attend jointly (Langton, Watt, & Bruce, 2000). Limitations in gaze development can lead to delays in or lack of ToM (Langton et al., 2000). This theory highlights the importance of gaze in social development and successful social interactions. Additionally, limited ToM can often lead to reciprocal communication difficulties. Without being able to attune to another person's internal states, a conversation is less likely to be successful and may end prematurely or without the intent of the communication accurately realized.

Overview of gaze models. The hyper-arousal, hypo-arousal, intention detector (Baron-Cohen & Ring, 1994; Perrett et al., 1985), and fast-track modulator are four models used to describe the cognitive/neurological process that occurs during social interactions involving gaze and social cognition (e.g., communicative reciprocity; Senju & Johnson, 2009). Each theory is supported to some extent by empirical evidence (Senju & Johnson, 2009). Neuroimaging studies exploring differences in social skills for people on the autism spectrum align with each theory, at least in part (Senju & Johnson, 2009).

The commonalities between the theories is the impairment of gaze during social situations for people with a diagnosis of ASD and the resulting limitations of ToM and social cognition. Behavioral research studies involving gaze in social situations align with the four theoretical descriptions (Riby et al., 2012; Senju et al., 2008; Schultz, 2005). All four of the gaze models address limited social learning due to differences in gaze for people with a diagnosis of ASD.

Each of the gaze models explains the origins of gaze limitation differently. Some contend limitations began at conception or in utero caused by differences in neuro structures (e.g., intention detector model and fast-track modulator model; Baron-Cohen, 1997; Perrett et al., 1985), whereas others state preference differences (i.e., hyposensitivity to faces and eye gaze) creating long term neuro-structural changes (e.g., hypo/hyperarousal model; Senju & Johnson, 2009). Despite the etiology of limited gaze within a social situation, ineffective use of the neurological pathways connected to social gaze could lead to increased limitations in social interactions.

Overview of neurological research. Neurologically, differences have been found in activation within the amygdala (Baron-Cohen et al., 1999; Baron-Cohen et al., 2000; Schultz, 2005), superior temporal sulcus (STS; Zilbovicius et al., 2006), and fusiform gyrus (Deeley et al., 2007; Schultz et al., 2000; Schultz, 2005), for people with a diagnosis of ASD

(Pierce, Müller, Ambrose, Allen, & Courchesne, 2001). Although all three brain structures are associated with social skills (Pierce et al., 2001), fusiform gyrus has been linked mostly to face processing and gaze (Schultz et al., 2000; Schultz, 2005; Deeley et al., 2007). Whereas, STS and the amygdala are associated more broadly to social skills involving social cognition (e.g., communicative reciprocity) and ToM (Baron-Cohen et al., 1999; Baron-Cohen et al., 2000; Pierce et al., 2001).

Baron-Cohen et al. (1999) performed a clinical trial using functional magnetic resonance imaging (fMRI) to measure activation of the amygdala, brain structure associated with gaze and social processing. The authors measured activation in neuro-typical adults and neuro-atypical adults with a diagnosis of ASD. The data indicated increased activation in the amygdala was found only in neuro-typical adults during gaze tasks (i.e., determining the emotional states from another person's facial stimuli; Baron-Cohen et al., 1999). Critchley et al. (2000) found similar differences in brain structure activation for adults with a diagnosis of ASD when processing emotional facial expression.

Limited activation of amygdala indicates limited social processing during activities involving gaze for people with a diagnosis of ASD. Gaze is a primary method of obtaining visual information related to social communication (Schultz, 2005; Senju & Johnson, 2009). Limited gaze (i.e., gaze aversion) may inhibit learning (Riby et al., 2012; Senju et al., 2008) and future use of effective social communication (e.g., communicative reciprocity). Additionally, ineffective use of the neurological pathways connected to social processing could lead to increased cognitive load, as seen in some studies (Doherty-Sneddon et al., 2012; Riby et al., 2012; Senju & Johnson, 2009).

Cognitive Load Theory

Cognitive load theory describes the amount of cognitive resources required during an instructional period to process information within working memory and encode into long-term memory (Cooper, 1998; Paas et al., 2004). Cognitive load can be directly and objectively measured using neuroimaging techniques or through use of the dual-task-paradigm (Brunken, Plass, & Leutner, 2003). Cognitive load theory has four principles:

1) Working memory is extremely limited.

2) Long term memory is essentially unlimited.

3) The process of learning requires working memory to be actively engaged in comprehension (and processing) of instructional material to encode to-be-learned information into long term memory.

4) If the resources of working memory are exceeded then learning will be ineffective." (Cooper, 1998, pg. 15).

Cooper (1998) contends that working memory can be utilized optimally and cognitive load can be decreased by providing instruction in small segments of information, creating schemas, and providing multiple means of instruction (e.g., pictorial examples paired with auditory information). A major contributor to cognitive load is the number of elements needing attention (Cooper, 1998). In other words as the number of new pieces of information increases, the ability of working memory to process the information decreases. Additionally, higher cognitive load is experienced when information is less relevant to the person or situation during instruction (i.e., limited schema development; Cooper, 1998).

Interdependence of pieces of information being learned is called element interactivity. Complex information tends to need greater element interactivity. The higher the element of interactivity the greater the need to teach the information within a relevant context (e.g., interview skills within the setting of an interview).

The cognitive load theory can be used to inform instruction in three ways 1) presentation of instructional materials may increase cognitive load; 2) modifications to instructional material may decrease cognitive load; and 3) complex information is more likely to be taught effectively with instructional design that minimizes cognitive load (Cooper, 1998). In other words, instruction of complex information in small packets of knowledge that apply to the learner and is presented in multiple modes (e.g., visual and auditory) will maximize learning by minimizing extraneous cognitive load.

Cognitive load and ASD. Cognitive load is a concern for people with a diagnosis of ASD. First, gaze aversion—a prominent characteristic associated with ASD—correlates with a high cognitive load (Doherty-Sneddon et al., 2012; Riby et al., 2012; Senju & Johnson, 2009). Yet, gaze is necessary to attend to new information. Second, social-cognitive neuroscience research links increased cognitive load to decreased ability to attend to visual communication cues (i.e., ToM; Doherty-Sneddon et al., 2012)—a challenge already commonly associated with ASD. Third, researchers have reported a connection

between working memory, cognitive load, and lack of inhibition in responses (e.g., perseveration, topic switching, pedantic speech) for people with a diagnosis of ASD (Kana et al., 2007).

Doherty-Sneddon et al. (2012) measured gaze aversion during high cognitive load task situations requiring speaking, thinking, and listening in matched-age peers with and without a diagnosis of ASD. During listening tasks, participants with a diagnosis of ASD used more gaze aversion than matched peers without a diagnosis of ASD. The result was not found across speaking and thinking activities. Tentative conclusion points to a higher cognitive load exhibited during listening activities (i.e., use of ToM) for participants with a diagnosis of ASD (Doherty-Sneddon et al., 2012).

Research on the impact of cognitive load helps inform optimal instructional methods for people with a diagnosis of ASD. An individual showing increased gaze aversion during face-to-face interactions especially those that require listening tasks indicates the need to teach skills requiring gaze separately from complex skills to decrease cognitive load. For example, practice answering interview questions and learning successful nonverbal behavioral skills may need to be taught at separate times.

Extended eye contact for people with ASD tends to increase cognitive load resulting in an increased gaze avoidance and social discomfort (Riby et al., 2012; Senju & Johnson, 2009); suggesting a need for an alternative to face-to-face methods of instruction for skills not requiring gaze (i.e., practice appropriate interview content responses). An alternative to face-to-face interview skills training may be technology-based instruction. When people on the autism spectrum interact with technology-based instruction, gaze avoidance and other cognitive load issues that occur with direct human-to-human contact is minimized (Doherty-Sneddon et al., 2012; Mineo et al., 2009; Riby et al., 2012).

Interview Skills and Training

Interview skills are imperative for job attainment and long term employment outcomes (Bell & Weinstein, 2011; Strickland et al., 2013; Smith et al., 2014; Smith et al., 2015). Factors influencing performance during an interview have been explored by several researchers (Arvey & Campion, 1982; Huffcutt, 2011; Huffcutt et al., 2011; Huffcutt et al., 2001; Macan, 2009). Huffcutt et al. (2011) developed a model for interviewee performance following a comprehensive review of previous employment research. The Huffcutt et al.

(2011) model outlines the interaction between characteristics of the interviewee, interviewer, and environment that influence the interviewee performance ratings. Using the Huffcutt et al. (2011) model, three factors influential in a successful interview for youth on the autism spectrum are social skills (i.e., impression management skills), interview training, and personal belief in performance (i.e., self-efficacy).

Impression management and interview performance. Impression management is a method people use to control the impression others form about them during a social interaction (Leary & Kowalski, 1990; Lievens & Peeters, 2008; Huffcutt et al., 2011; Schlenker, 1980). Numerous types of impression management strategies are used during interviews (Huffcutt et al., 2011; Lievens & Peeters, 2008). Verbal and nonverbal impression management behaviors are the two types associated with interviewee performance ratings (Lievens & Peeters, 2008; Macan, 2009; Huffcutt et al., 2011).

Verbal impression management. Verbal impression management (VIM) during an interview typically falls under two categories, self-focused and other-focused (Ellis, West, Ryan, & DeShon, 2002; Kristof-Brown et al., 2002). During self-focused VIM, an individual verbally attempts to promote or advocate for him or herself (Lievens & Peeters, 2008). Kacmar, Delery, and Ferris (1992) defines self-focused impression management during an interview as "tactics (that) maintain attention on the candidate and allow him or her to focus the direction of the conversation in areas which will allow him or her to excel." Other-focused is the use of verbal communication to direct the conversation to the interviewer's topic, usually creating the impression of aligned beliefs, feelings, and/or opinions with the interviewer (Ellis et al., 2002; Kacmar et al., 1992; Kristof-Brown et al., 2002).

The evidence regarding the usefulness of VIM during interviews is mixed and underpins the need for additional research, especially for individuals with ASD. Some studies demonstrate the strong influence of VIM on interviewee performance (Huffcutt, 2011; Kacmar et al., 1992; Kristof-Brown et al., 2002; McFarland, Ryan, & Kriska, 2003) while other studies do not (Higgins & Judge, 2004; Lievens & Peeters, 2008; Stevens & Kristof, 1995; Tsai, Chen, & Chiu, 2005).

Verbal communicative reciprocity (e.g., terseness, pausing/ no response, semantic drift, and pedantic speech) share similar characteristics to VIM self-focused (e.g., keeping

the conversation on the focus of one's abilities as related to the interview) and other-focused strategies (e.g., directing the focus of the conversation to the interviewer and interview's topic). Verbal communicative reciprocity is an area of limitation for people with a diagnosis of ASD (American Psychiatric Association, 2013; de Villiers, Fine, Ginsberg, Vaccarella, & Szatmari, 2007) making VIM a necessary part of employment interview interventions for young adults on the autism spectrum.

Nonverbal impression management. Nonverbal behavior is defined as communication without language (Mundy, Sigman, Ungerer, & Sherman, 1986). Smiling, gesturing, head nodding, attractiveness, and eye contact (i.e., eye gaze) are nonverbal characteristics correlated with higher interviewee performance ratings (DeGroot & Motowidlo, 1999; Edinger & Patterson, 1983). Burnett and Motowidlo's (1998) research supported Edinger & Patterson's (1983) literature review stating that nonverbal cues, attractiveness and eye gaze are positively correlated with interviewee performance ratings. DeGroot and Motowidlo (1999) also found nonverbal cues, including eye gaze, correlated with interviewee performance ratings. Kristof-Brown et al.'s (2002) research found a relationship between interviewee rating, eye gaze, and practical ratings of likability.

Although one study by Tsai et al. (2005) did not find a correlation, nonverbal behaviors as an influencing factor during interviews is strongly supported by many others studies (Burnett & Motowidlo, 1998; DeGroot & Motowidlo, 1999; Edinger & Patterson, 1983; Huffcutt et al., 2011). Gaze and variations of gaze (e.g., face-gaze, eye-gaze, mutual gaze, and eye contact) have been reported as a consistent correlate with higher interviewee performance ratings (DeGroot & Motowidlo, 1999; Edinger & Patterson, 1983; Kristof-Brown et al., 2002). Kristof-Brown et al. (2002) surveyed perceived agreeableness and use of impression management techniques of 72 undergraduate students following a mock interview. Gaze, a non-verbal impression management technique, correlated positively with agreeability ratings. DeGroot and Motowidlo (1999) conducted a post-analysis of 110 managerial-position interviewees. Visual cues including gaze had a strong positive correlation with performance ratings. Furthermore, gaze is a common area of limitation for most people with a diagnosis of ASD (American Psychiatric Association, 2013; Huffcutt et al., 2001; Mawhood & Howlin, 1999; Strickland et al., 2013).

Interview training. Lecture and classroom instruction, modeling, practice, and response shaping approaches are four types of interview training strategies typically used to increase impression management skills and overall interviewee performance (Forrest & Baumgarten, 1977; Maurer & Solamon, 2006; Williams, 2012). Among the types of training, response shaping approaches have received the strongest empirical support (Barbee & Keil, 1973; Forrest & Baumgarten, 1977; Grinnell & Lieberman, 1977; Harrison et al., 1983; Hollandsworth, Dressel, & Stevens, 1977; Maurer, Solamon, & Troxtel, 1998; Speas, 1979; Tross & Maurer, 2008; Williams, 2012). Response shaping describes any interview training that provides feedback after interviewee practice. The combination of response shaping approaches with the other three interview training techniques is generally described as an interview coaching program (Williams, 2012).

Previous research strongly supports the use of interview coaching to increase interviewee performance ratings (Barbee & Keil, 1973; Forrest & Baumgarten, 1977; Grinnell & Lieberman, 1977; Harrison et al., 1983; Hollandsworth et al., 1977; Maurer et al., 1998; Speas, 1979). One study did not find a difference between interview coaching and control groups (Campion & Campion, 1987). Recent research, however, continues to support the use of interview coaching to increasing interviewee performance (Tross & Maurer, 2008; Williams, 2012).

Based on Tross and Maurer's (2008) data, participants receiving comprehensive interview coaching (i.e., including all four of the training techniques) scored higher on interviewee performance ratings. Additionally, participants receiving any of the four training techniques (i.e., lecture and classroom instruction) compared to the control group reported higher self-efficacy.

Williams' (2012) dissertation research evaluated the effects of interview coaching (i.e., practice and feedback) on interviewee performance ratings. The researcher conducted a clinical trial with 115 college students randomly assigned to three treatment conditions. The three conditions were active control, practice interview only, and practice interview with video and verbal feedback (Williams, 2012). Williams (2012) reported significantly higher interviewee performance ratings for the interview coaching condition over practice and control conditions. The results support interview coaching as a promising intervention for increasing interviewee performance ratings.

Self-efficacy and interview performance. Self-efficacy is traditionally defined as the self-perceived ability to perform a task and is measured using self-report instruments (Wood & Bandura, 1989). Interview self-efficacy (ISE) is the self-reported ability to interview successfully (Tay et al., 2006). Research has linked interviewee performance to interview self-efficacy (Huffcutt et al., 2011; Macan, 2009; Tay et al., 2006; Tross & Maurer, 2008).

Tay et al. (2006) conducted research exploring the interactions of personality, ISE, and interviewee performance. The authors recruited 285 business college seniors preparing to interview at certified public accountant firms (Tay et al., 2006). Tay et al. (2006) collected ISE data before the seniors interviewed and 6 months after interviewing. The authors reported that high self-efficacy before an interview correlated with higher interviewee performance; a strong interviewee performance during an interview correlated with higher reports of post-interview self-efficacy (Tay et al., 2006).

Tross and Maurer (2008) found comprehensive interview coaching increased self-efficacy and interviewee performance rating. Tross and Maurer's (2008) and Tay et al.'s (2006) research results indicate that increased self-efficacy amplifies the interview coaching and interviewee performance. In other words, previously high self-efficacy and interview coaching increases self-efficacy, which in turn increases interviewee performance, and an interviewee's likelihood of a successful interview in the future.

Transition and Employment Outcomes for People with a Diagnosis of ASD

As children with a diagnosis of ASD transition into adulthood the need for successful adult interventions and programs becomes imperative (Hendricks & Wehman, 2009; Hendricks, 2010; Taylor & Seltzer, 2010). The importance of successful transitions are reflected in outcome research, indicating limited positive prospects for the majority of young adults with a diagnosis of ASD (Hendricks, 2010; Howlin, Goode, Hutton, & Rutter, 2004; Howlin, Mawhood, & Rutter, 2000; Hendricks & Wehman, 2009; Liptak, Kennedy, & Dosa, 2011; Morgan et al., 2014; Shattuck et al., 2012; Taylor & Seltzer, 2010; Taylor & Seltzer, 2011; Wehman et al., 2014). High risk of psychiatric disorders (i.e., depression and anxiety; Howlin, 2000; Hurlbutt & Chalmers, 2004), limited socialization (Liptak et al., 2011), low rates of post-secondary education, and even lower rates of competitive employment (Shattuck et al., 2012; Taylor & Seltzer, 2011; Wehman et al., 2014) are major concerns for

the transitioning population of young adults with ASD (Hurlbutt & Chalmers, 2002; Hurlbutt & Chalmers, 2004; Morgan et al., 2014).

Employment is a crucial quality life indicator and has a mediating effect on other adult life areas such as mental health, socialization, and education; (Dotson, Richman, Abby, Thompson, & Plotner, 2013; García-Villamisar & Hughes, 2007; García-Villamisar, Wehman, & Navarro, 2002, 2002; Hendricks, 2010; Hendricks & Wehman, 2009; Hurlbutt & Chalmers, 2004; Morgan et al., 2014; Roux et al., 2013). Previously, high rates of unemployment and underemployment for young adults with a diagnosis of ASD have been reported (Eaves & Ho, 2008; Hendricks, 2010; Howlin, 2000; Hurlbutt & Chalmers, 2004; Wagner, Newman, Cameto, Garza, & Levine, 2005). Howlin (2000) reviewed research conducted from 1985 to 1999 examining long-term outcomes for young adults with a diagnosis of ASD. The author reported the annual employment rate ranged from 9% to 44% across the 14 year time span (Howlin, 2000). A similar trend of high underemployment rates has been reported across the western world (Howlin et al., 2004; Taylor & Seltzer, 2011).

Shattuck et al. (2012) analyzed data from the National Longitudinal Transition Study 2 (NLTS2) that examined outcomes for young adults previously receiving services through special education during secondary school. The authors reported more than 50% of young adults with a diagnosis of ASD were not employed or attending post-secondary education in the two years after exiting high school (Shattuck et al, 2012). Roux et al. (2013) analyzed data from NLTS2 as well. The researchers analysis aligned with Shattuck et al.'s (2012) results, reporting about 53% of young adults with a diagnosis of ASD were employed outside of the home at the time of the survey (Roux et al., 2013).

Additionally, adults with a diagnosis of ASD were reported by both groups of researchers to be at greater risk for unemployment than people with diagnoses under other disability categories; youth were reported to be particularly at risk (Roux et al., 2013; Shattuck et al., 2012; Wehman et al., 2014). Adults with ASD who are high functioning are at even greater risk for unemployment (Hendricks & Wehman, 2009; Morgan et al., 2014; Taylor & Seltzer, 2010). High IQ or verbal ability are not primary factors associated with positive employment outcomes (Howlin, 2000; Hendricks, 2010). Additionally, Taylor and Selzer (2011) found high functioning young adults with ASD to be less likely to have access to services or daily activities that support employment acquisition.

