

Reducing Interfering Behaviors for Adults with Autism Spectrum Disorders

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Abstract

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Common employment barriers for adults with Autism Spectrum Disorders (ASD) have been well documented in past and current research. The social-communicative deficits and rigidity of behaviors associated with ASD are often cited as reasons for not being hired, as well as, explanations for failures once in the job market. Effective behavioral practices, however, have demonstrated positive effects for addressing social behaviors and flexibility in individuals with ASD across the lifespan. Discrete trial training (DTT) and video-feedback are instructional strategies with large evidence-bases demonstrating their effectiveness among learners with ASD. The purpose of this study is to demonstrate the importance of isolating nonverbal behaviors associated with these identified barriers and implementing effective behavioral practices to help reduce them. By using simple ABA strategies, DTT and video-feedback, with participants of a supported employment program, we aim to demonstrate the importance of the generalizability of

these strategies to a different population. In addition, several important social validity measures regarding these behaviors will be addressed.

REDUCING INTERFERING BEHAVIORS FOR ADULTS WITH ASD

Reducing Interfering Behaviors for Adults with Autism Spectrum Disorders

Autism spectrum disorder (ASD) is a developmental disability that can cause significant social, communication and behavioral challenges (CDC, 2014). The prevalence of people with ASD has been growing, with 1 in 59 children diagnosed annually (CDC, 2018). Due to some of the unique behavioral and social challenges that many individuals with ASD face, post-secondary and employment outcomes are remarkably low for this population (Fairweather & Shaver, 2014). The Second National Longitudinal Transition Survey (NLTS2), which followed approximately 4,810 participants with disabilities up to eight years out of school, found that adults with ASD were less likely to pursue postsecondary education than peers with learning disabilities, language, hearing, visual, orthopedic, or other health impairments (Sanford, et al., 2011). Since students that do attend post-secondary education typically have more employment options and improved earnings; and improved self-confidence, self-esteem, and self-determination, the lack of participation in these activities can have profound, lifelong, negative effects on the lives of people with ASD (Hart, Grigal, & Weir, 2010).

In a separate review of NLTS2 data, Shattuck (2012) found that more than 50% of students with ASD had not participated in educational programming or been employed in two years post exiting high school. For students reviewed six years after high school, only 55.1% of had been employed at some point (Shattuck, et al., 2012). The social, communication, and behavioral deficits associated with ASD are often cited as reasons for failure in the job market. In three of the earliest studies to follow up with exiting high school students with ASD, Rutter et al. (1967), Kanner (1973), and Lotter (1974) found that of their participants, only 4-11% had success in finding employment. In addition, while examining 830 cases of secondary school graduates who had an ASD diagnosis, Chiang et al., (2013) found that those with poor social

skills, as well as those with an intellectual disability, were significantly less likely to be employed compared to peers with ASD that had higher social skills or did not have an intellectual disability. When appropriate social skills are addressed, the odds for young adults to participate in employment are likely to be increased (Hendricks, 2010).

Historically, Applied Behavior Analysis (ABA) has helped in addressing important behaviors for adults with ASD. Before the deinstitutionalization of individuals with disabilities, research showed that ABA provided positive outcomes to adolescents and adults with disabilities in school and institutional settings. Zimmerman, et. al., (1969) demonstrated the use of token economies to increase productivity with adults with disabilities in a sheltered-workshop. Brown and Pearce (1970) showed how students who had been labeled “emotionally disturbed” increased their rates of filling envelopes in a school setting with the use of teacher praise and feedback. Practitioners explored the positive effects of response cost to reduce behaviors with adults with disabilities as well (Weiner, 1962; Weiner, 1963; Kazdin, 1972). In addition, Johnson, Katz, and Gelfand (1972) demonstrated how behavioral practices were implemented by undergraduates in psychiatric wards with adults with schizophrenia with positive results. Some of these examples of ABA used to improve skills for adults with disabilities helped demonstrate that skill-training approaches can lead to greater quality of life and independence with individuals impacted negatively by their disability.