Transition and skill development for young adults with ASD. Carefully developed and implemented transition plans influence post-secondary outcomes, including employment for young adults with a diagnosis of ASD (Hendricks & Wehman, 2009). Schall, Cortijo-Doval, Targett, Wehman, and Wehman (2006) recommends transition plans to include goals focusing on social–communication skills and employment skills. Natural, community-based instruction that is flexible and individualized is also recommended for best outcomes (Iovannone, Dunlap, Huber, & Kincaid, 2003; Wehman & Kregel, 2004). Research, however, on evidence-based practices for teaching young adults with a diagnosis of ASD is limited (Hendricks & Wehman, 2009; Mason et al., 2012; Wehman et al., 2014).

A strong research foundation on evidence-based practices for teaching young children with a diagnosis of ASD helps guide recommendations for young adults. Wong et al. (2014) provides a comprehensive review of evidence-based practices for young and adolescent children with a diagnosis of ASD. The authors recommend thirteen evidence-based practices for adolescents and young adults up to the age of 22 (Wong et al., 2014).

Wong et al. (2014) recommend six–modeling, prompting, reinforcement, self-management, technology-aided instruction and intervention, and video modeling– out of the thirteen practices to specifically develop vocational skills. Social skills training was also recommended for adolescent up to age 22 to teach social and communication, yet not vocational skills. Social skills training techniques, however, align with interview coaching–instruction on basic concepts, role-playing/practice and feedback.

Characteristics of ASD and interviewee skills. Since successful interviewing typically requires a high level of social competence, interviewing for a job may be a barrier to successful employment for many people diagnosed with ASD (American Psychiatric Association, 2013; Huffcutt, 2011; Huffcutt et al., 2001; Mawhood & Howlin, 1999; Strickland et al., 2013;). Social–communicative behaviors associated with ASD specific to interviewee performance are limited gaze and communicative reciprocity (Mason et al., 2012). Terseness, pausing/ no response, semantic drift, and pedantic speech are typical challenges associated with ASD during communicative reciprocity (de Villiers et al., 2007). Gaze—eyes and body orientated to another person—and variations of gaze (e.g., eye-gaze, face-gaze, mutual gaze, and eye contact) have been noted as a prominent challenge for people with a diagnosis of ASD (Senju & Johnson, 2009).

Interviewing skills development for people with ASD. Interview skills training intervention research for young adults with a diagnosis of ASD is limited. To date, two types of interventions have been used to improve interviewee skills, namely, interview coaching and technology-based instruction. Morgan et al. (2014) conducted a clinical study exploring interview coaching with 28 adults with a diagnosis of ASD. The researchers utilized the interview skills curriculum (ISC) to facilitate increases in social-pragmatic skills associated with successful interviewing. ISC consisted of instruction on interview skills, role-play, video feedback, peer review, games to practice skills, and mock interviews to assist skill development. The researchers reported improvements within the intervention group compared to the control group in social-pragmatics skills based on mock interviews and the Vineland Adaptive Behavior Scale (VABS) social subscale measurement (Morgan et al., 2014). Although improvements over the control group were observed, no long-term skill generalization was measured.

Technology-based instruction has been more widely used for teaching interview skills to adults with a diagnosis of ASD (Barnes, 2014; Moore, 2015; Smith et al., 2014). Electronic Screen Media (ESM) is an umbrella term encompassing a range of technology-centric evidence-based practices (EBP; Mineo et al., 2009). Electronic screen media provides intervention to people with a diagnosis of ASD that is flexible and responsive to individual needs (Picard, 2009; Sansosti et al., 2014; Weng et al., 2014). Additionally, the characteristics of electronic screen media aids in minimizing cognitive load in neuro-atypical populations (e.g., people with a diagnosis of ASD; Picard, 2009; Sansosti et al., 2014; Weng et al., 2014). Currently, electronic screen media encompasses video modeling, computer aided instruction (CAI), and more interactive computer aided instruction, virtual reality (VR).

Video modeling. Video modeling (VM) provides a video of a given task that can be rewound, fast-forwarded, paused, or replayed allowing for multiple views and learning opportunities. First person or third person viewpoints are typical video modeling perspectives. Video modeling has been used to teach a variety of skills to a variety of age groups and is considered an evidence based intervention for children and adolescents with a diagnosis of ASD (Wong et al., 2014).

Moore's (2015) dissertation explored the use of video modeling to teach interview skills to people with a disability. Intervention was provided by researchers through direct instruction for three interview behaviors—greeting, answering questions, and closing statements at the conclusion of the interview. Following direct instruction, video feedback on target behavior was provided. Although skills were acquired, generalization was limited (Moore, 2015).

Barnes (2014) also explored video modeling to teach interview skills to young adults with a diagnoses of ASD. The research specifically targeted eye contact as the sole interview skill taught. Similarly to Moore's (2015) procedures, intervention consisted of mock interviews followed by video feedback on eye contact performance. Results indicated increased eye contact during mock interviews; however maintenance of eye contact over time was not measured (Barnes, 2014).

Computer aided instruction. Computer aided instruction is the use of electronic screen media that can have video modeling embedded and includes interactive components with the electronic screen media (e.g., using a mouse to select videos or change topics). Computer aided instruction is a current evidence based intervention used to target interview skills and supports the learning characteristics associated with ASD (Sansosti et al., 2014; Wong et al., 2014). Limited research has been conducted on exclusively using computer aided instruction to teach interview skills. With advancement in technology, virtual reality has grown out of computer aided instruction.

Virtual reality. Virtual reality is a term used to describe the use of electronic screen media with specifically coded software to create the impression of an interactive experience in response to the users' actions (Smedley & Higgins, 2005). Degree of perceptual interaction is described in terms of level of immersion (Smedley & Higgins, 2005), largely determined by the perception of 3d imagery vs 2d imagery. As the interactions become more 3d, interaction becomes more realistic (i.e., higher level of immersion). Additional, hardware beyond a mouse and keyboard may also increase the degree of immersion (i.e., camera, microphones, speakers, headsets, data gloves, motion sensors, and motions tracks; Smedley & Higgins, 2005).

Virtual reality is implemented successfully in other fields (e.g., military, firefighting, industry, and medicine) to bridge the gap between learning a skill and successfully

performing the skill in the real world (Querrec et al., 2004; Rothbaum & Hodges, 1999). As virtual reality interventions advance and become more accessible and fiscally possible for individual use—its implementation as a flexible, individualized instructional method for high fidelity intervention is likely (Smith et al., 2014).

There is mounting evidence supporting virtual reality as an intervention targeting skill development for people with a diagnosis of ASD (Mitchell et al., 2007; Smith et al., 2014; Strickland et al., 2013; Weng et al., 2014). Yet, research is still limited on virtual reality intervention for interviewee skill development (Wright et al., 2008). Additionally, research on effective training that promotes skill generalization is limited (Mitchell et al., 2007).

Smith et al. (2014) conducted a randomized control trial exploring the effects of virtual reality software, Virtual Reality Job Interview Training (VR-JIT), on interviewee performance and self-confidence. Authors recruited 26 individuals with a diagnosis of ASD and meeting inclusion criteria. Participants were randomly assigned to control (i.e., waiting list) or treatment conditions. The treatment group (n=16) received 10 hours of VR-JIT training (Smith et al., 2014). The control group (n=10) continued treatment-as-usual without use of VR-JIT.

The researcher collected pre- and post-measurements based on standardized interview role-plays and self-confidence measures for both groups. Additionally, neurocognitive, social cognitive measures, and a feasibility assessment were conducted as pre- and post- measurements. Differences between groups were found and differences within treatment group based on time were found for both interviewee role play performance and self-confidence. Role play performance showed a large effect size for only the treatment group.

Future employment outcomes were not measured by Smith et al. (2014). However, Smith et al. (2015) published a follow-up to the research published by Smith et al. (2014) that focused on collection of 6-month post intervention survey measuring participants' engagement in employment and volunteer position interviews and employment and volunteer positions acceptance (Smith et al., 2015). At the date of collection reflected a nearly 8 times greater acceptance of all positions for treatment group over control group. However, follow-up data was not validated and volunteer positions and employment

positions were not reported separately. It is unknown to what extent the treatment groups were able to attain meaningful, competitive employment, which is linked to success in quality of life outcomes (e.g., mental health and socialization; Morgan et al., 2014; Roux et al., 2013).

Blending of Intervention. Strategies for effectively teaching interview skills to young adults with a diagnosis of ASD is informed from numerous disciplines. Industrial psychology research on interviewee performance supports the use of interview coaching. Cognitive psychology research on cognitive load supports the use of instructional methods utilizing multiple means of instruction (e.g., visual, auditory) that breaks complex information down into smaller units that is relevant to the learner's current schemas or creates new schemas from existing schemas. Educational research focusing on evidence-based practices for teaching vocational skills to adolescents with a diagnosis of ASD suggest modeling, prompting, reinforcement, self-management, technology-aided instruction and intervention, and video modeling as optimal interventions. The current, yet limited, research on interviewing skills for young adults with ASD have focused on using a technology-based instruction and interview coaching.

The collective review of the disciplines informing intervention on interviewing skills instruction for young adults with a diagnosis of ASD indicates using technology-based instruction may improve acquisition and fluency of skills taught, lowering cognitive load (Mitchell et al., 2007; Wainer & Ingersoll, 2011). Once fluency is established through a technology interface (i.e. the participants becomes experienced), generalization to a human interface may be improved using more traditional methods to teach successful social non-verbal behaviors. Additionally, using behavioral learning techniques such as modeling, prompting, reinforcement, and feedback during use of a technology interface and face-to-face intervention would be beneficial.

Summary

Gaze and conversational reciprocity are impression management behaviors associated with a diagnosis of ASD. Interweaving cognitive and learning/behavioral theories with technology-based instruction guides interview skills training that increases fluency without increasing cognitive load for young adults on the autism spectrum. Strong interview skills including impression management behaviors, increases the likelihood of obtaining

competitive employment—a quality of life indicator for young adults with a diagnosis of ASD. High self-efficacy and successful use of impression management behaviors influence successful interviewee performance. Increasing fluency without increasing cognitive load is essential during interview skills training for young adults on the autism spectrum. Using a virtual reality interface has been demonstrated to effectively teach interview skills. It is unclear whether the skills developed during virtual reality interface training will transfer into real world employment outcomes. However, once interview skills are firmly established through technology-based instruction, the incorporation of live coaching (practice with feedback) with multiple interviewers and office settings after interview skills are acquired to fluency through technology-based instruction (i.e., virtual reality interface) may enhance performance and increase transfer of skills to future real-world interviews.

Significance of Study

This study extends Smith et al. (2014) research by exploring the impact of virtual reality technology-based instruction and live interview coaching (VR-LIC) on impression management behaviors—gaze and conversational reciprocity—across multiple exemplars (i.e., interviewers) with young adults with a diagnosis of ASD. Self-efficacy will be assessed at pre- and post-intervention. Social validity will be assessed by community-based employers rating the performance of digitally recorded live-mock interviews.

Cognitive, learning/behavioral, and neurological theories support use of instructional methods that minimize cognitive load for people on the autism spectrum. Cognitive load theory supports the instruction of complex information that provides parceled lessons that apply to the learner and is presented in multiple modes (e.g., auditory and visual) that will maximize learning by minimizing extraneous cognitive load. Aligning with cognitive load theory, this study attempts to minimizing cognitive load through practice answering interview questions and learning successful nonverbal behavioral skills at separate times using technology-based instruction (i.e., virtual reality intervention) and live interview coaching (VR-LIC) program. Virtual reality intervention paired with live interview coaching may increase acquisition and fluency of interview skills including impression management behaviors by minimizing cognitive load for young adults with a diagnosis of ASD.

Chapter 3: Method

The purpose of this research was to investigate the use of computer-aided instruction, virtual reality training, and live interview coaching on (a) specific impression management behaviors, gaze and conversational reciprocity; (b) interviewee performance scores generated through virtual reality training software; and (c) self-efficacy ratings of young adults with a diagnosis of autism spectrum disorder (ASD). This research extended the Smith et al. (2014) investigation on interviewee performance scores generated through virtual reality training software and self-efficacy scores with young adults diagnosed with ASD by: 1) adding a live interview coaching component; 2) examining impression management behaviors (i.e., gaze and conversational reciprocity) assessed through an ABCA single subject design; 3) collecting social validity data; and 4) probing for generalization of impression management behaviors across different interviewers and settings.

This chapter provides an overview of a pilot study conducted prior to implementation of the main study. The purpose of the pilot was to refine measurement protocol, calibrate observational data collectors, and clearly delineate training procedures. Following the pilot study, the chapter outlines the methodology used in the main study (i.e., participants and settings, instrumentation, data collection procedures, and data analysis process).

Pilot Study

A pilot study was conducted to determine feasibility of design and possible adjustments needed for procedures, assessments, and the data collection system. Modifications made based on the pilot resulted in the procedures outlined for the main study.

Participant (Joe). One male participant, age 22, was selected to participate in the pilot study. The participant, pseudonym Joe, received a diagnosis of ASD in middle school from a local education agency's (LEA) school psychologist. Joe was recruited from the University of Idaho's (U of I) Center on Disabilities and Human Development (CDHD) student employees, where he worked following graduation from a local university. Joe was seeking new employment with a job search limited to reviewing open positions posted on-line. Joe had yet to apply for any employment positions and reported little interviewee experience. He demonstrated a low performance on interview skills as assessed through an

initial live-mock interview using the main study's two dependent variables, gaze and conversational reciprocity. Joe's Social Responsiveness Scale (SRS-2) score was in the severe range "indicating deficiencies in reciprocal social behavior" (Constantino & Gruber, 2012). Prior to participation, Joe read and signed informed consent stating his understanding of the study and confirming willingness to participate.

Setting. The pilot study occurred at the Center on Disabilities and Human Development (CDHD) office in a private room with a door and one-way mirror; this feature of the room was not used during the intervention. The setting was a natural and convenient location for Joe, having interviewed previously at CDHD for a job and its close proximity to his home. The room contained a couch, computer, desk, table, and two chairs. Seated opposite of each other, the interviewer and interviewee (i.e., participants) used the table and chairs during live-mock interviews. A camera on a tripod recorded a wide angle view of the whole room, capturing all interactions. An additional camera located behind the interviewer captured the interviewee's facial expressions. During the first intervention phase (B) of the study, Joe was alone in the room while using the computer to complete virtual reality software sessions. All data was electronically stored for review by researchers.

Procedures. The pilot study provided a test trial for the main study which resulted in only slight adjustments made to observational definitions and protocol. The procedural descriptions are provided for both the pilot study and the main study below.

Main Study

Participants. Three participants, ages 18-23, diagnosed with ASD were recruited to participate in this study. Participants were recruited from the University of Idaho and Washington State University student bodies. Prior to beginning the study, all participants were given an informed consent to read and sign if they wished to participate. The three participants were given the pseudonyms Cinna, Josie, and Belle.

Cinna was a 22 year old, female student completing her final year of undergraduate studies. She had received a diagnosis of ASD from a psychologist at the age of 18. Currently unemployed, Cinna had one part-time, temporary job prior to the study that required an interview before being hired. At the beginning of the study, she applied for employment following graduation; she had yet to interview for any positions. She demonstrated a moderately low performance on interview skills as assessed through an initial live-mock

interview using the two dependent variables, gaze and conversational reciprocity. Cinna's Social Responsiveness Scale (SRS-2) score was in the mild range with clinically significant deficiencies in reciprocal social behavior that mildly to moderately interfere with social interactions (Constantino & Gruber, 2012).

Josie was a 23 year old female completing her final semester of undergraduate studies. She received a diagnosis by a LEA school psychologist during elementary school. Josie was unemployed with no previous interview experience and had not begun searching for a job. She demonstrated a low performance on interview skills as assessed through an initial live-mock interview on the two dependent variables, gaze and conversational reciprocity. Her Social Responsiveness Scale (SRS-2) score was in the severe range indicating reciprocal social behavior deficits (Constantino & Gruber, 2012).

Belle was a 23 year old graduate student currently employed part-time with plans to apply for a new job at the end of the school year. A diagnosis of ASD was recently obtained from a local school psychologist. Belle reported being very familiar with the interview process; she had recently completed a course requiring her to practice interview skills. Belle reported she struggled performing successfully during this course. She demonstrated a low performance on interview skills as assessed through an initial live-mock interview using the two dependent variables, gaze and conversational reciprocity. Belle's Social Responsiveness Scale (SRS-2) score was in the moderate to severe range indicating some reciprocal social behavior deficits (Constantino & Gruber, 2012).

Setting. The study occurred on the University of Idaho and Washington State University campuses. For two participants, Cinna and Josie, the study was conducted on University of Idaho campus in variety of reserved rooms within the Idaho Commons and CDHD buildings. For one participant, Belle, the study was conducted on the Washington State University campus in a variety of reserved rooms within the Owens Science and Engineering library. All the rooms contained a table and chairs, arranged for interviewer and interviewee to be seated opposite of each other during live-mock interviews. A camera on a tripod recorded a wide angle view of the whole room, capturing all interactions. During the first intervention phase (B) of the study, participants used their home computers to complete virtual reality software sessions. All data was electronically stored for review by researchers.

Materials

Virtual reality software (VRS). Virtual reality software (VRS) is a computer program that provides simulated interview coaching. VRS was used during the first intervention phase (intervention B) of the study directly following the initial baseline. The VRS program, SIMmersion's Job Interview Training with Molly Porter™, is designed to provide interview coaching through assistive technology instruction. The software includes direct instruction and practice with feedback modules. Instructional content is available in written, video, or audio/video formats, to suit a large range of learning preferences. The user controls the pace and presentation style of instructional content.

The practice with feedback module provides a simulated interview experience using an interactive, virtual interviewer, Molly Porter™. The Molly Porter™ avatar's programming code draws from a database of over 1,000 interview questions during the simulated interviews. Based on questions asked, immediate feedback on appropriateness of users' answers are provided by a virtual interview coach. Answers are provided in multiple choice format and manually selected with a mouse or keyboard. Interview questions and possible responses are provided using SIMmersion's patented non-branching logic™. This coding technique allows for a flexible, dynamic, and life-like experience during each mock interview. Additionally, due to the unique characteristics of non-branching logic™ each digital interview was specific to the interviewee and had a low likelihood of being identical to previous digital interviews completed during previous sessions.

Measures

Dependent Variables. Each dependent variable was measured through video recording of live-mock interviews conducted throughout each phase of the study. The mock interviews were conducted using one introductory question and 10 interview questions. The introductory question, "How is your day going?" was not scored and was followed by 8-10 randomly selected interview questions. Questions, supplied by SIMmersions' VRS interview question database, were selected using a random number generator.

Impression management measures. Gaze and conversational reciprocity during live-mock interviews were measured. Observers scored gaze and conversation reciprocity during post-analysis of each recorded live-mock interview.

Gaze was measured using whole-interval recoding. Intervals of 5 seconds were recorded as occurrence or non-occurrence of gaze. Body, head, and face orientated towards

interviewer while interviewer was speaking was required for a score of an occurrence of gaze. Gaze occurrences divided by total number of gaze opportunities (5 second intervals of occurrences/non-occurrences) per interview was calculated to determine percent of intervals of gaze per interview.

Conversational reciprocity was scored by trained research assistances as correct or incorrect based on the presence or absence of five behavioral components: 1) any response to a question, 2) staying on topic, 3) providing a concise answer, 4) responding completely, and 5) a timely response to the question. The presence of all five components of conversational reciprocity was scored as a complete answer to the interview question. The absences of one or more of the five components was scored as an incomplete answer. The defined criterion for each behavioral component of conversational reciprocity and the associated deficit linked to a diagnosis of ASD is as follows in Table 1. A percentage of correct performance on conversational reciprocity was calculated for each live-mock interview, dividing total number of opportunities (each question) for correct performance by occurrences of correct performance (See Appendix D).

Table 3.1

Occurrence Criteria and Corresponding ASD Deficits for Behavioral Components of Conversational Reciprocity

Component	Occurrence Criterion	Deficit
Any response	Any intelligible verbalization	No Response
On topic	Response with the same subject as the question asked by the interviewer with the subject consistent throughout the response	Semantic Drift
Concise	No more than two supporting statements used when answering the question	Pedantic Speech
Complete	A complete sentence with at least one supporting statement	Terseness
Timely	An intelligible verbalization within 5 seconds after interview question was asked	Pausing

Interviewee performance scores. Interview performance scores were computer generated scores by SIMmersion's VRS following completion of the software's virtual reality job interview training. Scores were calculated based on the participants' responses. Each response was given a score between 0-100 with a high number indicating a more successful interview.

Self-efficacy measure. Interview self-efficacy (ISE), is the self-reported ability to interview successfully (Tay et al. 2006). ISE scale was adapted from the Tay et al. (2006) and Wanberg, Kanfer, and Rotundo, (1999) interview self-efficacy measures. The adapted ISE measure was a 5-question, Likert scale ranging from 1 (not at all) to 7 (to a very great extent). The original self-efficacy scale by Wanberg et al. (1999) was highly interrelated (r = .65) supporting strong validity and coefficient alpha of .85, suggesting high reliability.

***Social Validity Measure*.** Participant rating of enjoyment and satisfaction with intervention rating scale (SV) was adapted from William's (2012) candidate reactions rating form. SV rating form is a 5-point, Likert scale. Data was collected at the end of the study's last intervention session. Mean satisfaction scores are presented

Description of the Independent Variables

Virtual Reality Software-Job Interview Coaching (VRS). VRS software, designed to provide virtual instruction on interview skills, was introduced to the participant during the first intervention phase (B). During the first session of phase B, the participant was provided a visual/ verbal orientation by lead researcher of software and hardware operation and a step-by-step checklist of tasks to complete during each session. The checklist prompted participants to review the instructional modules for 15 minutes, then complete a mock interview module.

Participants were encouraged to independently solve small software problems—yet if needed, researcher was available to answer questions. During all subsequent sessions, researcher did not provide any directions beyond the checklist. At the end of each session, the completed checklist was collected by the researcher and the participant's data was downloaded for analysis. Sessions lasted twenty to thirty minutes. After initial introduction, researcher encouraged participants to complete sessions at their own discretion in a timely fashion.

Live Interview Coaching. Live interview coaching (LIC) was introduced to participants following stabilized data during VRS intervention phase B. LIC consisted of 15 to 30 minute sessions of face-to-face intervention. At the beginning of each session, the interviewer invited the participant to have a seat and review rationale for the study. Once the participant secured a seated position and had heard and understood the rational, the interviewer reviewed the five interview prompts:

1) Remember to stay on topic.
2) Answer the question completely, using a complete sentence and at least one and no more than two examples to support response.
3) Respond in a timely fashion, within 5 seconds of question being asked.
4) Look towards and have body facing interviewer when the interviewer is talking.

Following review of prompts, the interviewer began each interview with a warm-up question, "How is your day going?" The warm-up question was followed by 7-10 randomized interview questions. At the end of the interview, the interviewer and the participant watched the video of participant's interview. Participants were encouraged to point out times of success and times the five interview prompts were not followed. Interviewer and participant practiced sections of the interview that did not meet the requirements of the five interview prompts. Scheduling of sessions were based on the participants' convenience.

Research Design and Procedures

Pilot Design. The pilot study utilized a single subject, ABCA design (pre-baseline, baseline phase A, intervention phase B, intervention phase C, generalization/maintenance across people and settings A; Gast & Ledford, 2018). The dependent variables were measured across each phase of the study during video recorded mock interviews as described for the main study.

Main Study Design. The main study utilized an ABCA design (pre-baseline, baseline A, intervention B, intervention C, generalization/maintenance across people and settings A; Gast & Ledford, 2018). The dependent variables were measured across each phase of the study through video recorded mock interviews.

Procedures. Activities across phases are described as follows:

Pre-baseline. For the participant, pre-baseline consisted of three parts: rationale of study, informed consent, and self-efficacy assessment. Review of rationale for the study was followed by reading and signing informed consent documentation. A self-efficacy assessment was administered at the end of the pre-baseline session.

Baseline (phase A). The initial baseline, phase A, consisted of an initial live-mock interview following completion of pre-baseline. Subsequent live-mock interviews were scheduled within the following weeks based on the participant's schedule. Live-mock interviews continued until a pattern of stable data was collected and a baseline was established for interviewee performance ratings on dependent variables.

During baseline no feedback was provided to the participant on interviewee performance during the live-mock interviews. All interviews were digitally recorded. Digital recordings provided baseline data for gaze and conversational reciprocity (i.e., impression management behaviors) for each interviewee. The dependent variables were assessed directly following each interview. Baseline interviews continued until a stable baseline was reached. Each mock interview was recorded as one interview session.

Intervention B (phase B). Phase B was implemented after the introduction of baseline phase A and stable data observed. Phase B consisted of interview coaching using virtual reality software, VRS. VRS sessions were scheduled and administered in half hour segments until a pattern of stable data was observed for the participant. Dependent variables were measured after each VRS session through live-mock interviews.

Intervention C (phase C). Phase C was implemented after phase B data stabilized and only if data from phase B indicated a need to continue developing interview skills. Phase C was a face-to-face intervention using behavioral learning techniques—multiple exemplars, systematic instruction, prompting, and reinforcement during practice and feedback. During this intervention impression management skills were directly taught and prompted to be used during the live-mock interviews (i.e., systematic instruction).

At the end of the interview, the interviewer and the participant watched the video of participant's interview. Participants were encouraged to point out times of success and times the five interview prompts were not followed. Interviewer and participant practiced sections of the interview in a variety of ways that did not meet the requirements of the five interview prompts (i.e., multiple exemplars and reinforcement during practice with feedback).

Intervention was continued until data indicates a stable level of performance. Additionally, participant social validity (SV) rating form was completed after the end of the last session phase C.

Generalization/maintenance phase A. This phase represents a return to baseline following completion of phase C and a test of generalization across interviewers. Baseline conditions were replicated with the exception of adding novel interviewers and settings. Three data points were collected for each participant using different interviewers and settings. Data was used to measure possible generalization of skills overtime, across people and settings (i.e., different interviewers and locations). During this phase of mock interviews, each participant was interviewed by two novel interviewers, in three novel settings.

Data Analysis

Procedural-Fidelity. Fidelity of implementation was assessed by trained data collectors (a) during mock interviews to ensure feedback, coaching or other instruction did not occur and (b) during live interview coaching to ensure fidelity of intervention. Forms used for examination of fidelity of implementation in both areas are in Appendix F. Mock interviews were examined for fidelity using two criteria, 1) no verbal feedback on interviewee responses during each interview and 2) interviewer verbalizations limited to interview questions only. Every mock interview was reviewed for compliance across all phases of the study and participants. Live interview coaching was reviewed for fidelity after each coaching session to ensure all four of the main intervention characteristic were present for each live-mock interview: 1) five interview prompts were reviewed prior to beginning interview, 2) 7-10 interview questions were asked, 3) feedback with reinforcement provided post interview in conjunction with visual review of interview, and 4) practice of areas needing additional support. Each live-mock interview was reviewed for all phases and participants.

Dependent Variables. Verbal and non-verbal impression management scores were plotted using equal interval graphs, per variable per participant with means across phases. Gaze data was recorded using whole interval collection every 5 second, an occurrence of gaze percentage was determined by dividing gaze occurrence by total number of gaze opportunities per mock interview. Conversational reciprocity was measured using event

recording, an occurrence of correct performance on conversational reciprocity percentage was calculated by dividing occurrences by total number of occurrence opportunities per mock interview. Means were calculated by adding up percentage of gaze and conversation reciprocity occurrences scores per phase for each variable per participant and dividing by the total number of data points in each corresponding phase per variable per participant.

Visual analysis was used to determine level, trend, and strength of change. Level stability was determined using median line and "80%-20%" criteria. Level change was reported using absolute and relative level change formulas. Absolute level change is "computed by a) identifying the ordinate values of the first and last data points of a condition; b) subtracting the smallest from the largest; c) noting whether the change in level within the condition is in a therapeutic (improving) or contratherapeutic (deteriorating direction)". Relative level change is "computed by a) calculating the median value of the first half of the data series; b) calculating the median value of the second half of the data series; c) ignoring the middle data point if there are an odd number of data points across the condition; d) subtracting the smallest median value from the largest median value; and e) noting the difference between median values." Level stability aided in therapeutic decision-making. Trend was analyzed using split-middle method for trend direction. Trend stability was calculated using 80%-20% formula. Strength of change was determined using percentage of non-overlapping data point values (PND).

Self-efficacy was reported as a cumulative score using a four-question 7-point Likert scale form; possible scores ranging from 4 to 28 (see appendix E). The higher the cumulative score of the four questions, the higher ISE. Social validity was measured using a 5-point rating scale from strongly disagree to strongly agree (see appendix F). Participant social validity is reported qualitatively pre and post intention package (VR-LIC).

Interobserver-agreement (IOA). IOA was calculated using total number of agreed scores for each impression management dependent variable, gaze and conversational reciprocity, measured during live-mock interviews. Observers scored gaze and conversation reciprocity per interview question per participant divided by total number of scores for each variable per question per participant. Average for each variable per participant was taken. Strong IOA should be at or above 90%. During this study, kappa (k) was not used to calculate IOA. Despite merits to using k, independent variables having the potential to have

a high frequency of occurrence may inflate the estimation of interobserver agreement (Kennedy, 2005).

Training of observers was done prior to the beginning of the study. Training consisted of reviewing dependent variable definitions and scoring training interviews. Disagreements in scores between observers were reviewed and discussed until at least 90% accuracy was achieved. IOA was reviewed weekly to assure at least 90% accuracy and if needed recalibration occurred.

Chapter 4: Results

Introduction

The purpose of this research was to investigate the use of computer-aided instruction, virtual reality training, and live interview coaching on (a) specific impression management behaviors, gaze and conversational reciprocity; (b) interviewee performance scores generated through virtual reality training software; and (c) self-efficacy ratings of young adults with a diagnosis of autism spectrum disorder (ASD). This research extended the Smith et al. (2014) investigation on interviewee performance scores generated through virtual reality training software and self-efficacy scores with young adults diagnosed with ASD by: 1) adding a live interview coaching component; 2) examining impression management behaviors (i.e., gaze and conversational reciprocity) assessed through an ABCA single subject design; 3) collecting social validity data; and 4) probing for generalization of impression management behaviors across different interviewers and settings.

This chapter presents the results of both a pilot investigation that established the research protocol, and the main study. Results include interviewee performance scores generated through the virtual reality interview training program, graphic displays of impression management behaviors, interobserver agreement scores on the observational data, self-efficacy scores across participants including the pilot participant, and social validity scores.

Dependent Measures

Virtual Reality Scores and Impression Management Behaviors. Two impression management behaviors, gaze and conversational reciprocity, were examined through observational analysis during the pilot and main study.

Pilot results. Visual analysis of Joe's overall percent correct conversational reciprocity per live-mock interview, (see figure 4.1) showed a variable response during baseline (phase A) with a mean of 18% and a range between 0% and 50%. Joe's conversational reciprocity increased steadily during virtual reality training (phase B) with a mean of 55% and a range of 10%-80%. During live interview coaching (phase C) his mean performance increased to 90% (range 78%-100%).

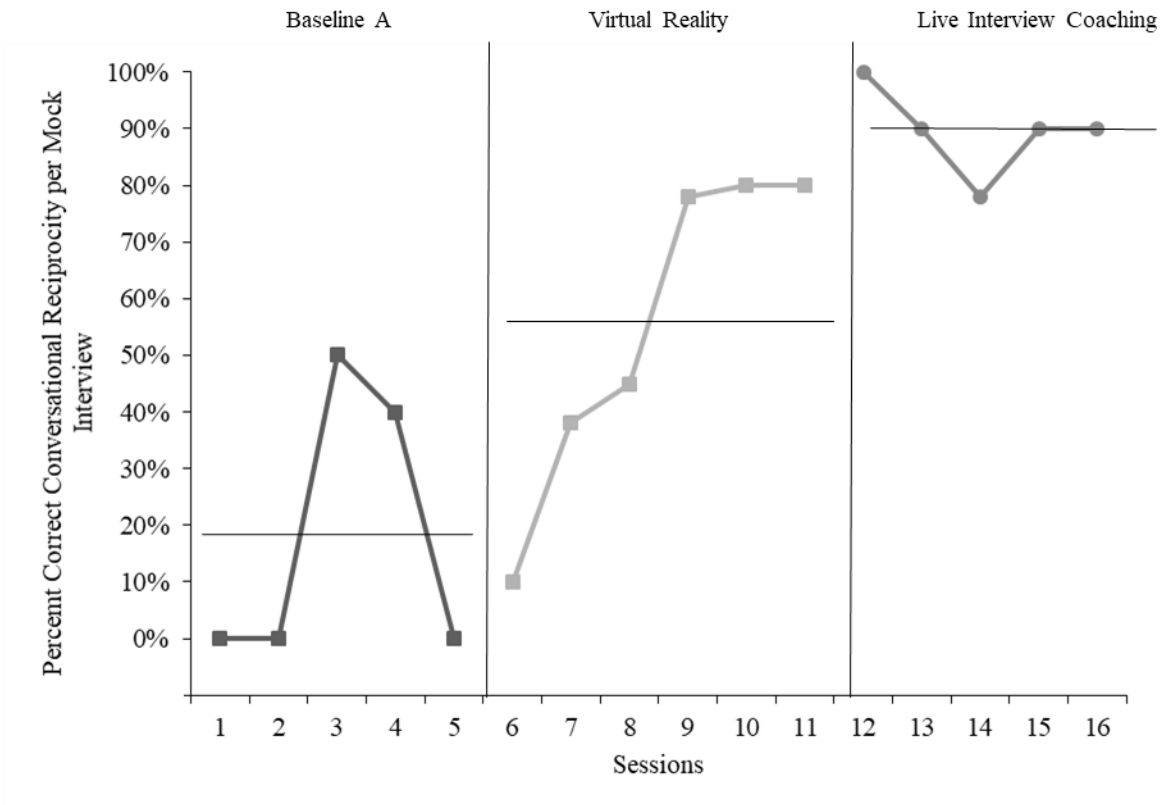

Figure 4.1. Graph of Joe's percentage of correct performances on conversational reciprocity for each mock interview session with mean lines for phases A, B, and C. Conversational reciprocity was scored as correct or incorrect based on the presence or absence of five behavioral components: 1) any response to a question 2) staying on topic, 3) providing a concise answer, 4) responding completely, and 5) a timely response to the question.

Joe's percentage of correct gaze performance intervals per live-mock interview during baseline (phase A) was variable with a mean of 39% and a range of 25%-50%. During virtual reality training (phase B) percentage of correct gaze performance decreased to a mean of 21% (range 0% to 30%). With the introduction of live coaching (phase C), Joe's gaze performance increase to 81% with a large level increase from both baseline and virtual training with a range of 56% to 100%.

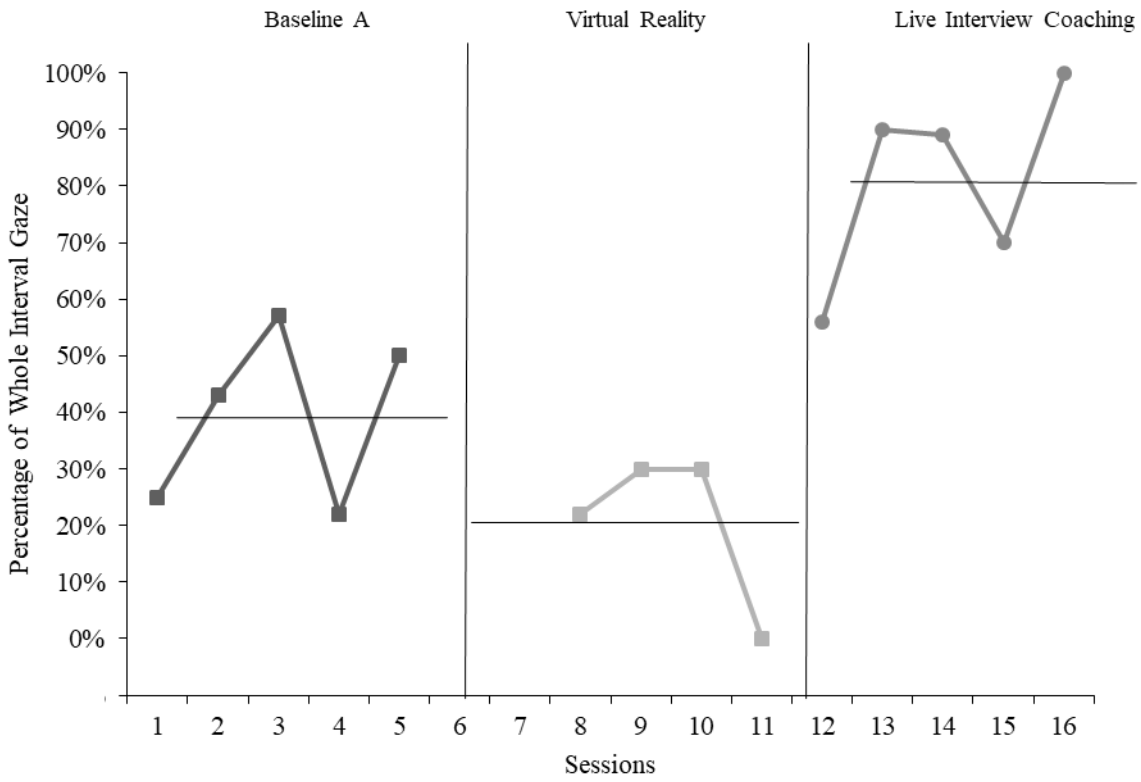

Figure 4.2. Graph of Joe's data for impression management–non-verbal communicative reciprocity defined as percentage of intervals with correct gaze performance per mock interview with mean lines across phases A, B, and C.

Joe's interviewee performance scores were computer generated scores by SIMmersion's VRS following completion of the software's mock interview. Scores were calculated based on Joe's responses during his 8 sessions. His average score was 86% with a range of 34%-100%.