All of these examples of implementation of ABA with institutionalized populations occurred prior to the Rehabilitation Act of 1973 which addresses the issues of discrimination against individuals with disabilities in the areas of education, housing, and employment. Following the implementation of the Rehab Act, more individuals with disabilities were eligible for employment. Consequently, supported employment (SE), a service for adults with disabilities to find and maintain employment was created as a result of provisions of the Rehabilitation Act

and was introduced in the 1980's. The Developmental Disability Act of 1984 further defined the purpose of supported employment as:

“paid employment for individuals with developmental disabilities for whom competitive employment at or above the minimum wage is unlikely and who, because of their disabilities, need ongoing support to perform in a work setting, and is conducted in a variety of work settings, particularly work sites in which persons without disabilities are employed, and is supported by any activity needed to sustain paid work by persons with disabilities, including supervision, training and transportation” (Developmental Disability Act of 1984).

According to guidelines around SE, employees with disabilities would be paid at or above minimum wage and receive ongoing support by a job coach or other support staff due to their disability (Unger, 2015). This was a shift from the previous model where the majority of “working” individuals with disabilities held positions in sheltered workshops or volunteer jobs, and a large percentage of individuals with disabilities were considered unemployable (Wehman, et al., 1997). Supported employment provides the level of support a person with disabilities may need to help achieve individual career goals.

With more individuals participating in supported employment, the use of ABA practices being implemented in competitive employment settings increased. Many articles were published highlighting the use of ABA-based interventions with adults with disabilities in integrated work settings. Rusch, Connis and Sowers (1978) improved on-task behavior for employees with disabilities in a restaurant setting using combinations of social reinforcement, tokens, and response cost with their participants. Using a multiple-baseline design, Mozingo, Ackley, and Bailey (1990) demonstrated how using skills-training and prompting could improve job-interview skills for individuals with disabilities. Using behavior specific praise and corrective

feedback, Wacker and Berg (1984) taught 3 participants with severe disabilities a complex photocopying task by modeling a moderately disabled peer. Rusch and Menchetti (1981) improved appropriate responses from one employee with a disability among his non-disabled co-workers to create better team-work in a competitive work setting. Also, Martella, Agran, and Marchand-Martella, (1992) taught problem-solving skills to prevent work-related injuries in a variety of work settings.

Currently, there are not many examples of behavioral research being conducted in work settings with adults with disabilities, however, research has documented the types of barriers that keep individuals with ASD from successful employment outcomes. In an article by Hendricks (2010), "Employment and Adults with Autism Spectrum Disorders: Challenges and Strategies for Success," the author reviewed articles related to employment for individuals with ASD published between 2000 and 2009 to determine common themes. Her findings include a list of behaviors associated with ASD that contributed to barriers for adults with ASD to hold durable, integrated, competitive employment.

Hendricks (2010) describes the three largest barriers to adults with ASD in securing employment as difficulties with communication, lack of social skills, and demonstration of challenging behaviors. Communication challenges included; difficulty understanding directions, inability to "read between the lines" or read facial expressions, difficulty understanding tone of voice, asking too many questions, and communicating in an inappropriate manner were seen as direct barriers for some (Hulburtt & Chalmers, 2002, Hulburtt and Chalmers, 2004). Social deficits such as inappropriate hygiene and grooming skills, difficulty following social rules, inability to understand affect, and trouble working alone were also documented (Koning & Evans, 2001, Tantam, 1991). Problem solving and organization (Barnhill, 2007), acclimating to new job routines and managing changes in the work setting (Keel, Mesibov, & Woods, 1997),

and challenges executing tasks due to issues with attention, motor planning, response shifting and working memory (Hume & Odom, 2007, Marks, et. al., 2000, Mueller, et. al, 2003, Patterson & Rafferty, 2001) also were shown to demonstrate barriers to successful employment outcomes.

Many of these employment challenges are associated with skill deficits that researchers in the communication discourse community label as nonverbal communication. Nonverbal communication (NVC) is defined as “those behaviors other than words themselves that form a socially shared coding system” (Burgoon, Guerrero & Manusov, 1994, p. 240). These NVC behaviors make-up close to 90% of effective conversation. For individuals with ASD, it is often deficits within these nonverbal behaviors that lead to challenges when trying to communicate effectively. Burgoon, Guerrero, and Manusov (1994) propose that nonverbal communication can be described by eight distinct categories or codes. They include; kinesics, vocalics, physical appearance, proxemics, haptics, chronemics, environment and artifacts, and olfactics (p. 241). These categories are defined in Table 1 below.

Table 1		
<i>Nonverbal Communication Codes</i>		
Code	Definition	Examples
Kinesics	display and interpretation of body movements	posture, gait, hand movements, eye gaze
Vocalics:	all features of the voice other than the words themselves	paralanguage and prosody, loudness, pitch, tempo, intonation, patterns, and pauses
Physical appearance:	any aspect of a person’s appearance that can be used as messages	aesthetics, clothing, cleanliness
Proxemics:	communicative process of distance. This includes both arrangements of the environment that may influence behavior, as well as orientation of person-to-person.	distance from speaker to listener, “close talking”, spatial awareness
Haptics:	use of touch as communication, and the different signals that it may give off	gestures, high fives, fist bumps, pat on back

Chronemics:	use of time as communication	pacing of communication, promptness, duration of event
Environment and Artifacts:	arrangement of an environment that can tell specific messages about an individual	cleanliness, messiness, compact spaces, lofty spaces
Olfactics:	interpretation of scents and odors as communication	body odor, cologne, food odors

Each code represents a dimension of behavior that serve an explicit function within nonverbal behavior. For the purpose of this study, only the following codes will be included as target behaviors: kinesics, vocalics, proxemics, and chronemics. These codes were selected as they tend to include the majority of behaviors cited as barriers for adults with ASD.

By understanding the subtleties associated with each of these different categories of nonverbal behavior, we may be able to better address “social skills” in a more precise, objective, and effective way. Combinations of the behaviors above are often taught under the broad category of social skills for individuals with ASD. However, rarely is the emphasis on whether the skills being taught are explicitly verbal or nonverbal, and commonly include a complexity of many behaviors within one goal. Social skills training research rarely addresses the exact dimensions of strictly nonverbal behaviors associated with the targeted social skill. By including research on these behaviors from nonverbal communication research, we are able to develop a more in-depth understanding and analysis of nonverbal behaviors, and their effects on overall successful communication.

However, adults with ASD that demonstrate interfering social behaviors, specifically nonverbal behaviors, are often not able to demonstrate their ability to be a good employee because the interview process required to gain employment is inherently difficult. Despite supported employment helping individuals in seeking and gaining employment, the interview process is often an area that is modified for adults with ASD, due to the specific social challenges one may have. For some individuals with ASD, a modified interview process where

the focus on a working-interview to see the capabilities of completing tasks is assessed is appropriate. For many others who are considered “high-functioning autism,” social and communicative skills are equally as important to assess in order to be hired. It is for this group of individuals that the interview process is very important, but also incredibly difficult. In the past, literature has demonstrated the importance of interview training, but it has rarely included interview training specifically for adults with ASD and the unique challenges that may be present. One article by Smith, et al., (2014) used visual reality to complete job interview training for adults with ASD, however the goals addressed improving communication skills in the interview and failed to include the nonverbal challenges that a person with ASD may face, or the importance of them in the outcome of the interview. One aspect of this study that was successful was the use of immediate feedback as a training tool for the participant, which is an approach this study includes.

Video feedback is an evidence-based instructional strategy within ABA that allows for a participant and the researcher or coach to provide real-time feedback while reviewing video clips of the behavior of interest. Theimann and Goldstein (2001) used video feedback to improve behaviors, and to teach students to identify their own appropriate behaviors when reviewing videos of their own play. In addition, past research of video feedback has shown to be an effective approach to modifying behaviors of teachers and paraprofessionals. Through video-feedback, teachers and coaches have had success in teaching teacher mentees or paraprofessionals how to implement targeted teaching behaviors in their classrooms (Dawson, Dawson, & Fourness, 1975; Robinson, 2011). This model may be particularly successful with adults with ASD, in that it provides real examples of the nonverbal behaviors as demonstrated by the participant, and an immediate and appropriate opportunity to provide feedback specific to the learner’s behavior.