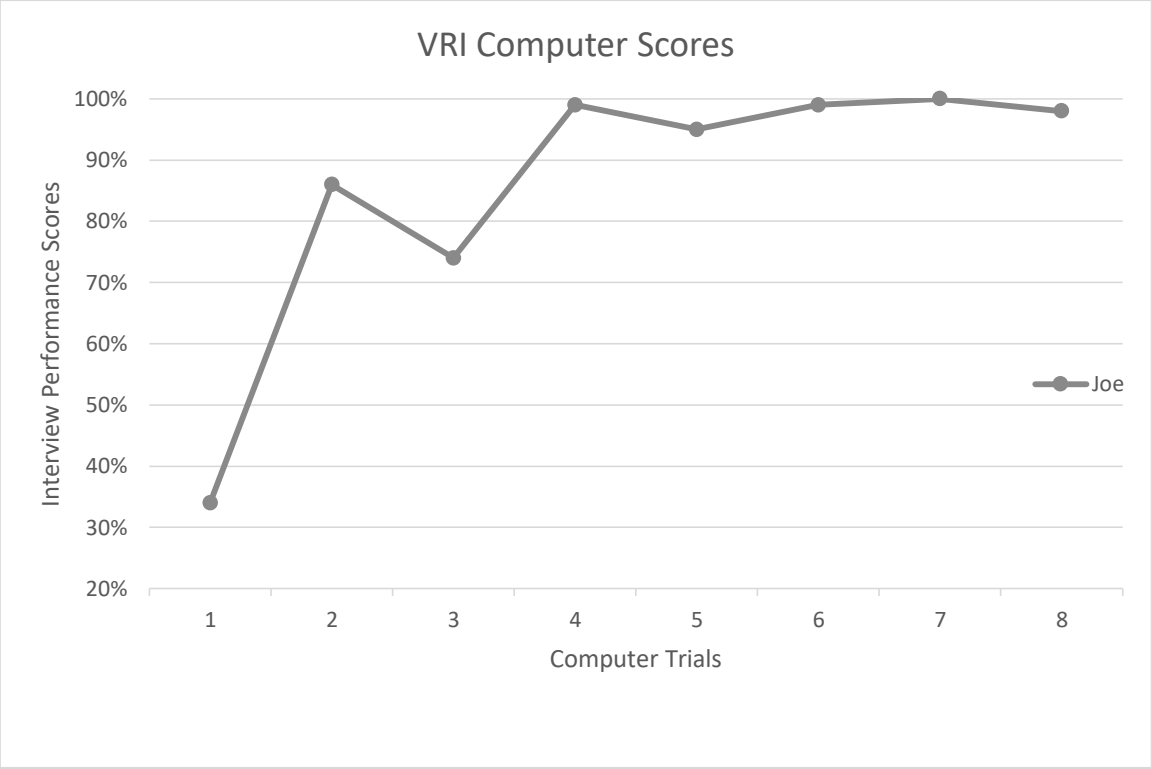

Figure 4.3. Graph of Joe's data for computer generated interview performance scores during phases B.

Joe's scores on the pre/post self-efficacy questionnaire were 12 and 19 respectively, a 7 point increase overall. Joe's scores on satisfaction with the training and impressions of the outcomes were at or above agree.

Main study.

Participant 1 (Cinna). Visual analysis of Cinna's overall percentage of correct conversational reciprocity per live-mock interview showed a variable but continual increase in performance from baseline through generalization (see figure 4.4). During baseline (phase A) Cinna's conversational reciprocity percentage scores were highly variable with a mean of 65% (range 0% to 100%). During virtual reality training (phase B) her performance stabilized with a mean of 70% (range from 63% to 78%). During live interview coaching (phase C) Cinna's mean conversational reciprocity performance increased to 86% (range of 70%-100%). Generalization probe data remained stable at 100%.

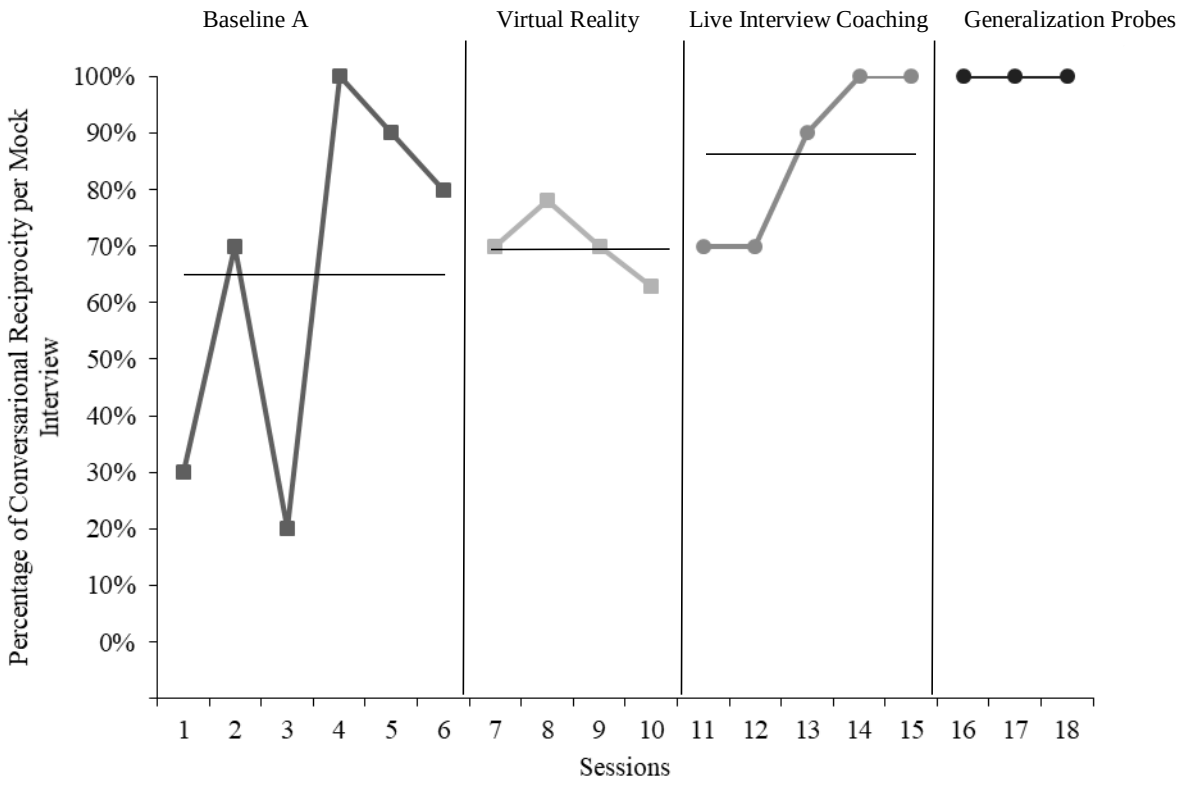

Figure 4.4. Graph of Cinna's percentage of correct performances per interview question on conversational reciprocity (on topic, concise answer, and responding completely and in a timely fashion) for each mock interview session with mean lines for phases A, B, C, and generalization.

Cinna's mean percentage of correct gaze intervals per live-mock interviews increased across all phases. During baseline (phase A) gaze scores were variable with a mean of 43% and a range of 10%-78%. During virtual reality intervention (phase B) her mean percentage of correct gaze performance increased to 75% (range of 38%-100%). During live interview coaching (phase C) Cinna's mean percent correct gaze performance increase to 92% (range of 70%-100%). Generalization probe data remained stable at 100% for all three data points.

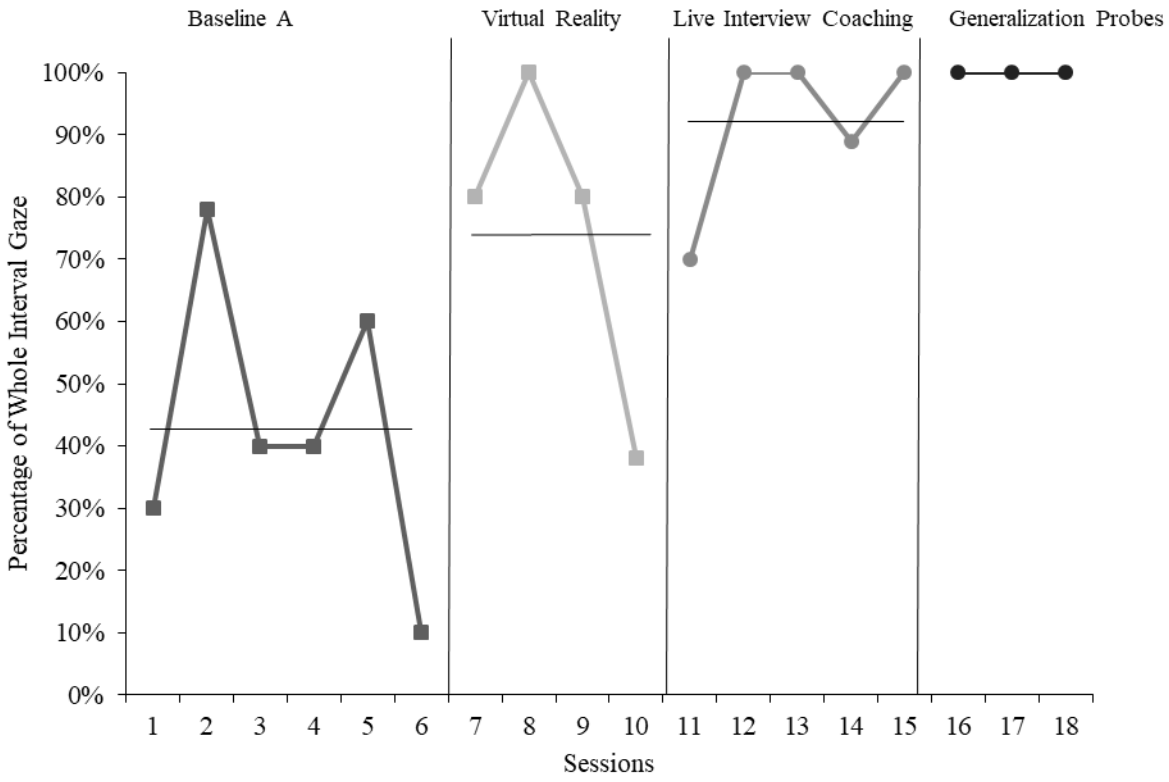

Figure 4.5. Graph of Cinna's data for impression management–non-verbal communicative reciprocity defined as percentage intervals of correct gaze per mock interview with mean lines across phases A, B, C, and generalization.

Participant 2 (Josie). Josie's overall conversational reciprocity scores increased from baseline levels to intervention conditions (see figure 4.6). Josie's baseline (phase A) performance showed a mean of 42% (20%-60%). During virtual reality intervention (phase B) her mean performance increased to 86% (range 70%-100%). Josie's mean performance increased to 98% during live interview coaching (phase C) with a range 90% to 100%. Generalization probe data was consistent at 100% across all three data probes.

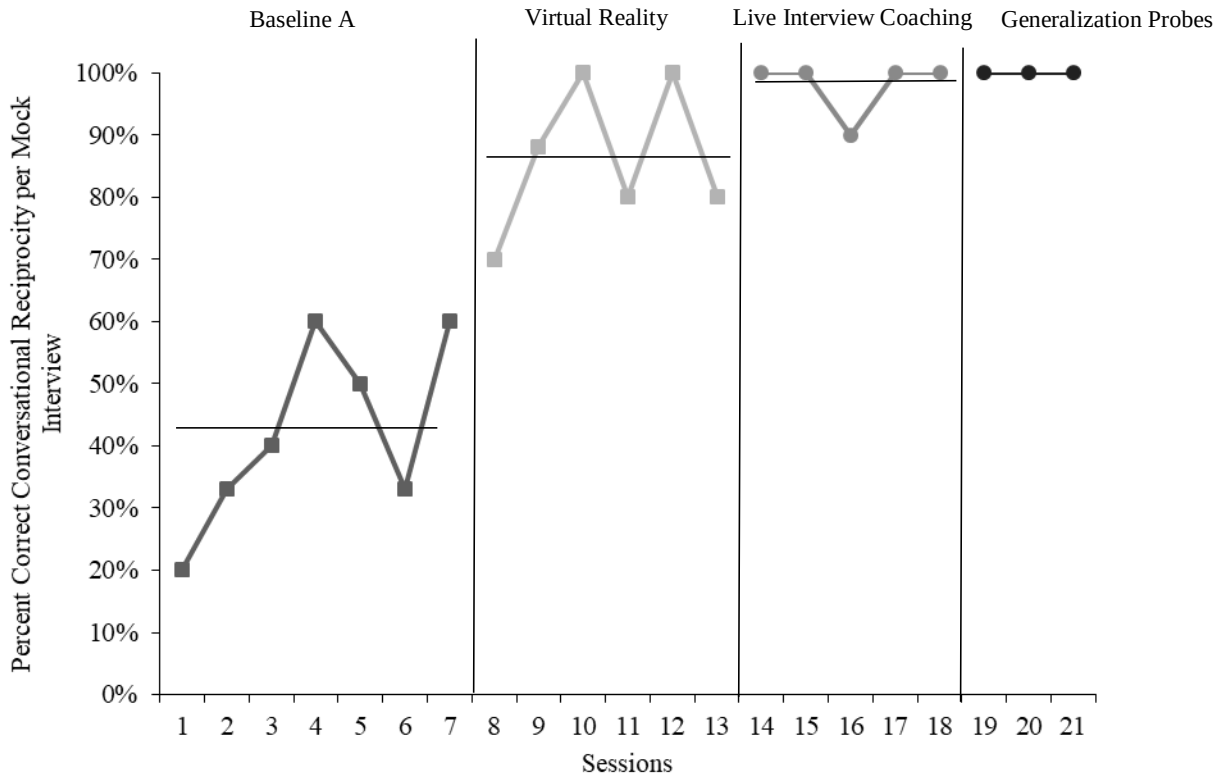

Figure 4.6. Graph of Josie's percentage of correct performances per live-mock interview session on conversational reciprocity (on topic, concise answer, and responding completely and in a timely fashion) with mean lines for phases A, B, and C.

Josie's percent correct gaze performance increased dramatically from zero performance during baseline through intervention phases (phases B, and C) and remained stable and high during generalization probes (see figure 4.7). During baseline (phase A) Josie displayed 0% correct gaze performance. Following introduction of virtual reality intervention (phase B) her mean gaze performance increased to 84% (range 10% to 100%). During live interview coaching (phase C) Josie's gaze performance increased to 100% and stayed stable at 100% for the duration of the phase. Generalization probes were stable at 100% for all three data points.

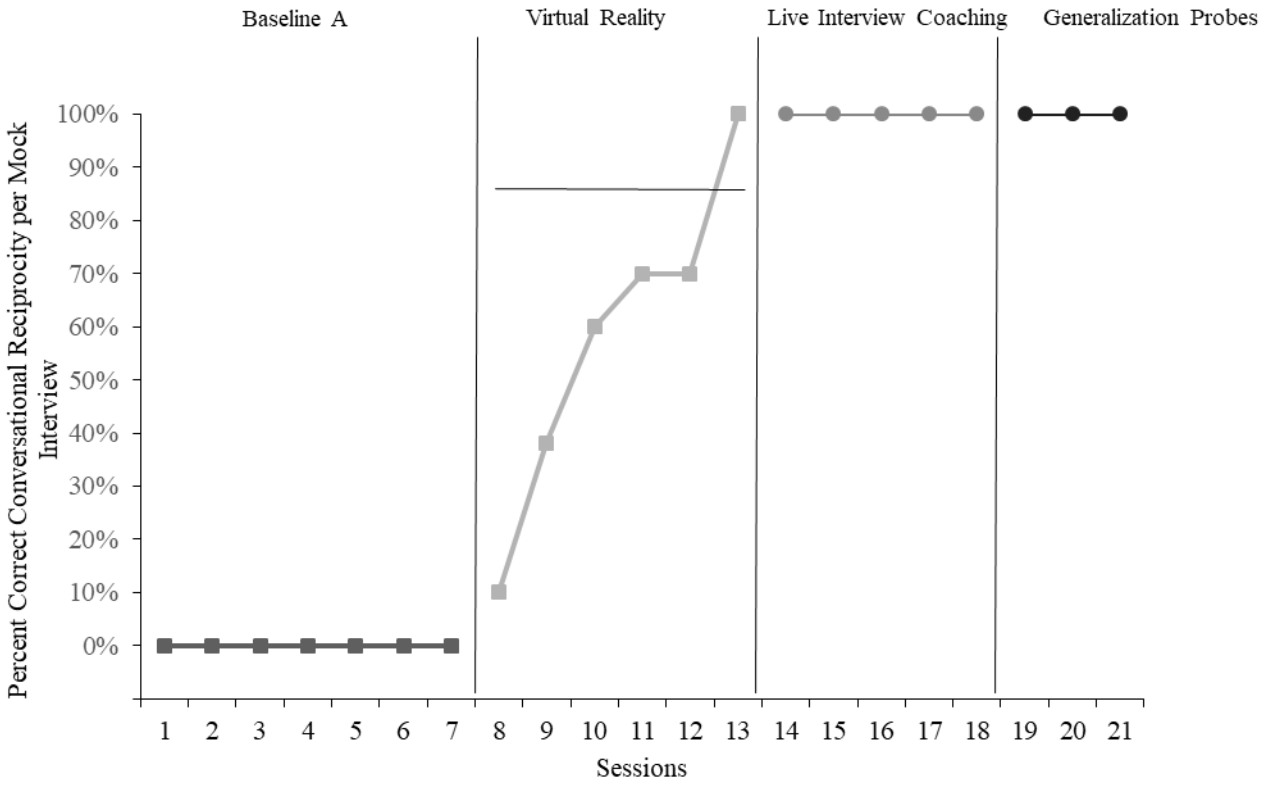

Figure 4.7. Graph of Josie's data for impression management–non-verbal communicative reciprocity defined as percentage of intervals of correct gaze performance per live-mock interview with mean lines across phases A, B, and C and generalization.

Participant 3 (Belle). Belle's overall conversational reciprocity increased and stabilized following baseline, and plateaued during generalization phase (see figure 4.8). Baseline (phase A) mean percent performance was 47% with a range of 0%-71%. During virtual reality intervention (phase B) her mean percent performance increased to 80% (range 33%-100%). During live interview coaching (phase C) the mean increased, stabilized, and plateaued at 100%. Generalization probes were stable at 100% for all three data points. No change in gaze performance occurred between phases A-B or phases B-C (see figure 9). Belles' gaze scores however increased during baseline to 100% and remained stable and plateaued for the duration of the study including generalization phase.

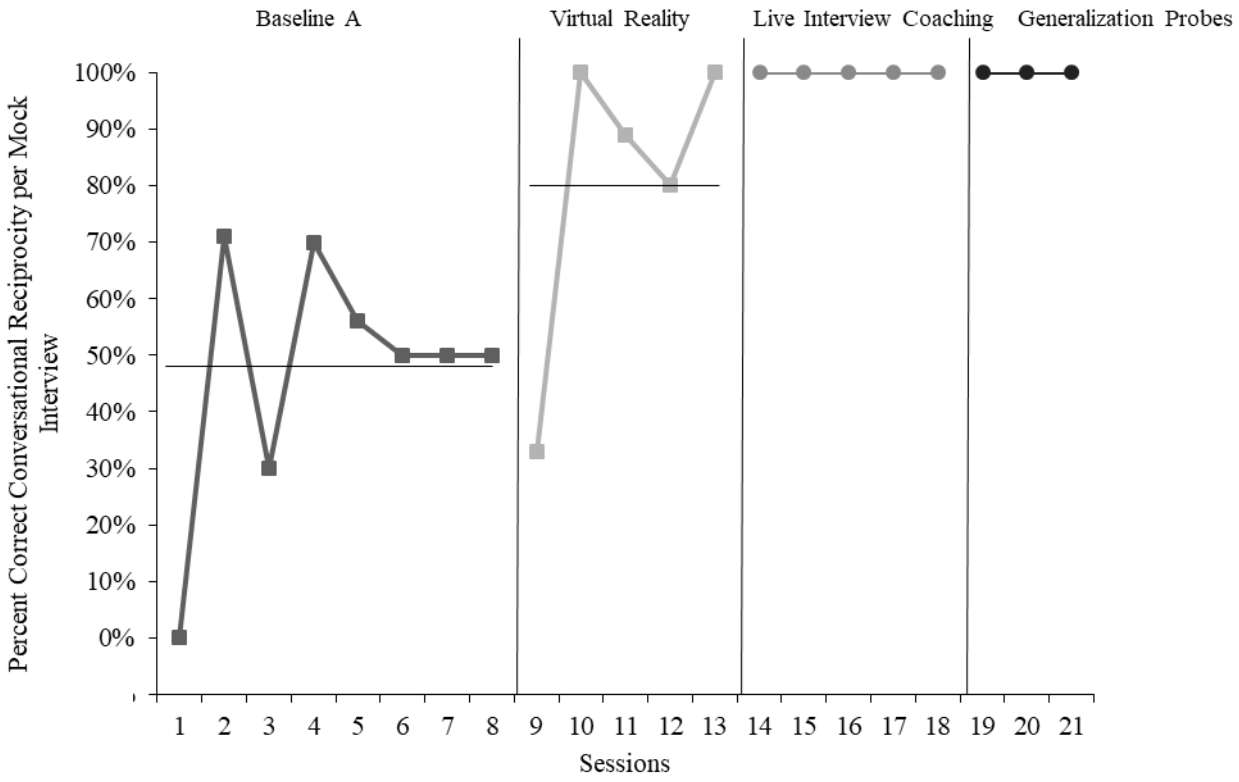

Figure 4.8. Graph of Belle's percentage of correct performances on conversational reciprocity (on topic, concise answer, and responding completely and in a timely fashion) for each live-mock interview session with mean lines for phases A, B, and C and generalization

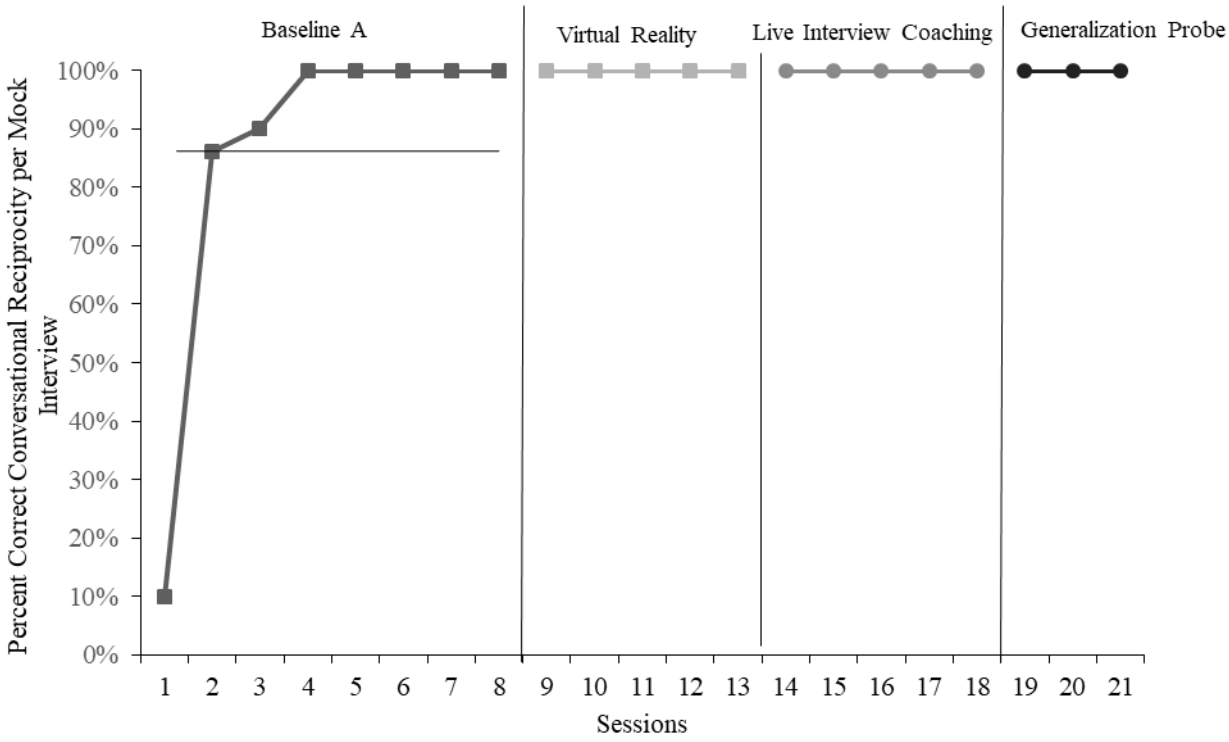

Figure 4.9. Graph of Belle's data for impression management–non-verbal communicative reciprocity defined as percentage of intervals of correct gaze performance per live-mock interview with mean lines across phases A, B, and C and generalization.

Interview performance scores. Interview performance scores were computer generated scores by SIMmersion's VRS following completion of the software's virtual reality job interview training during each participants' sessions within the VR intervention phase B. Scores were calculated based on the each participants' responses (see figure 4.10). Cinna completed 6 session averaging 97%, ranging from 93% to 100%. Josie completed 8 sessions. Her average score was 93% with a range of 77%-100%. Belle completed 6 sessions with an average o81% (26%-97%).

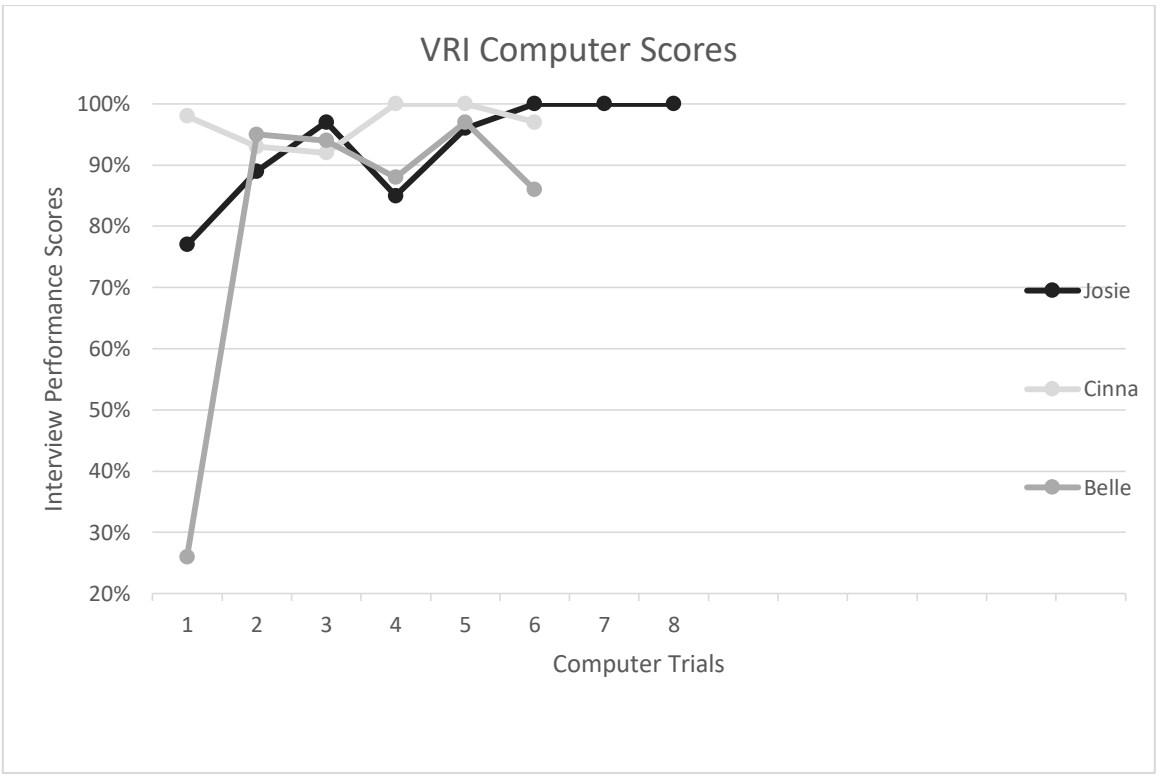

Figure 4.10. Graph of main study data for computer generated scores interview performance scores during phases B.

Interobserver Agreement (IOA)

Interobserver agreement (IOA) was collected during 100% of baseline sessions, 95% of intervention sessions, and 67% of maintenance sessions. Overall IOA for the main study across sessions and participants ranged from 85% to 100% with a mean of 96%. Means per phase and participants is provided in Table 4.1.

Table 4.1
Inter-rater Agreement Means

	IOA Percent				
	Phase				Whole
Participant	A	B	C	M	Study
Cinna	94	94	97	100	96
Josie	92	96	96	100	95
Belle	97	97	97	100	98

Fidelity of Implementation

Fidelity of Implementation was examined two ways: 1) during mock interviews to ensure feedback and instruction did not occur and 2) during live interview coaching to ensure fidelity of intervention. Fidelity of implementation for live-mock interview was 100% across all three participant and 57 mock interviews conducted during the duration of this study. Fidelity of implementation for live interview coaching was 100% for each of the five live interview coaching sessions for all three of the participants, totaling 15 sessions.

Pre Post Measures

Self-Efficacy. Cinna, Josie, Belle, and Joe's pre-intervention self-efficacy scores were 17, 11, 20, and 12 respectively (see figure 4.11). Post intervention score all increased with Cinna's increasing by 4 points, Josie's by 14, and Belle's by 3 (see figure 4.11).

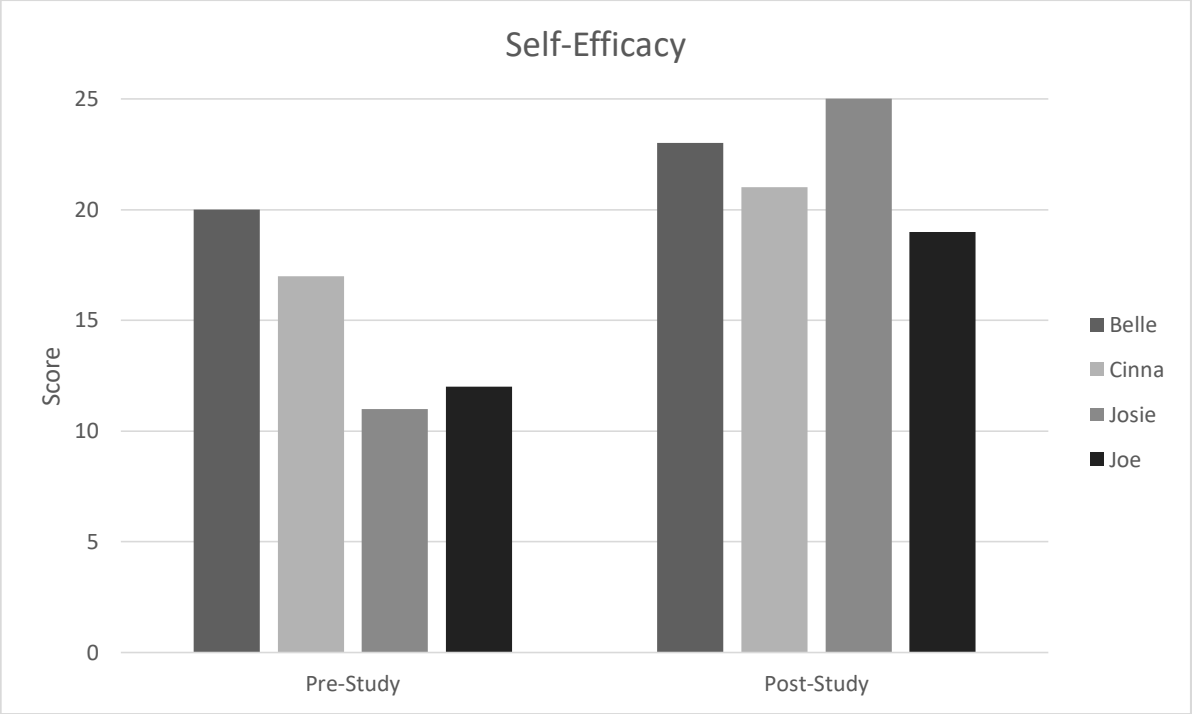

Figure 4.11. Graph self-efficacy scores for pilot study participant Joe, and current study's participants Cinna, Josie, and Belle. Self-efficacy scores before the start of the study (pre-study) and scores taken at the conclusion of the study (post-study) are presented in the graph.

Social Validity. Social validity was measured using a 5-point rating scale from strongly disagree to strongly agree (see appendix E). Cinna, Josie, Belle, and Joe scored at or above "agree" for all questions (see figure 4.123) Cinna wrote in a comment regarding her opinion that the program was not a good fit for her due to her high level of social competence.

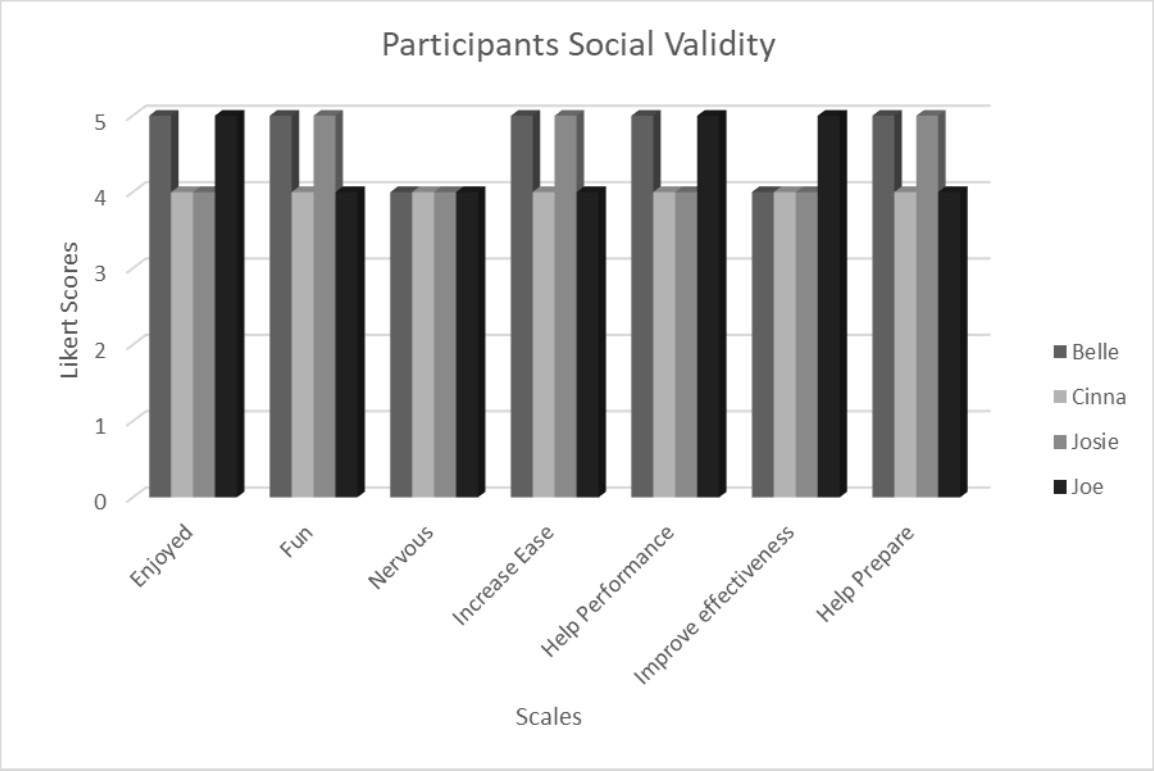

Figure 4.12. Graph of participant social validity scores for pilot study participant Joe, and current study's participants Cinna, Josie, and Belle.

Summary of Findings

By extending Smith et al.'s (2014) research this study provided interview training VR-LIC intervention package that increase interviewee impression management behaviors (i.e., gaze and conversational reciprocity) across multiple exemplars (i.e., interviewers) for three young adults with a self- reported diagnosis of ASD. Self-efficacy also increased from pre- and post-intervention based on self-report. Participant social validity scores were in agreement with general satisfaction in VR-LIC intervention.

Chapter 5: Discussion

This study extended the Smith et al.'s (2014) research in three important ways. First, a live interview coaching phase was added following the computerized virtual reality interview training with three young adults diagnosed with ASD. Second, impression management behaviors (i.e., conversational reciprocity and gaze) and individual variation were examined through an ABCA single subject research design. Finally, through the research design generalization across 3 participants was assessed. The study was designed to answer the following six research questions:

1. What influence does the implementation of virtual reality training have on interviewee impression management behaviors (i.e., gaze and conversational reciprocity) following baseline levels of performance?
2. What influence does live interview coaching following virtual reality training have on interviewee impression management behaviors?
3. What influence does the Virtual Reality–Live Interview Coaching (VR-LIC) intervention package have on generalized impression management behaviors across interviewers and settings?
4. To what extent does the virtual reality training influence computer generated interviewee performance scores of young adults diagnosed with ASD?
5. Does VR-LIC intervention package have an overall effect on self-efficacy?
6. What influence does the Virtual Reality-Live Interview Coaching (VR-LIC) intervention package have on social validity?

This chapter will crosswalk the major findings with current literature, identify implications of the study, provide suggestions for future research, and note limitations of the study. Summary and conclusions will follow.

Major Findings

VR and Impression Management Behaviors. Mounting evidence supports the use of virtual reality (VR) technology as a training tool to increase skills for typically developing youth and adults as well as for people with developmental disabilities across several kinds of behaviors including interviewing (Mitchell et al., 2007; Smith et al., 2014; Strickland et al., 2013; Weng et al., 2014). The results of this study aligned with previous VR research in that the SIMmersion computer generated scores for all three study

participants and one pilot study young adult increased with the implementation of the VR intervention (phase B). That is, during VR interviews with an avatar interviewer, respondents corrected their interview responses based on immediate feedback delivered by a virtual interview coach. Over multiple VR sessions participants' responses to interview questions appeared to be shaped and thus scores increased as a result of the VR feedback. This finding replicates the Smith et al.'s (2014) study conducted using a group design with 26 adults diagnosed with ASD. The participants in the Smith et al.'s (2014) study were only interviewed pre and post VR intervention in a live interview settings.

The present study extended the Smith et al.'s (2014) findings by specifically measuring conversational reciprocity and eye gaze during live-mock interviews. Both behaviors have been associated in previous research with successful interview performance (Kristof-Brown et al., 2002). Even though the specific behaviors were not directly addressed by the VR interview coach, the mean percentages of conversational reciprocity and eye gaze for the three main study participants increased during the live-mock interviews with the implementation of the VR intervention (phase B). The pilot study participant's eye gaze score did not increase during VR training, but his conversational reciprocity increased as it did for the other three participants. In retrospect, it appeared that the pilot participant looked away from the interviewer each time a question was being posed as if contemplating a response. Future research is needed to determine extraneous variables that may influence gaze scores.

The clear finding of this study is that feedback on general interview responses by the VR avatar coach affected conversational reciprocity and eye gaze, which are typically problematic for people on the autism spectrum. Another important finding in the present study is that interview skills seemed to generalize from the VR experience to a live interview setting. Collectively, these findings suggests that the VR training practice may reduce the cognitive load often associated with the stress of live human-to-human contact (Doherty-Sneddon et al., 2012; Mineo et al., 2009; Riby et al., 2012), thus supporting VR as an important first step in the acquisition of interview skills by people with ASD.