Another effective, quick, and simple behavior modification procedure is discrete trial training, or DTT. DTT is another evidence-based practice within ABA, that has been used effectively with learners of various ages and abilities. DTT is a one-to-one instructional approach used to teach skills in a planned, controlled, and systematic manner, and is characterized by repeated trials that have a definite beginning and end (Wong, et al., 2014). DTT is especially effective in breaking down complex tasks into discrete teachable skills. Some examples of skills that are commonly taught using DTT are; perspective taking, spontaneous responses, answering wh- questions, color, shape, and letter identification, facial expressions, emotions, and even safety skills. Although DTT is most often thought of as being synonymous with early learners, because the approach is simple, clear, and effective, it may also be a great approach in teaching specific nonverbal skills in adults with ASD in and out of work-settings.

By adopting the framework of Nonverbal Communication and isolating nonverbal behaviors as the main target behavior for intervention, we attempt to demonstrate the importance and impact of pinpointing these skills as the sole target behavior. Furthermore, by applying effective instructional strategies that are not normally used with this population, we aim to demonstrate the meaningful impact these approaches have for the participants and the conversations they hold. The purpose of this study is to demonstrate how a supportive employment program can use behavioral intervention strategies to help high-functioning adults with ASD improve their interviewing skills. In addition, by implementing DTT and video feedback to reduce interfering nonverbal behaviors in adults with ASD seeks to demonstrate meaningful and dramatic changes in these behaviors that may lead to greater outcomes. By using simple, quick, and effective strategies that are not typically used with this population, we aim to further the implications of the power of ABA strategies to address a current challenge for adults with ASD, which may lead to much greater quality of life. By including the comparative

properties of nonverbal communication, we may be able to demonstrate the importance of separating strictly nonverbal behaviors from other social skills that are commonly taught together. In addition, another aim of this study is to determine if improving the behavior that causes the most barriers in social communication for an adult with ASD actually improves other untrained areas. By including a social validity measure that compares overall perception of the individuals' performance in interview settings to unbiased viewers, we may be able to demonstrate changes in areas that have been left unaddressed.

Method

Participants

Four young adults, ages 19-21, participated in this study. All four were male, had a diagnosis of Autism Spectrum Disorder (ASD), and would be considered "high-functioning." None of the four participants qualified for Developmental Disabilities Administration (DDA) services, meaning, they all had an IQ higher than 70; although three of the participants qualified for Department of Vocational Rehabilitation (DVR) services. All four participants had completed at least some college and had limited work experience varying from internships, volunteering, part-time work to no experience at all. None of them had participated in more than 4 work interviews in their life. Participants for this study were recruited through a supported employment program. In order to be eligible to participate, each participant was required to be seeking work or currently working. In addition, participants demonstrated interfering behaviors in two of the four non-verbal codes included in the study that they, a boss, parent(s), and/or caregiver identified as problematic. These included behaviors such as, a disregard for personal space while communicating with a speaker, using too loud of volume when speaking with a partner, etc. In addition, in order to qualify for inclusion in the study, all participants had to have experienced one of the following 1) received negative feedback from an employer or interviewer

regarding a non-verbal behavior 2) received negative feedback from job coach or behavior consultant from the supported employment agency about a nonverbal behavior 3) self-identified an interfering nonverbal behavior they would like addressed.

Participants who self-identified behaviors that were interfering with interviewing were given preference. In a questionnaire shared with participants before enrolling in the study, all of the participants identified at least one area they wished to improve from the following categories: professional appearance, posture and mannerisms, connection with the interviewer (orientation to speaker, friendly demeanor), manner of speaking (clarity, tone, volume), and answers to questions. Each participant selected an area in which the target behavior would have been listed. For example, individuals that wanted to work on their speaking volume selected “Manner of Speaking” as an area to improve. Individuals with deficits regarding communication, but did not include nonverbal behaviors, were not eligible to participate in the study.

Leo was 21 years old at the time of the study and identified as multiracial. Leo had attended some college before the study began. He had been on 4 interviews, and had previously held part-time work, internship, and volunteer positions. Leo’s behavior of interest to address was voice volume. He was aware that his speaking volume was loud and wished to reduce it. Matt was a Caucasian male, who was 23 years old at the time of the study. He had attended some college and had been on 2-3 interviews before participating in the study. Matt had held part-time work, and volunteer positions. Matt’s behavior of interest to address was body posture and hand mannerisms. Simon was a Caucasian male, who was 19 years old at the time of the study. Simon had attended some college before the study began. Simon had been on 3 interviews, and had previously held a part-time job, internship, and volunteer positions before participating in the study. Simon’s behavior to address was also voice volume. Simon was aware that his speaking volume was too loud. Jake was 20 years old at the time of the study. He had attended some

college before the study began. He had not been on any interviews or have any type of paid or unpaid work experience before the study. His behavior was body posture and hand mannerisms.

Participant	Age	Race	Education Level	# Int.	Past Work Experience	Behavior
Leo	21	Multiracial	Some college	4	Volunteer, Internship, Part-time work	Voice volume
Matt	23	Caucasian	Some college	2-3	Volunteer, Part-time work	Posture & Mannerisms
Simon	19	Caucasian	Some college	3	Volunteer, Internship, Part-time work	Voice Volume
Jake	20	Caucasian	Some college	0	None	Posture & Mannerisms

Setting

All components of this study was conducted at a supported employment program office on a University campus. This program provides employment support, in the form of job coaching, job training, and long-term job supports to adults with disabilities in the community. All study activities took place in a small private office. The office, a 10 ft x 12 ft room, with a single desk and one window looking out to a quiet veranda, was used for both training and interview sessions.

Materials

For video recording, two iPads were used by the researcher. Each iPad was placed in front of the participant and angled at two separate positions of the participant. One iPad was positioned to take video of the body of the participant, while the other iPad was positioned to take video of the upper body and face of the individual. In addition, a third iPad was used as a volume monitor using the app “Decibel X.” The Decibel X app shows an in-real time, scale-level

chart with a visual representation of room-volume level in the form of a 2-digit number. While filming interviews, the screen of the third iPad was only visible in the video of the 2nd iPad, focused on the upper body and face of the participant. For the video feedback portion of the training, the participant reviewed their interview on the second iPad with the interventionist using iPhotos. A checklist was used by the interventionist to keep their session on track, along with a small kitchen timer.

Dependent Variables

Target Behavior. For each participant, a primary behavior (treated) and a secondary behavior (untreated) was selected. The target behaviors for Leo and Simon were the same; their primary behavior was voice volume and the secondary behavior was orientation. However, Leo and Simon had slightly different level goals. Using the Decibel X monitor, Leo's goal was to stay below 80, while Simon's goal was to stay below 75. Matt and Jake shared the same target behaviors. The primary behavior was professional hands, and the secondary behavior was orientation. The definitions for all behaviors are found below in Table 3.

Table 3 <i>Definitions of Target Behaviors</i>	
Behavior	Definition
Voice Volume	Vocal speaking volume that could be heard above a certain level as depicted on the Decibel X monitor. Noise at or above set level due to ambient noise, cough, sneeze, yawn, or sigh did not count as behavior.
Professional Hands	Any use of one or more hands to touch one's own face, neck, arms, fingernails, or torso, including rubbing, picking, or gently touching body parts. The behavior included crossing one's arms, as well as grazing one's face while adjusting glasses. Touching one's own hands, fingers, or lap (tops of thighs), did not count towards the behavior.
Orientation	Eye gaze towards the conversation partner in an attempt to make eye contact with the individual for any amount of time.

	Short glances towards the speaker count as behavior, as well as eye contact for the duration of the conversation. Eye contact with the conversation partner did not need to be made in order to count as behavior.
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Video Recorded Sessions Data. Observation data from interviews were collected during ten-minute sessions of the participant speaking with a communicative partner about a professional topic. These sessions were video-recorded and data were collected from the videos. The data collection videos were conducted the same way during all phases of the study. Videos were scored using a 10-second partial interval method.

Pre- and Post-Study Questionnaire. Participants completed a questionnaire before the study that gathered background information about demographics, education, and employment history. Both before and after the study participants completed a questionnaire with seven questions regarding the participants confidence in their interview skills, as well as specific behaviors they feel more comfortable with was assessed. The initial questionnaire was delivered in paper format before the study began (Appendix B). The post-intervention questionnaire was delivered online using SurveyMonkey after completing their last session of the study.