LIC and Impression Management Behaviors. Previous research supports the use of interview coaching to increase interviewee performance (Tross & Maurer, 2008; Williams, 2012). Wong et al. (2014) identified evidence based strategies used to increase

other skills of youth with a diagnosis of ASD that are also used in live interview coaching. For example, interview coaching typically incorporates a practice with feedback component and reinforcement for correct responding. The current study extended previous research by exploring LIC intervention on conversational reciprocity and eye gaze behaviors during interviews of people on the autism spectrum. The mean percentages for both behaviors increased and stabilized with the implementation of the LIC intervention (phase C). While the specific behaviors measured increased across participants during VR training, it was not until live interview coaching was introduced that the behaviors increased uniformly and were sustained. It could be that the live interview coach was able to provide more nuanced feedback as compared to the avatar thus further shaping conversational reciprocity and eye gaze. In addition, positive comments made by a live coach may have been more naturally reinforcing than the affirmative comments made by the avatar coach. Future research is needed to explore the specific variables of LIC that contributed to the increased and sustained results in the present study. Moreover, it could be that once the nuanced variables are identified, those attributes could be used to develop more sophisticated avatar coaching.

VR-LIC, Impression Management Behaviors, and Generalization. As previously noted, past research supports the use of interview coaching to increase interviewee performance (Tross & Maurer, 2008; Williams, 2012) and mounting evidence supports the use of virtual reality technology as a training tool to enhance interview skills (Mitchell et al., 2007; Smith et al., 2014; Strickland et al., 2013; Weng et al., 2014). However, there is limited or no known evidence that VR or live interview coaching leads to generalized responses maintained over time especially for people with ASD. While the current study expanded previous research by combining virtual reality technology and live interview coaching, the more salient and perhaps intriguing contribution was the addition of a generalization and maintenance phase. In the return to baseline, mock interviews were conducted across participants with novel interviewers and in novel settings up to one month post LIC phase of the study. In all cases, generalization was achieved. In future research, generalization effects should be replicated and maintenance of skill acquisition should be measured at intervals greater than a month post intervention.

VR-LIC and Self-Efficacy. Previous researchers reported a positive relationship between self-efficacy and interview skills efficacy (Huffcutt et al., 2011; Macan, 2009; Tay

et al., 2006; Tross & Maurer, 2008). Additionally, growth in self-efficacy had been reported based on implementation of interview skill interventions (Tross & Maurer, 2008). The current study showed similar co-occurrence between self-efficacy score and interview skills training. All four participants' self-efficacy scores increased following interview skill intervention (e.g., VR-LIC). These results provide additional support for the value of interview skill intervention for young adults with ASD transitioning into the workforce.

VR-LIC and Social Validity. Social validity was measured using a 5-point rating scale in which Cinna, Josie, and Belle scored at or above "agree" for all questions (see figure 4.12). Cinna commented regarding her opinion that the program was not a good fit for her due to her high level of social competence. Cinna's self-reported social competence is linked to her scores on baseline levels of correct responses of gaze and conversational reciprocity. Cinna had higher baseline levels of correct responses than the other three participants. Consequently, while she did show improvement from baseline to treatment conditions, she excelled quickly and maintained a high level of performance throughout the duration of the study including the generalization phase. Future research is needed to determine possible traits associated with VR intervention outcomes.

The participants with lower baseline means showed greater improvement across phases of the study. Participants with low baseline scores for conversational reciprocity, below 50% showed an increase between 17 to 44% with the introduction of VR intervention. The relationship between deficits in social responsiveness, as measured by baseline means, and outcomes post VR-LIC intervention were not explored in this study and should be addressed in future research. Future research is needed to determine a relationship between deficits in social responsiveness and post VR-LIC intervention outcomes.

Implications of the Study

Employment is a crucial quality of life indicator and interview skills are imperative for job attainment and long term employment outcomes (Bell & Weinstein, 2011; García-Villamisar & Hughes, 2007; García-Villamisar et al., 2002; Hendricks, 2010; Hurlbutt & Chalmers, 2004; Morgan et al., 2014; Roux et al., 2013; Smith et al., 2014; Smith et al., 2015; Strickland et al., 2013). Previous research supported the use of virtual reality training and interview coaching as separate interventions to influence acquisition and fluency of interview skills (Mitchell et al., 2007; Morgan et al., 2014; Smith et al., 2014; Strickland et

al., 2013; Weng et al., 2014; Wong et. al, 2014). For people with neuro-atypical learning styles and specific social communicative differences, research on bridging the gap between learning (acquisition) and practicing (fluency) interview skills and successfully performing the skill in the real world (i.e., generalization) is limited (Morgan et al., 2014; Smith et al., 2014; Smith et al., 2015).

The current study addressed the limitation of acquisition, fluency, and generalization by exploring the use of a combination of virtual reality and live interview coach (VR-LIC) as an intervention package and its influence on targeted interview skills (i.e., gaze and conversational reciprocity) with young adults on the autism spectrum. In this study, implementation of VR-LIC intervention package resulted in an overall improvement of mean percentage scores by the completion of the study. Retention of stable, high scores for both dependent variables for all four participants were shown during the maintenance phase across novel settings and interviewers.

The results of this study align with and add to the collective review of the research on enhancing interview skills for young adults with a diagnosis of ASD. First, the major findings of the current study highlight VR's potential to support acquisition of interview skills, possibly lowering cognitive load. Second, the generalization to a human interface (i.e., LIC) may increase fluency and generalization of target skills to real world settings (i.e., novel interviewers and settings) especially for young adults with ASD. Additionally, young adults on the autism spectrum with low baseline interview skills may respond positively to the blended intervention package. Overall, VR-LIC intervention utilizes specific instructional strategies associated with successful outcomes for people with a diagnosis of ASD while possibly decreasing cognitive load and increasing interview skills that generalize to real word settings and are maintained overtime.

Future Research

Future research targeting the limitations of this study is necessary. Additional research replicating the current study using a more robust design (i.e., multiple baseline design) would aid in demonstrating a clear functional relationship between dependent and independent variables including determining extraneous variables that may be influencing gaze scores. Replication of the current study would also increase the generalizability of the findings and strengthen external and internal validity. Exploring use of VR-LIC package

with people with varying degrees of initial interview competence, ages, degree of functioning, and education increases ability to generalize results.

Future research is needed to determine a relationship between participants' initial deficits in social responsiveness and post VR intervention outcomes. Additionally, future research is needed to explore the specific variables of LIC that contributed to the increased and sustained results in the present study. Generalization effects of interview skills to novel real world settings should be replicated and maintenance of skill acquisition should be measured at intervals greater than a month post intervention. Also, it could be, that once the nuanced variables are identified, those attributes could be used to develop more sophisticated avatar coaching.

Recent advancements in technology have led to the development of software and hardware that mimics real life to a greater degree. Research studying advancements in virtual reality intervention effects on interview skills and long-term generalization is needed. Expanding virtual reality interview training by using more immersive software may control for the human limitations in research and allow examination of a fully VR based intervention.

Limitations

The overarching limitation of the current study is lack of generalization to a broader population due to the small number of participants involved and participant selection. Such variables as gender, cognitive development, language development and degree of social skills were not measured in this study. The results of this study are confined to the population of young adults with a diagnosis of ASD, specifically the four participants active in this study. Future research could increase generalization and control for extraneous variables (e.g., gender, cognitive development, language, and social skills) through implementation of a group design. All the participants volunteered their time to engage in the study potentially creating a limitation due to participation bias. Further, participants were selected from a limited geographical pool, thus impacting generalization to a broader region.

While this study extends Smith et al. (2014) research, Smith et al. (2014) used quasi-experimental group design measuring interviewee performance. This study focused on operationally defined impression management behaviors, in addition to overall computer generated interviewee performance rating scores, limiting identification of a functional

relationship. Additionally, a return to baseline scores for dependent variables did not occur during the second phase A indicating a practice effect, farther limiting identification of a functional relationship between dependent variables and implemented interventions, VR-LIC package. Systematic implementation of the intervention package occurred differentiating responses across participants, however results of this study should be replicated to improve generalizability of findings and the functional relationship between independent and dependent variables.

Summary and Conclusions

Despite recent advancements in the field of autism, young adults with a diagnosis of ASD continue to struggle working and living independently (Thompson, 2013). Competitive employment is a quality of life indicator (García-Villamisar & Hughes, 2007; García-Villamisar et al., 2002; Hendricks, 2010; Hurlbutt & Chalmers, 2004; Morgan et al., 2014 Roux et al., 2013). Strong interview skills including impression management behaviors, increase the likelihood of obtaining competitive employment (Bell & Weinstein, 2011; Smith et al., 2014; Smith et al., 2015; Strickland et al., 2013). High self-efficacy and impression management behaviors influence successful interviewee performance (Huffcutt et al., 2011). This study explored the use of a Virtual Reality–Live Interview Coaching (VR-LIC) intervention package to increase gaze and conversational reciprocity of young adults diagnosed with ASD reciprocity across interviewers and settings. The participants demonstrated improvement in impression management behavior with the introduction of VR intervention. The incorporation of live coaching with multiple interviewers and office settings enhanced performance and increased transfer of skills to future real-world interviews as concluded by high and consistent maintenance probe data. Statements of limitations for VR-LIC intervention package effectiveness include generalization of study results to a larger population, limited identification of a functional relationship, and limited control for practice effect due to learning during live mock interviews. The results of this study support the use of virtual reality and live-interview coaching to develop and strengthen interview skills for young adults with a diagnosis of ASD. These promising results supports the need for more research exploring VR and interview skill interventions topics and limitations.

References

American Psychiatric Association. APA (2013). *Diagnostic and statistical manual of mental disorders*, *5*.

Arvey, R. D., & Campion, J. E. (1982). The employment interview: A summary and review of recent research. *Personnel Psychology*, *35*, 281-322.

Barbee, J. R., & Keil, E. C. (1973). Experimental techniques of job interview training for the disadvantaged: Videotape feedback, behavior modification, and microcounseling. *Journal of Applied Psychology*, *58*(2), 209.

Barnes, A. (2014). *Using video feedback to increase eye contact during mock job interviews for transition age adults with autism spectrum disorders* (Doctoral dissertation, University of South Florida).

Baron-Cohen, S. (1997). *Mindblindness: An essay on autism and theory of mind*. MIT press.

Baron-Cohen, S., & Ring, H. (1994). A model of the mindreading system: Neuropsychological and neurobiological perspectives. *Origins of an Understanding of Mind*, 183-207.

Baron-Cohen, S., Ring, H. A., Bullmore, E. T., Wheelwright, S., Ashwin, C., & Williams, S. C. R. (2000). The amygdala theory of autism. *Neuroscience & Biobehavioral Reviews*, *24*(3), 355-364.

Baron-Cohen, S., Ring, H. A., Wheelwright, S., Bullmore, E. T., Brammer, M. J., Simmons, A., & Williams, S. C. (1999). Social intelligence in the normal and autistic brain: An fMRI study. *European Journal of Neuroscience*, *11*(6), 1891-1898.

Bell, M. D., & Weinstein, A. (2011). Simulated job interview skill training for people with psychiatric disability: Feasibility and tolerability of virtual reality training. *Schizophrenia Bulletin*, *37*, S91-S97.

Bernard-Opitz, V. (1982). Pragmatic analysis of the communicative behavior of an autistic child. *Journal of Speech and Hearing Disorders*, *47*(1), 99-109.

Blade, R. A., & Padgett, M. L. (2002). Virtual environments standards and terminology. *Handbook of Virtual Environments*, 15-27.

Bobroff, S., & Sax, C. L. (2010). The effects of peer tutoring interview skills training with transition-age youth with disabilities. *Journal of Vocational Rehabilitation*, *33*(3), 143.

Bouck, E. C., & Flanagan, S. M. (2010). Virtual manipulatives. *Intervention in School and Clinic*, *45*(3), 186.

Brunken, R., Plass, J. L., & Leutner, D. (2003). Direct measurement of cognitive load in multimedia learning. *Educational Psychologist*, *38*(1), 53-61.

Bureau-of-Labor-Statistics, U. (2015). Labor force characteristics by race and ethnicity, 2014. *US Bureau of Labor Statistics*.

Burgoine, E., & Wing, L. (1983). Identical triplets with Asperger's syndrome. *The British Journal of Psychiatry*, *143*(3), 261-265.

Burnett, J. R., & Motowidlo, S. J. (1998). Relations between different sources of information in the structured selection interview. *Personnel Psychology*, *51*(4), 963.

Campion, M. A., & Campion, J. E. (1987). Evaluation of an interviewee skills training program in a natural field experiment. *Personnel Psychology*, *40*(4), 675-691.

Capps, L., Kehres, J., & Sigman, M. (1998). Conversational abilities among children with autism and children with developmental delays. *Autism*, *2*(4), 325-344.

Carter, A. S., Davis, N. O., Klin, A., & Volkmar, F. R. (2005). Social development in autism. *Handbook of Autism and Pervasive Developmental Disorders, Volume 1, Third Edition*, 312-334.

Chandler, P., & Sweller, J. (1991). Cognitive load theory and the format of instruction. *Cognition and Instruction*, *8*(4), 293-332.

Constantino, J. N., & Gruber, C. P. (2012). *Social responsiveness scale (SRS)*. Torrance, CA: Western Psychological Services.

Cooper, G. (1998). Research into cognitive load theory and instructional design at UNSW. Retrieved February 12, 2016, from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.470.3428&rep=rep1&type=pdf

Critchley, H. D., Daly, E. M., Bullmore, E. T., Williams, S. C., Van Amelsvoort, T., Robertson, D. M., & Murphy, D. G. (2000). The functional neuroanatomy of social behaviour. *Brain*, *123*(11), 2203-2212.

Dawson, G., Webb, S. J., & McPartland, J. (2005). Understanding the nature of face processing impairment in autism: Insights from behavioral and electrophysiological studies. *Developmental Neuropsychology*, *27*(3), 403-424.

Deeley, Q., Daly, E. M., Surguladze, S., Page, L., Toal, F., Robertson, D., Curran, S., Giampietro, V., Seal, M., Brammer, M.J., Andrew, C., Murphy, K., Phillips, M.L., & Murphy, D.G.M., (2007). An event related functional magnetic resonance imaging study of facial emotion processing in Asperger syndrome. *Biological Psychiatry*, *62*(3), 207-217.

DeGroot, T., & Motowidlo, S. J. (1999). Why visual and vocal interview cues can affect interviewers' judgments and predict job performance. *Journal of Applied Psychology*, *84*(6), 986.

de Villiers, J., Fine, J., Ginsberg, G., Vaccarella, L., & Szatmari, P. (2007). Brief report: A scale for rating conversational impairment in autism spectrum disorder. *Journal of Autism and Developmental Disorders*, *37*(7), 1375-1380.

Doherty-Sneddon, G., Riby, D. M., & Whittle, L. (2012). Gaze aversion as a cognitive load management strategy in autism spectrum disorder and Williams's syndrome. *Journal of Child Psychology and Psychiatry*, *53*(4), 420-430.

Dotson, W. H., Richman, D. M., Abby, L., Thompson, S., & Plotner, A. (2013). Teaching skills related to self-employment to adults with developmental disabilities: An analog analysis. *Research in Developmental Disabilities*, *34*(8), 2336-2350.

Eaves, L. C., & Ho, H. H. (2008). Young adult outcome of autism spectrum disorders. *Journal of Autism and Developmental Disorders*, *38*(4), 739-747.

Edinger, J. A., & Patterson, M. L. (1983). Nonverbal involvement and social control. *Psychological Bulletin*, *93*(1), 30.

Ellis, A. P., West, B. J., Ryan, A. M., & DeShon, R. P. (2002). The use of impression management tactics in structured interviews: A function of question type?. *Journal of Applied Psychology*, *87*(6), 1200.

Forrest, D. V., & Baumgarten, L. J. (1975). An Hour for Job Interviewing Skills. *Journal of College Placement*, *36*(1), 77-78.

Forrest, D. V., & Baumgarten, L. (1977). Self-Evaluation: The performance booster. *Journal of College Placement*, *37*, 59-60.

Frith, U. (1991). *Autism and Asperger syndrome*. Cambridge University Press.

García-Villamisar, D., & Hughes, C. (2007). Supported employment improves cognitive performance in adults with autism. *Journal of Intellectual Disability Research, 51*(2), 142-150.

García-Villamisar, D., Wehman, P., & Navarro, M. D. (2002). Changes in the quality of autistic people's life that work in supported and sheltered employment: A 5-year follow-up study. *Journal of Vocational Rehabilitation, 17*(4), 309-312.

Gast, D. L., & Ledford, J. R. (Eds.). (2018). *Single subject research methodology in behavioral sciences*. Routledge.

Ghaziuddin, M., & Gerstein, L. (1996). Pedantic speaking style differentiates Asperger syndrome from high-functioning autism. *Journal of Autism and Developmental Disorders, 26*(6), 585-595.

Grice, S. J., Halit, H., Farroni, T., Baron-Cohen, S., Bolton, P., & Johnson, M. H. (2005). Neural correlates of eye-gaze detection in young children with autism. *Cortex, 41*(3), 342-353.

Grinnell, R. M., & Lieberman, A. (1977). Teaching the mentally retarded job interviewing skills. *Journal of Counseling Psychology, 24*(4), 332.

Happé, F., & Frith, U. (2006). The weak coherence account: Detail-focused cognitive style in autism spectrum disorders. *Journal of Autism and Developmental Disorders, 36*(1), 5-25.

Harrison, R. P., Horan, J. J., Torretti, W., Gamble, K., Terzella, J., & Weir, E. (1983). Separate and combined effects of a cognitive map and a symbolic code in the learning of a modeled social skill (job interviewing). *Journal of Counseling Psychology*, *30*(4), 499.

Hendricks, D. (2010). Employment and adults with autism spectrum disorders: Challenges and strategies for success. *Journal of Vocational Rehabilitation, 32*(2), 125.

Hendricks, D. R., & Wehman, P. (2009). Transition from school to adulthood for youth with autism spectrum disorders: Review and recommendations. *Focus on Autism and Other Developmental Disabilities*. *24*, 77-88.

Higgins, C. A., & Judge, T. A. (2004). The effect of applicant influence tactics on recruiter perceptions of fit and hiring recommendations: A field study. *Journal of Applied Psychology, 89*(4), 622.

Hillier, A., Campbell, H., Mastriani, K., Izzo, M. V., Kool-Tucker, A. K., Cherry, L., & Beversdorf, D. Q. (2007). Two-year evaluation of a vocational support program for adults on the autism spectrum. *Career Development for Exceptional Individuals*, *30*(1), 35-47.

Hollandsworth, J. G., Dressel, M. E., & Stevens, J. (1977). Use of behavioral versus traditional procedures for increasing job interview skills. *Journal of Counseling Psychology*, *24*(6), 503.

Hoque, M. E., Courgeon, M., Martin, J. C., Mutlu, B., & Picard, R. W. (2013, September). Mach: My automated conversation coach. In *Proceedings of the 2013 ACM International Joint Conference on Pervasive and Ubiquitous Computing* (pp. 697-706). ACM.

Howlin, P. (2000). Outcome in adult life for more able individuals with autism or Asperger syndrome. *Autism*, *4*(1), 63-83.