Research Design and Data Analysis

A multiple baseline design across subjects was used to demonstrate the impact of Discrete Trial Training (DTT) and video feedback on the reduction of the target behavior, as well as an untrained interfering behavior. For each participant, percentage of occurrence for interfering nonverbal behaviors was collected and graphed in a multiple baseline design. The change between baseline and intervention conditions was determined using visual analysis. Visual analysis was used to determine any trends, patterns, and changes in data in the intervention condition as compared to the baseline condition. Percentage of non-overlapping data points (PND) was used as a visual analysis tool. PND allows researchers to determine the

amount of change between the two conditions, by determining the amount of data points that fall within the range of values within the first condition, compared to the amount of data points that fall in the same range of values in the second condition, and dividing the number of data points which fall outside the range of the first condition by the total number of data points of the second condition and multiplying it by 100 (Scruggs & Mastropieri, 1998). The higher the PND, the greater the impact the intervention had on the target behavior (Gast & Spriggs, p. 214).

Procedure

The individual components of the procedure for this study were as follows:

- Participant Selection
- Pre-Study Survey
- Treatment; Baseline and Intervention
- Conversation Partner Survey
- Comparison Videos
- Post-Study Survey

Baseline. All baseline sessions were conducted in the office setting with the participant and a randomly selected conversation partner associated with the supported employment program. Conversation partners had experience working with adults with disabilities but had not known the participants at the time of the study. The interviewer chose questions from a list of pre-selected questions. The interviewer was able to choose which questions they wanted to ask, and in which order. In addition, the interviewer was able to ask follow-up questions to the participant based on the questions they asked from the list. The interviewer did not give any feedback to the participant regarding the content of the answer, or any other aspect of the participant's performance during the interview. The conversation pairs (participant and conversation partner) were recorded for a 10-minute conversation in a question-answer format of

professional-related topics. No feedback about their responses or communication effectiveness was given to the participant from the conversation partner. If the participant did not know how to answer a question, they were allowed to skip or pass the question, and were asked a different one instead. The recorded sessions were later scored for the intervals the target behavior was present. The second untrained behavior was also scored in this way.

Intervention. One-hour weekly meeting sessions were conducted between each participant and an interventionist. Each meeting included:

- 5-minute review
- 25 minutes of instruction on the target behavior
- 10-minute data collection session during which a conversation was video recorded with the conversation partner replicating the baseline condition
- 20 minutes of reviewing the video and receiving feedback with the interventionist

5-Minute Review: During the 5-minute review, the interventionist provided 3 positive statements about the participant's performance on the previous session regarding the participant's targeted behavior. The interventionist also offered constructive feedback, if applicable, based on the previous session as well. Following the feedback, the interventionist set and shared the goal with the participant for the current session, as well as a rationale for why it is important to address the behavior. If this was the first intervention session after baseline for the participant, the goals and feedback were set and based on baseline sessions.

Instruction: Instruction for reducing the behavior was conducted using a Discrete Trial Teaching (DTT) approach. The interventionist would first model the appropriate behavior, and the participant would have the opportunity to ask any questions as needed. The participant was then instructed to respond to a question while demonstrating the absence of the target behavior for a 30-second trial. During the 30 seconds, the interventionist could ask follow-up questions to

keep the conversation going while the participant's main focus was to work on the target behavior. The participant's response to the question was not addressed in the training. At the end of the 30-second period, a timer would sound to end the trial and the interventionist would give feedback on the participant's behavior. During the participants' response, the interventionist tracked whether or not the target behavior occurred. If the participant did not exhibit the behavior, the interventionist would provide behavior specific praise to the participant regarding the absence of the behavior. For example, she could say "Leo, great job keeping your voice volume below 80!" If the target behavior did occur, the interventionist would give constructive feedback about the behavior, and they would start the next trial. That might look like, "Matt, you tried to keep your hands busy but you were still rubbing your neck. Let's try again." The participant and interventionist continued interacting this way until 10 trials had been completed. At the end of the 10 trials, if the participant had demonstrated appropriate behavior, i.e., trials where the behavior did not occur during the trials, for 90% or more of the trials they would move on to the next step of the intervention. If the participant scored less than 9 out 10 opportunities of the behavior not occurring, i.e., the behavior occurred in more than one trial, the pair would continue to practice the behavior in sets of 10 trials, until the participant had met the goal, or the 25 minutes had expired.

Data collection: Immediately after the participant and interventionist completed their training phase, the participant would meet with an interviewer (i.e., not the interventionist) following the same protocol as baseline. At the end of the 10-minute period, the interviewer excused themselves from the room, at which time the interventionist would return to meet with the participant. The data from these sessions were used to evaluate the effectiveness of the intervention.

Video Review and Feedback: Immediately following the data collection session, the interventionist would meet with the participant. Using the iPad that had the best view of the participant based on the behavior, the interventionist reviewed the interview with the participant. Any time the targeted behavior would occur during the recorded session, the interventionist would pause the video and discuss the behavior with the participant. If the participant demonstrated an appropriate behavior instead of the target behavior, the interventionist would pause the video and give behavior specific praise to the participant. At the end of the 20-minute period, or when the data collection video would end, the participant was thanked for their time, confirmed their next session date, and was excused for the day.

After session 5, Matt requested to use a fidget during his interview sessions, a strategy he had learned prior to the beginning of the study. He was offered a choice of fidgets his following session, and chose to use the fidget the duration of the study, for sessions 6, 7, and at follow-up on session 12. Because Matt had requested the fidget, Jake was offered to use a fidget on session 9, his first intervention session. Jake requested to use it at the beginning of each following session, sessions 10 and 11.

Follow-up. Each participant was invited to return 3-months after the completion of the study. Following the same protocol as baseline, those participants that chose to participate met with a randomly selected conversation partner and were asked questions on a professional topic. At the end of the 10-minute interview, data regarding the participant's target behavior was scored and graphed.

Interobserver Agreement

Interobserver agreement (IOA) was taken for 30% of all video recorded sessions by a second independent observer. Both the researcher and second observer independently took data on the same video and compared data for the session. IOA was scored using a trial-by-trial basis.

An agreement was scored if both observers scored the occurrence or non-occurrence of behavior for that trial period. Observers scored 87% accuracy over all videos.

Procedural Fidelity

In order to ensure procedural fidelity, the DTT training and video feedback sessions for at least one baseline and one intervention session for each participant was recorded and checked for procedural fidelity.

Social Validity

Social validity was measured in several ways (Table 4); through the participant’s experience, from the viewpoint of the conversation partner, and from a third-party observer.

Table 4	
<i>Description of social validity measures</i>	
Participant Post-Intervention Follow-up	Upon completing the intervention phase of the study, participants answered a brief survey regarding satisfaction of the intervention and referencing any noticeable changes to conversations and experiences since the end of the study.
Conversation Partner	At the end of each recorded video session with the participant, the conversation partner completed a brief Likert-rated survey regarding their conversation with the participant.
Comparison Videos	Unassociated, third-party observers were asked to complete a brief survey regarding the conversation(s) after watching video clips of the participant and conversation partner.

Post-Intervention Follow-up. Following the intervention, data was collected from the participant to determine the success of the intervention. Participants received an electronic survey regarding their satisfaction of the intervention, and current employment status.

Conversation Partner Survey. Immediately after the data collection interview ended, the interviewer completed a brief 8-item, Likert-scale survey about the participant’s behavior. This survey was adopted and modified from Hollandsworth et al. (1979) *Relative Contributions*

of Verbal, Articulative, and Nonverbal Communication to Employment Decisions in the Job Interview Setting (Appendix C). From the Likert-scale, the interviewer would select either Strongly Disagree, Disagree, Neither Agree nor Disagree, Agree, or Strongly Agree, regarding the following 8 questions.

1. **Orientation.** Generally maintained appropriate orientation when speaking or listening to the interviewer.
2. **Loudness of voice.** Spoke with clarity and appropriate volume without whispers or shouts.
3. **Body Posture.** Sat erect, used appropriate hand gestures, facial expression appropriate to verbal message.
4. **Fluency of speech.** Spoke spontaneously, used words well, was able to articulate thoughts clearly.
5. **Appropriateness of content.** Responded concisely, cooperated fully in answer questions, stated personal opinions when relevant, and kept to the subject at hand.
6. **Personal appearance.** Neat and clean in appearance, and appropriately dressed.
7. **Composure.** Appeared at ease during the interview, comfortable and relaxed.
8. **Interview readiness.** Shows skills necessary to attend interview for a competitive job of interest.