Howlin, P., Goode, S., Hutton, J., & Rutter, M. (2004). Adult outcome for children with autism. *Journal of Child Psychology and Psychiatry*, *45*(2), 212-229.

Howlin, P., Mawhood, L., & Rutter, M. (2000). Autism and developmental receptive language disorder—a follow-up comparison in early adult life II: Social, behavioural, and psychiatric outcomes. *Journal of Child Psychology and Psychiatry*, *41*(05), 561-578.

Huffcutt, A. I. (2011). An empirical review of the employment interview construct literature. *International Journal of Selection and Assessment*, *19*(1), 62-81.

Huffcutt, A. I., Conway, J. M., Roth, P. L., & Stone, N. J. (2001). Identification and meta-analytic assessment of psychological constructs measured in employment interviews. *Journal of Applied Psychology*, *86*(5), 897.

Huffcutt, A. I., Van Iddekinge, C. H., & Roth, P. L. (2011). Understanding applicant behavior in employment interviews: A theoretical model of interviewee performance. *Human Resource Management Review*, *21*(4), 353-367.

Hurlbutt, K., & Chalmers, L. (2002). Adults with autism speak out perceptions of their life experiences. *Focus on Autism and Other Developmental Disabilities*, *17*(2), 103-111.

Hurlbutt, K., & Chalmers, L. (2004). Employment and adults with Asperger syndrome. *Focus on Autism and Other Developmental Disabilities*, *19*(4), 215-222.

Iovannone, R., Dunlap, G., Huber, H., & Kincaid, D. (2003). Effective educational practices for students with autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities*, *18*(3), 150-165.

Kacmar, K. M., Delery, J. E., & Ferris, G. R. (1992). Differential effectiveness of applicant impression management tactics on employment interview decisions. *Journal of Applied Social Psychology*, *22*(16), 1250-1272.

Kalyuga, S., Ayres, P., Chandler, P., & Sweller, J. (2003). The expertise reversal effect. *Educational Psychologist*, *38*(1), 23-31.

Kana, R. K., Keller, T. A., Minshew, N. J., & Just, M. A. (2007). Inhibitory control in high-functioning autism: Decreased activation and underconnectivity in inhibition networks. *Biological Psychiatry*, *62*(3), 198-206.

Kanner, L. (1943). Autistic disturbances of affective contact. *Nervous Child, 2*, 217-250.

Kennedy, C. H. (2005). *Single-case designs for educational research*. Prentice Hall.

Kristof-Brown, A., Barrick, M. R., & Franke, M. (2002). Applicant impression management: Dispositional influences and consequences for recruiter perceptions of fit and similarity. *Journal of Management*, *28*(1), 27-46.

Landa, R., Klin, A., Volkmar, F., & Sparrow, S. (2000). Social language use in Asperger syndrome and high-functioning autism. *Asperger Syndrome*, 125-155.

Langton, S. R., Watt, R. J., & Bruce, V. (2000). Do the eyes have it? Cues to the direction of social attention. *Trends in Cognitive Sciences*, *4*(2), 50-59.

Leary, M. R., & Kowalski, R. M. (1990). Impression management: A literature review and two-component model. *Psychological Bulletin*, *107*(1), 34.

Leonard, L. (2015). Cognitive load and Asperger's: Teaching relevance. *Journal of Student Engagement: Education Matters*, *5*(1), 12-17.

Lievens, F., & Peeters, H. (2008). Interviewers' sensitivity to impression management tactics in structured interviews. *European Journal of Psychological Assessment*, *24*(3), 174-180.

Liptak, G. S., Kennedy, J. A., & Dosa, N. P. (2011). Social participation in a nationally representative sample of older youth and young adults with autism. *Journal of Developmental & Behavioral Pediatrics*, *32*(4), 277-283.

Loth, E., Gómez, J. C., & Happé, F. (2008). Event schemas in autism spectrum disorders: The role of theory of mind and weak central coherence. *Journal of Autism and Developmental Disorders*, *38*(3), 449-463.

Macan, T. (2009). The employment interview: A review of current studies and directions for future research. *Human Resource Management Review*, *19*(3), 203-218.

Manjaly, Z. M., Bruning, N., Neufang, S., Stephan, K. E., Brieber, S., Marshall, J. C., Kamp-Becker, I., Remchmidt, H., Herpertz-Dahlmann, B., Konrad, K., & Fink, G. R. (2007). Neurophysiological correlates of relatively enhanced local visual search in autistic adolescents. *Neuroimage*, *35*(1), 283-291.

Mason, R. A., Rispoli, M., Ganz, J. B., Boles, M. B., & Orr, K. (2012). Effects of video modeling on communicative social skills of college students with Asperger syndrome. *Developmental Neurorehabilitation*, *15*(6), 425-434.

Maurer, T. J., & Solamon, J. M. (2006). The science and practice of a structured employment interview coaching program. *Personnel Psychology*, *59*(2), 433-456.

Maurer, T. J., Solamon, J., & Troxtel, D. (1998). Relationship of coaching with performance in situational employment interviews. *Journal of Applied Psychology*, *83*(1), 128.

Mawhood, L., & Howlin, P. (1999). The outcome of a supported employment scheme for high-functioning adults with autism or Asperger syndrome. *Autism*, *3*(3), 229-254.

McComas, J., MacKay, M., & Pivik, J. (2002). Effectiveness of virtual reality for teaching pedestrian safety. *CyberPsychology & Behavior*, *5*(3), 185-190.

McFarland, L. A., Ryan, A. M., & Kriska, S. D. (2003). Impression management use and effectiveness across assessment methods. *Journal of Management*, *29*(5), 641-661.

Mitchell, P., Parsons, S., & Leonard, A. (2007). Using virtual environments for teaching social understanding to 6 adolescents with autistic spectrum disorders. *Journal of Autism and Developmental Disorders*, *37*(3), 589-600.

Mineo, B. A., Ziegler, W., Gill, S., & Salkin, D. (2009). Engagement with electronic screen media among students with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, *39*(1), 172-187.

Moore, J. L. (2015). *Using video feedback to increase job interview skills for young adults with developmental disabilities*. (Master's thesis, University of South Florida). Retrieved from http://scholarcommons.usf.edu

Morgan, B., Maybery, M., & Durkin, K. (2003). Weak central coherence, poor joint attention, and low verbal ability: independent deficits in early autism. *Developmental Psychology*, *39*(4), 646.

Morgan, L., Leatzow, A., Clark, S., & Siller, M. (2014). Interview skills for adults with autism spectrum disorder: A pilot randomized controlled trial. *Journal of Autism and Developmental Disorders*, *44*(9), 2290-2300.

Mundy, P., Sigman, M., Ungerer, J., & Sherman, T. (1986). Defining the social deficits of autism: The contribution of non-verbal communication measures. *Journal of Child Psychology and Psychiatry*, *27*(5), 657-669.

Paas, F., Renkl, A., & Sweller, J. (2004). Cognitive load theory: Instructional implications of the interaction between information structures and cognitive architecture. *Instructional Science*, *32*(1), 1-8.

Parsons, S., Mitchell, P., & Leonard, A. (2004). The use and understanding of virtual environments by adolescents with autistic spectrum disorders. *Journal of Autism and Developmental Disorders*, *34*(4), 449-466.

Paul, R., Orlovski, S. M., Marcinko, H. C., & Volkmar, F. (2009). Conversational behaviors in youth with high-functioning ASD and Asperger syndrome. *Journal of Autism and Developmental disorders*, *39*(1), 115-125.

Perrett, D. I., Smith, P. A. J., Potter, D. D., Mistlin, A. J., Head, A. S., Milner, A. D., & Jeeves, M. A. (1985). Visual cells in the temporal cortex sensitive to face view and gaze direction. *Proceedings of the Royal Society of London B: Biological Sciences*, *223*(1232), 293-317.

Picard, R. W. (2009). Future affective technology for autism and emotion communication. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *364*(1535), 3575-3584.

Pierce, K., Müller, R. A., Ambrose, J., Allen, G., & Courchesne, E. (2001). Face processing occurs outside the fusiform "face area" in autism: Evidence from functional MRI. *Brain*, *124*(10), 2059-2073.

Querrec, R., Buche, C., Maffre, E., & Chevaillier, P. (2004). Multiagents systems for virtual environment for training: Application to fire-fighting. *International Journal of Computers and Applications (IJCA)*, *1*(1), 25-34.

Riby, D. M., Doherty-Sneddon, G., & Whittle, L. (2012). Face-to-face interference in typical and atypical development. *Developmental Science*, *15*(2), 281-291.

Rothbaum, B. O., & Hodges, L. F. (1999). The use of virtual reality exposure in the treatment of anxiety disorders. *Behavior Modification*, *23*(4), 507-525.

Roux, A. M., Shattuck, P. T., Cooper, B. P., Anderson, K. A., Wagner, M., & Narendorf, S. C. (2013). Postsecondary employment experiences among young adults with an autism spectrum disorder. *Journal of the American Academy of Child & Adolescent Psychiatry*, *52*(9), 931-939.

Sansosti, F. J., Doolan, M. L., Remaklus, B., Krupko, A., & Sansosti, J. M. (2014). Computer-assisted interventions for students with autism spectrum disorders within school-based contexts: A quantitative meta-analysis of single-subject research. *Review Journal of Autism and Developmental Disorders*, *2*(2), 128-140.

Sansosti, F. J., & Powell-Smith, K. A. (2008). Using computer-presented social stories and video models to increase the social communication skills of children with high-functioning autism spectrum disorders. *Journal of Positive Behavior Interventions*, *10*(3), 162-178.

Schall, C., Cortijo-Doval, E., Targett, P. S., Wehman, P., & Wehman, P. (2006). Applications for youth with autism spectrum disorders. *Life Beyond the Classroom: Transition Strategies for Young People with Disabilities*, 535-575.

Schlenker, B. R. (1980). *Impression management: The self-concept, social identity, and interpersonal relations* (pp. 21-43). Monterey, CA: Brooks/Cole Publishing Company.

Schultz, R. T. (2005). Developmental deficits in social perception in autism: The role of the amygdala and fusiform face area. *International Journal of Developmental Neuroscience*, *23*(2), 125-141.

Schultz, R. T., Gauthier, I., Klin, A., Fulbright, R. K., Anderson, A. W., Volkmar, F. & Gore, J. C. (2000). Abnormal ventral temporal cortical activity during face discrimination among individuals with autism and Asperger syndrome. *Archives of General Psychiatry*, *57*(4), 331-340.

Senju, A. & Johnson, M. H. (2009). Atypical eye contact in autism: Models, mechanisms and development. *Neuroscience & Biobehavioral Reviews*, *33*(8), 1204-1214.

Senju, A., Kikuchi, Y., Hasegawa, T., Tojo, Y., & Osanai, H. (2008). Is anyone looking at me? Direct gaze detection in children with and without autism. *Brain and Cognition*, *67*(2), 127-139.

Shattuck, P. T., Narendorf, S. C., Cooper, B., Sterzing, P. R., Wagner, M., & Taylor, J. L. (2012). Postsecondary education and employment among youth with an autism spectrum disorder. *Pediatrics*, *129*(6), 1042-1049.

Smedley, T. M., & Higgins, K. (2005). Virtual technology: Bringing the world into the special education classroom. *Intervention in School and Clinic*, *41*(2), 114.

Smith, M. J., Fleming, M. F., Wright, M. A., Losh, M., Humm, L. B., Olsen, D., & Bell, M. D. (2015). Brief report: Vocational outcomes for young adults with autism spectrum disorders at six months after virtual reality job interview training. *Journal of Autism and Developmental Disorders*, 1-6.

Smith, M. J., Ginger, E. J., Wright, K., Wright, M. A., Taylor, J. L., Humm, L. B., Olsen, D.E., Bell, M.D., & Fleming, M. F. (2014). Virtual reality job interview training in adults with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, *44*(10), 2450-2463.

Speas, C. M. (1979). Job-seeking interview skills training: A comparison of four instructional techniques. *Journal of Counseling Psychology*, *26*(5), 405.

Stevens, C. K., & Kristof, A. L. (1995). Making the right impression: A field study of applicant impression management during job interviews. *Journal of Applied Psychology*, *80*(5), 587.

Stokes, T. F., & Baer, D. M. (1977). An implicit technology of generalization. *Journal of Applied Behavior analysis*, *10*(2), 349-367.

Strickland, D. C., Coles, C. D., & Southern, L. B. (2013). JobTIPS: A transition to employment program for individuals with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, *43*(10), 2472-2483.

Strickland, D. C., McAllister, D., Coles, C. D., & Osborne, S. (2007). An evolution of virtual reality training designs for children with autism and fetal alcohol spectrum disorders. *Topics in Language Disorders*, *27*(3), 226.

Surian, L. (1996). Are children with autism deaf to Gricean maxims?. *Cognitive Neuropsychiatry*, *1*(1), 55-72.

Tager-Flusberg, H., Paul, R., & Lord, C. (2005). Language and communication in autism. *Handbook of Autism and Pervasive Developmental Disorders*, *1*, 335-364.

Tay, C., Ang, S., & Van Dyne, L. (2006). Personality, biographical characteristics, and job interview success: A longitudinal study of the mediating effects of interviewing self-efficacy and the moderating effects of internal locus of causality. *Journal of Applied Psychology*, *91*(2), 446.

Taylor, J. L., & Seltzer, M. M. (2010). Changes in the autism behavioral phenotype during the transition to adulthood. *Journal of Autism and Developmental disorders*, *40*(12), 1431-1446.

Taylor, J. L., & Seltzer, M. M. (2011). Employment and post-secondary educational activities for young adults with autism spectrum disorders during the transition to adulthood. *Journal of Autism and Developmental Disorders*, *41*(5), 566-574.

Thompson, T. (2013). Autism research and services for young children: History, progress and challenges. *Journal of Applied Research in Intellectual Disabilities*, *26*(2), 81-107.

Tross, S. A., & Maurer, T. J. (2008). The effect of coaching interviewees on subsequent interview performance in structured experience-based interviews. *Journal of Occupational and Organizational Psychology*, *81*(4), 589-605.

Tsai, W. C., Chen, C. C., & Chiu, S. F. (2005). Exploring boundaries of the effects of applicant impression management tactics in job interviews. *Journal of Management*, *31*(1), 108-125.

Wagner, M., Newman, L., Cameto, R., Garza, N., & Levine, P. (2005). After high school: A first look at the postschool experiences of youth with disabilities. A report from the National Longitudinal Transition Study-2 (NLTS2). *Online Submission*.

Wainer, A. L., & Ingersoll, B. R. (2011). The use of innovative computer technology for teaching social communication to individuals with autism spectrum disorders. *Research in Autism Spectrum Disorders*, *5*(1), 96-107.

Wanberg, C. R., Kanfer, R., & Rotundo, M. (1999). Unemployed individuals: Motives, job-search competencies, and job-search constraints as predictors of job seeking and reemployment. *Journal of Applied Psychology*, *84*(6), 897.

Wehman, P., & Kregel, J. (2004). *Functional curriculum for elementary, middle, and secondary age students with special needs*. PRO-ED, Inc. 8700 Shoal Creek Blvd, Austin, TX 78757.

Wehman, P., Schall, C., Carr, S., Targett, P., West, M., & Cifu, G. (2014). Transition from school to adulthood for youth with autism spectrum disorder: What we know and what we need to know. *Journal of Disability Policy Studies*, *44*, 487-500.

Weng, P. L., Maeda, Y., & Bouck, E. C. (2014). Effectiveness of cognitive skills-based computer-assisted instruction for students with disabilities: A synthesis. *Remedial and Special Education*, *35*(3), 167-180.

Wilczynski, S. M., Trammell, B., & Clarke, L. S. (2013). Improving employment outcomes among adolescents and adults on the autism spectrum. *Psychology in the Schools*, *50*(9), 876-887.

Williams, K. (2012). *Does practice make perfect? Effects of practice and coaching on interview performance* (Doctoral dissertation, Clemson University).

Wolff, S. (2004). The history of autism. *European Child & Adolescent Psychiatry*, *13*(4), 201-208.

Wong, C., Odom, S. L., Hume, K., Cox, A. W., Fettig, A., Kucharczyk, S., & Schultz, T. R. (2014). Evidence-based practices for children, youth, and young adults with autism spectrum disorder. *Chapel Hill, NC: University of North Carolina, Frank Porter Graham Child Development Institute, Autism Evidence Based Practice Review Group*.

Wood, R., & Bandura, A. (1989). Impact of conceptions of ability on self-regulatory mechanisms and complex decision making. *Journal of Personality and Social Psychology*, *56*(3), 407.

Wright, C., Hogard, E., Ellis, R., Smith, D., & Kelly, C. (2008). Effect of PETTLEP imagery training on performance of nursing skills: Pilot study. *Journal of Advanced Nursing*, *63*(3), 259-265.

Zilbovicius, M., Meresse, I., Chabane, N., Brunelle, F., Samson, Y., & Boddaert, N. (2006). Autism, the superior temporal sulcus and social perception. *Trends in Neurosciences*, *29*(7), 359-366.

Appendix A

Definitions

Central Coherence: A cognitive theory describing the propensity to process information more globally; using details to create a larger narrative of information (Morgan et al., 2003).

Cognitive Load: Cognitive load is defined as the amount of cognitive resources required to process information during an instructional period (Paas et al., 2004).

Computer Aided Instruction (CAI): Computer aided instruction is the use of electronic screen media that can have video modeling embedded and includes interactive components with the electronic screen media.

Desktop Virtual Reality: Electronic screen media in the form of a computer screen is used to view the virtual reality environment created by data sets. Simulated movement through the environment is typically done with external controls such as a keyboard, mouse, and/or joystick (Parsons et al., 2004).

Electronic Screen Media: Electronic Screen Media (ESM) is an umbrella term encompassing a wide range of technology centric evidence based practices (EBP; Mine et al., 2009).

Element Interactivity: Interdependence of pieces of information being taught (Cooper, 1998).

Eye Contact: Both communication partners' eyes orientated towards each other's eyes (Klienke, 1986).

Eye Graze: Orientation of eyes towards another person's eyes (Klienke, 1986). **"…**defined geometrically as the relative rotation of eyes from head, torso or the viewer…" (Senju & Johnson, 2009). Generally, eye gaze is defined as the physical act of moving one's eyes in the direction of the perceiver, typically a communication partner (Senju & Johnson, 2009).

Face-Gaze: Orientation of eye towards another person's face (Klienke, 1986).

Fast-Track Modulator Model: Describes hardwired processing that increase face preferences and activates social structures of the brain subconsciously (Senju & Johnson, 2009).

Fully-immersive systems: "(A) …realistic 3D scenes … encountered in 'real time, … (meaning) that as a user navigates through a scene, the movement on the screen is like walking through a real environment at a normal pace. …the user has a 'through-the-eyes' view of the scene, rather than a bird's-eye-view. Bird's-eye-view means that the user cannot see a representation of themselves on the screen, nor any part of themselves during task completion, such as hands and arms." (Parsons et al., 2004).

Gaze: body and eyes orientated towards another person (Klienke, 1986).

Hyperarousal Model: Description of differences in gaze due to visual stimulation from social interactions to overwhelm an individual to the point of avoidance of the social situation (i.e., gaze avoidance; Senju & Johnson, 2009).

Hypo-Arousal Model: Describes the lack of stimulation (i.e., positive reward) of social situations, translating into lack of interest in social situations (Senju & Johnson, 2009).

Intention Detector Model: Describes modules–joint attention and eye direction detector–needed to successfully acquire and utilize ToM (Baron-Cohen & Ring, 1994).

Interview Coaching Program: The combination of response shaping approach (i.e., practice and feedback), modeling, lecture, and classroom training is generally considered an interview coaching program (Williams, 2012).

Interviewee Performance Ratings: Score based on interviewers' impression of how an interviewee performed during an interview. Interviewee performance rating most reliable is the behaviorally anchored rating scales (Macan, 2009).

Interview Self-Efficacy (ISE): ISE is the self-reported ability to interview successfully (Tay et al., 2006).

Impression Management: A method people use to control the impression others form about them during a social interaction (Huffcutt et al., 2011; Leary & Kowalski, 1990; Lievens & Peeters, 2008; Schlenker, 1980).

Lecture And Classroom Instruction: Interview training approach that consists of lectures and discussions on the topic of interviewing (e.g., appropriate appearance, interview etiquette, preparation before interview, answering questions, attitudes, nervousness, verbal expression, and nonverbal behavior; Campion & Campion, 1987).

Modeling Interview Training Approach: The use of any strategy used to provide an example of an interview likely to be scored high by an interviewer (e.g., video or live model; Williams, 2012).

Mutual Gaze: Both communication partners' eyes orientated towards each other's face (Klienke, 1986).

Nonverbal Behavior: Communication without language that expresses a (n) affect, request, or indication (Mundy et al., 1986).

Other-Focused VIM: The use of verbal communication to move the center of the conversation to the interviewer and/or interviewer's topic, usually creating the impression of aligned beliefs, feelings, and/or opinions with the interviewer (Ellis et al., 2002; Kacmar et al, 1992; Kristof-Brown et al, 2002).

Pedantic Speech: "Speakers typically offer more factual, accurate, specific or technical information or more detail than the conversation demands. The language also has a stereotypic quality, sounding imitative or rehearsed. There may also be unnecessary repetition or self-correction." (de Villiers et al., 2007).

Perseveration: "Excessive persistence on a chosen topic without turning attention to new topics or situations" (de Villiers et al., 2007).

Practice Effects Interview Training Approach: Intervention consisting of rehearsing an interview without any specific instructions or feedback (Williams, 2012).

Response Shaping Approaches: Interview training approach that combines practices effects with feedback (Williams, 2012). Interviewees practice interview and receive feedback on performance either from an expert, self, and/or peer (Williams, 2012).

Self-Efficacy: Self-efficacy is traditionally defined as the self-perceived ability to perform a task and is measured using self-report instruments (Wood & Bandura, 1989).

Self-Focused VIM: An individual verbally attempts to promote or advocate for him or herself (Lievens & Peeters, 2008).

Semantic Drift: "Disengagement from verbal context, … attention to outside environment (beyond) major semantic focus (of conversation), … topic switching" (de Villiers et al., 2007).

Social–Communicative Skills: Use of skill for interpersonal interactions and the use of functional communication (Carter et al, 2005, p. 312; Sansosti & Powell-Smith, 2008).

Terseness: "minimal responsiveness. Speakers initiate rarely and respond with concise, short answers." (de Villiers et al., 2007).

Theory of Mind (Tom): A cognitive theory describing the ability of a person to use perceived cue(s) to develop a hypothesis of others' internal states (e.g., thoughts, feelings, and beliefs; Baron-Cohen et al., 2000).

Topic switching: "tangential language and shifting topic abruptly. It is often characterized by making 'out of the blue' comments" (de Villiers et al., 2007).

Verbal Impression Management (VIM): VIM during an interview typically falls under two categories, self-promotion or other-focused (Kristof-Brown et al., 2002; Ellis et al., 2002).

Video Modeling (VM): Video modeling (VM) provides a video of a given task that can be rewound, fast-forwarded, paused, or replayed allowing for multiple views and learning opportunities.

Virtual Reality (VR): A visual environment created by computer data sets resembling real world visual stimuli. Virtual reality and virtual environment are terms typically used synonymously. Fine distinction between virtual reality and virtual environment describes the latter as the visual environment created by the data set. The former may be used to describe the full experience of interacting with the visual environment. The method of viewing and interacting with virtual reality depends on the sophistication of the technology used. (Blade & Padgett, 2002; Strickland, McAllister, Coles, & Osborne, 2007).

Weak Central Coherence: A cognitive process usually associated with ASD, indicates a more local processing of information leading to a detail-focused orientation and limited construction of a more global context (Happé & Frith, 2006).

Appendix B

Demographics

Please complete this form.

Judge name: _____

Date of form completion: _____

Code number on video: _____

Age: _____

Gender: _____

Are you employed:_____ Name of Employer:_____

Are you currently seeking employment: _____

What steps have you taken to find a job: _____

Appendix C

Impression Management Rating Scale: Verbal and Non-verbal
Please complete this form for each interview.

Judge name: _____
Date of form completion: _____
Code number on video: _____

Please view video to completion. Re- watch video pausing after an answer has been given to each question, check yes or no if each item applied to each answer given. Use response to score until interviewer responds to statement by interviewee or asks a new question. Continue scoring if interviewee interrupts interviewer before interviewer responds or asks a question. Aim for accuracy, but do not dwell on any given item. (de Villiers, Fine, Ginsberg, Vaccarella, & Szatmari 2007).

Question 1	Yes	No
Applicant changed or abruptly shifted the topic from question asked by interviewer or made an "out of the blue" comment	❍	❍
Applicant provided too little detail- not a complete sentence or yes or no response	❍	❍
Applicant provided more detail than necessary.	❍	❍
Applicant used key term(s) from question in her/his answer.	❍	❍
Applicant's response was delayed at least 5 seconds.	❍	❍
Applicant responded to the question.	❍	❍

Question 2	Yes	No
Applicant changed or abruptly shifted the topic from question asked by interviewer or made an "out of the blue" comment	❍	❍
Applicant provided too little detail- not a complete sentence or yes or no response	❍	❍
Applicant provided more detail than necessary.	❍	❍
Applicant used key term(s) from question in her/his answer.	❍	❍
Applicant's response was delayed at least 5 seconds.	❍	❍
Applicant responded to the question.	❍	❍

	Off topic	Too little detail	Too much Detail	Used Key Terms	Delayed Response	Responded to question	Answered Question
Page 1							

Answered question is all the Nos from 1, 2, 3, and 5 and all the YESES for 4 and 6 per question for a score of a Yes	Question1	Question2

Question 3	Yes	No
Applicant changed or abruptly shifted the topic from question asked by interviewer or made an "out of the blue" comment	❍	❍
Applicant provided too little detail- not a complete sentence or yes or no response	❍	❍
Applicant provided more detail than necessary.	❍	❍
Applicant used key term(s) from question in her/his answer.	❍	❍
Applicant's response was delayed at least 5 seconds.	❍	❍
Applicant responded to the question.	❍	❍

Question 4	Yes	No
Applicant changed or abruptly shifted the topic from question asked by interviewer or made an "out of the blue" comment	❍	❍
Applicant provided too little detail- not a complete sentence or yes or no response	❍	❍
Applicant provided more detail than necessary.	❍	❍
Applicant used key term(s) from question in her/his answer.	❍	❍
Applicant's response was delayed at least 5 seconds.	❍	❍
Applicant responded to the question.	❍	❍

Question 5	Yes	No
Applicant changed or abruptly shifted the topic from question asked by interviewer or made an "out of the blue" comment	❍	❍
Applicant provided to little detail- not a complete sentence or yes or no response	❍	❍
Applicant provided more detail than necessary.	❍	❍
Applicant used key term(s) from question in her/his answer.	❍	❍
Applicant's response was delayed at least 5 seconds.	❍	❍
Applicant responded to the question.	❍	❍

Answered question is all the Nos from 1, 2, 3, and 5 and all the YESES for 4 and 6 per question for a score of a Yes	Question3	Question4	Question5

	Off topic	Too little detail	Too much Detail	Used Key Terms	Delayed Response	Responded to question	Answered Question
Page 1							
Page 2							
Total							

Question 6	Yes	No
Applicant changed or abruptly shifted the topic from question asked by interviewer or made an "out of the blue" comment	❍	❍
Applicant provided too little detail- not a complete sentence or yes or no response	❍	❍
Applicant provided more detail than necessary.	❍	❍
Applicant used key term(s) from question in her/his answer.	❍	❍
Applicant's response was delayed at least 5 seconds.	❍	❍
Applicant responded to the question.	❍	❍

Question 7	Yes	No
Applicant changed or abruptly shifted the topic from question asked by interviewer or made an "out of the blue" comment	❍	❍
Applicant provided too little detail- not a complete sentence or yes or no response	❍	❍
Applicant provided more detail than necessary.	❍	❍
Applicant used key term(s) from question in her/his answer.	❍	❍
Applicant's response was delayed at least 5 seconds.	❍	❍
Applicant responded to the question.	❍	❍

Question 8	Yes	No
Applicant changed or abruptly shifted the topic from question asked by interviewer or made an "out of the blue" comment	❍	❍
Applicant provided too little detail- not a complete sentence or yes or no response	❍	❍
Applicant provided more detail than necessary.	❍	❍
Applicant used key term(s) from question in her/his answer.	❍	❍
Applicant's response was delayed at least 5 seconds.	❍	❍
Applicant responded to the question.	❍	❍

Answered question is all the Nos from 1, 2, 3, and 5 and all the YESES for 4 and 6 per question for a score of a Yes	Q6	Q7	Q8

	Off topic	Too little detail	Too much Detail	Used Key Terms	Delayed Response	Responded to question	Answered Question
Page 1 & 2							
Page 3							
Total							

Question 9	Yes	No
Applicant changed or abruptly shifted the topic from question asked by interviewer or made an "out of the blue" comment	❍	❍
Applicant provided too little detail- not a complete sentence or yes or no response	❍	❍
Applicant provided more detail than necessary.	❍	❍
Applicant used key term(s) from question in her/his answer.	❍	❍
Applicant's response was delayed at least 5 seconds.	❍	❍
Applicant responded to the question.	❍	❍

Question 10	Yes	No
Applicant changed or abruptly shifted the topic from question asked by interviewer or made an "out of the blue" comment	❍	❍
Applicant provided too little detail- not a complete sentence or yes or no response	❍	❍
Applicant provided more detail than necessary.	❍	❍
Applicant used key term(s) from question in her/his answer.	❍	❍
Applicant's response was delayed at least 5 seconds.	❍	❍
Applicant responded to the question.	❍	❍

	Off topic	Too little detail	Too much Detail	Used Key Terms	Delayed Response	Responded to question	Answered Question
Page 1,2,& 3							
Page 4							
Total							

Answered question is all the Nos from 1, 2, 3, and 5 and all the YESES for 4 and 6 per question for a score of a Yes	Question 9	Question 10

Double Check

	1. Off topic	2. Too little detail	3. Too much Detail	4. Used Key Terms	5. Delayed Response	6. Responded to question	Answered Question
Page 1							
Page 2							
Page 3							
Page 4							
Total							
Percentage of yeses							

Please view video to completion. Record occurrences of gaze with a check mark for every 5 second interval.

Question 1	5 second intervals			
Applicant's body, head, and face oriented toward interviewer while interviewer spoke.	Time interval			
	Occurrence			

Comment:

Question 2	5 second intervals			
Applicant's body, head, and face oriented toward interviewer while interviewer spoke.	Time interval			
	Occurrence			

Comment:

Question 3	5 second intervals			
Applicant's body, head, and face oriented toward interviewer while interviewer spoke.	Time interval			
	Occurrence			

Comment:

Question 4	5 second intervals			
Applicant's body, head, and face oriented toward interviewer while interviewer spoke.	Time interval			
	Occurrence			

Comment:

Question 5	5 second intervals			
Applicant's body, head, and face oriented toward interviewer while interviewer spoke.	Time interval			
	Occurrence			

Comment:

Question 6	5 second intervals			
Applicant's body, head, and face oriented toward interviewer while interviewer spoke.	Time interval			
	Occurrence			

Comment:

Question 7	5 second intervals			
Applicant's body, head, and face oriented toward interviewer while interviewer spoke.	Time interval			
	Occurrence			

Comment:

Question 8	5 second intervals			
Applicant's body, head, and face oriented toward interviewer while interviewer spoke.	Time interval			
	Occurrence			

Comment:

Question 9	5 second intervals			
Applicant's body, head, and face oriented toward interviewer while interviewer spoke.	Time interval			
	Occurrence			

Comment:

Question 10	5 second intervals			
Applicant's body, head, and face oriented toward interviewer while interviewer spoke.	Time interval			
	Occurrence			

Comment:

Summary

Number of non-occurrences		Percentage of non-occurrences	%
Number of occurrences		Percentage of occurrences	%

Appendix D

Interview Self-Efficacy Scale

Please complete this form.

Name: _____

Date of form completion: _____

Please indicate the response that BEST describes yourself. (1 = not at all, 4 = to some extent, 7 = to a very great extent)

	1 = not at all	2	3	4 = to some extent	5	6	7 = to a very great extent
How confident are you that you can successfully prepare for an interview?	❍	❍	❍	❍	❍	❍	❍
How confident are you that you can successfully persuade potential employers during the job interview to consider you for a job?	❍	❍	❍	❍	❍	❍	❍
How confident are you that you can successfully market your skills and abilities during the job interview?	❍	❍	❍	❍	❍	❍	❍
How confident are you that you can successfully get your points across in the job interview?	❍	❍	❍	❍	❍	❍	❍

Appendix E

Participant Social Validity Rating Form

Please complete this form.

Name: _____
Date of form completion: _____

Please indicate the response that BEST describes yourself. (Strongly Disagree to Strongly Agree).

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I enjoyed my interview coaching.	❍	❍	❍	❍	❍
Participating in this program was fun.	❍	❍	❍	❍	❍
I was nervous during my interview coaching.	❍	❍	❍	❍	❍
Interview coaching will help me feel more at ease during future interviews.	❍	❍	❍	❍	❍
Interview coaching will help me perform well in future interviews.	❍	❍	❍	❍	❍
Interview coaching will improve my effectiveness in upcoming interviews.	❍	❍	❍	❍	❍
Interview coaching has help me prepare for future interviews.	❍	❍	❍	❍	❍

Appendix F

Procedural-Fidelity for Non-Coaching Mock Interview

Please complete this form for each interview.

Judge name: _____
Date of form completion: _____
Code number on video: _____

Mock interview 1	Yes	No
No verbal feedback on interviewee responses during each interview	❍	❍
Interviewer verbalizations limited to interview questions only	❍	❍

Mock interview 2	Yes	No
No verbal feedback on interviewee responses during each interview	❍	❍
Interviewer verbalizations limited to interview questions only	❍	❍

Mock interview 3	Yes	No
No verbal feedback on interviewee responses during each interview	❍	❍
Interviewer verbalizations limited to interview questions only	❍	❍

Mock interview 4	Yes	No
No verbal feedback on interviewee responses during each interview	❍	❍
Interviewer verbalizations limited to interview questions only	❍	❍

Mock interview 5	Yes	No
No verbal feedback on interviewee responses during each interview	❍	❍
Interviewer verbalizations limited to interview questions only	❍	❍

Mock interview 6	Yes	No
No verbal feedback on interviewee responses during each interview	❍	❍
Interviewer verbalizations limited to interview questions only	❍	❍

Mock interview 7	Yes	No
No verbal feedback on interviewee responses during each interview	❍	❍
Interviewer verbalizations limited to interview questions only	❍	❍

Mock interview 8	Yes	No
No verbal feedback on interviewee responses during each interview	❍	❍
Interviewer verbalizations limited to interview questions only	❍	❍

Mock interview 9	Yes	No
No verbal feedback on interviewee responses during each interview	❍	❍
Interviewer verbalizations limited to interview questions only	❍	❍

Mock interview 10	Yes	No
No verbal feedback on interviewee responses during each interview	❍	❍
Interviewer verbalizations limited to interview questions only	❍	❍

Mock interview 11	Yes	No
No verbal feedback on interviewee responses during each interview	❍	❍
Interviewer verbalizations limited to interview questions only	❍	❍

Mock interview 12	Yes	No
No verbal feedback on interviewee responses during each interview	❍	❍
Interviewer verbalizations limited to interview questions only	❍	❍

Mock interview 13	Yes	No
No verbal feedback on interviewee responses during each interview	❍	❍
Interviewer verbalizations limited to interview questions only	❍	❍

Mock interview 14	Yes	No
No verbal feedback on interviewee responses during each interview	❍	❍
Interviewer verbalizations limited to interview questions only	❍	❍

Mock interview 15	Yes	No
No verbal feedback on interviewee responses during each interview	❍	❍
Interviewer verbalizations limited to interview questions only	❍	❍

Mock interview 16	Yes	No
No verbal feedback on interviewee responses during each interview	❍	❍
Interviewer verbalizations limited to interview questions only	❍	❍

Mock interview 17	Yes	No
No verbal feedback on interviewee responses during each interview	❍	❍
Interviewer verbalizations limited to interview questions only	❍	❍

Mock interview 18	Yes	No
No verbal feedback on interviewee responses during each interview	❍	❍
Interviewer verbalizations limited to interview questions only	❍	❍

Mock interview 19	Yes	No
No verbal feedback on interviewee responses during each interview	❍	❍
Interviewer verbalizations limited to interview questions only	❍	❍

Mock interview 20	Yes	No
No verbal feedback on interviewee responses during each interview	❍	❍
Interviewer verbalizations limited to interview questions only	❍	❍

YESES	No verbal feedback	Only interview question
Interview 1		
Interview 2		
Interview 3		
Interview 4		
Interview 5		
Interview 6		
Interview 7		
Interview 8		
Interview 9		
Interview 10		
Interview 11		
Interview 12		
Interview 13		
Interview 14		
Interview 15		
Interview 16		
Interview 17		
Interview 18		
Interview 19		
Interview 20		
Total		

Procedural-Fidelity for Live Interview Coaching
Please complete this form for each interview.

Judge name: _____
Date of form completion: _____
Code number on video: _____

LIC interview 1	Yes	No
Five interview prompts were reviewed prior to beginning interview	❍	❍
7-10 interview questions were asked	❍	❍
Feedback with reinforcement provided post interview in conjunction with visual review of interview	❍	❍
Role play practice of areas needing additional support.	❍	❍

LIC interview 2	Yes	No
Five interview prompts were reviewed prior to beginning interview	❍	❍
7-10 interview questions were asked	❍	❍
Feedback with reinforcement provided post interview in conjunction with visual review of interview	❍	❍
Role play practice of areas needing additional support.	❍	❍

LIC interview 3	Yes	No
Five interview prompts were reviewed prior to beginning interview	❍	❍
7-10 interview questions were asked	❍	❍
Feedback with reinforcement provided post interview in conjunction with visual review of interview	❍	❍
Role play practice of areas needing additional support.	❍	❍

LIC interview 4	Yes	No
Five interview prompts were reviewed prior to beginning interview	❍	❍
7-10 interview questions were asked	❍	❍
Feedback with reinforcement provided post interview in conjunction with visual review of interview	❍	❍
Role play practice of areas needing additional support.	❍	❍

LIC interview 5	Yes	No
Five interview prompts were reviewed prior to beginning interview	❍	❍
7-10 interview questions were asked	❍	❍
Feedback with reinforcement provided post interview in conjunction with visual review of interview	❍	❍
Role play practice of areas needing additional support.	❍	❍

YESES	Prompts	Questions	feedback	Role play
Interview 1				
Interview 2				
Interview 3				
Interview 4				
Interview 5				
Total				