Comparison Videos. Unassociated, third-party observers were shown comparison video clips from the intervention and baseline phases. Five comparison videos for a total of 10 video clips were shown. The comparison video clips were selected by the researcher based on their ability to demonstrate the different phases of the target interfering behavior (Table 5).

Table 5

<i>Comparison Video Arrangements</i>

	Video A	Video B
Comparison Video 1	Pre-intervention	Post-intervention
Comparison Video 2	Pre-intervention	Pre-intervention
Comparison Video 3	Post-intervention	Post-intervention
Comparison Video 4	Pre-intervention	Post-intervention
Comparison Video 5	Pre-intervention	Post-intervention

The comparison videos clips were shown one after the other, each from a specific phase of the study for the same participant. Information about the target behavior or the phase of intervention in which the video was recorded was not shared with the observers. Immediately after the two comparison video clips were shown, the observers were asked to answer a series of questions about the videos they watched by filling in their answers on a handout (Appendix D).

The questions were consistent for each pair of videos. The questions asked were:

Question 1: On a scale of 1-3, 1 being no change, 2 being some change, and 3 being a lot of change, how much change in the participant’s behavior did you see between Video A and Video B?

Question 2: What changes in behavior for the participant did you notice?

Question 3: Which of these videos would make you more likely to want to want to engage in a conversation with this individual? Video A, Video B, Both or Neither

Percentage of accuracy was tracked and graphed for Question 1. A correct response included a “change” response when the viewer observed a Pre-intervention video, and a Post-intervention video. A correct response also included if the viewer selected a “no change” response after viewing a Pre-intervention and a Pre-intervention, or a Post-intervention and a Post-intervention video. An incorrect response would include if the viewer selected “no change”

after observing a Pre-intervention and Post-intervention video, or a “change” response after observing a Pre-intervention and Pre-intervention video, or a Post-intervention and a Post-intervention video. Responses on type of behavior change (Question 2) was analyzed for patterns and accurate responses. Responses regarding engagement (Question 3) were also analyzed for patterns and accurate responses.

Results

The results indicate that all four participants reduced their target interfering nonverbal behavior contingent upon the introduction of the intervention, which lead to overall improvement in their interview skills. The results for the secondary untrained behaviors were not as consistent as the target behavior. Results for each measure and participant are as follows.

Target behavior. Figure 1 shows the percentage of intervals of the target interfering behavior for each participant. During baseline, each participant demonstrated high levels of their target behavior; speaking volume for Leo and Simon, and professional hands for Matt and Jake. Due to the repetitiveness of each interview session, and the participants’ stable rate of responding, only three baseline sessions were conducted for three of the participants. Leo only had 5 weeks to participate in the study, because he was leaving town for an internship. Therefore, due to his stable responding and shortened timeline he only had 2 baseline sessions. At the start of the intervention, there was an immediate and dramatic reduction of the target behavior for each participant. Both participants with a volume reduction goal, Leo and Simon, dropped from demonstrating the target behavior in 50%-88% of the intervals, to almost complete elimination of the behavior. Participants with “professional hands” goal, Matt and Jake, dropped from demonstrating the behavior in 55%-82% of intervals in baseline to 15%-30% initially and continued to decrease to 3%-10% at their final session. Matt requested the use of a fidget after his first intervention session, session 5, and a fidget was offered to Jake at the beginning of his

intervention session, session 9. Both Matt and Jake, before being offered the fidget engaged in fidget behavior with items available to them. For example, in session 8 for Jake, he used a parking validation ticket as a fidget and still displayed high levels of the target behavior. Matt played with the strings of his sweatshirt for majority of the interview in session 5, and upon reviewing this behavior with the interventionist during the feedback phase, requested to use a proper fidget instead. Follow-up sessions for Matt and Simon show that both participants maintained lower levels of the interfering behaviors 3 months after the end of the intervention. For all four participants, the percentage of nonoverlapping data points was 100%.

Secondary Untrained Behavior. Figure 2 shows the percentage of occurrence for the secondary untrained target behavior. The secondary behavior for all four participants was orientation towards the speaker. Participants scored a relatively high level of orientation ranging from 50-100% of intervals. Jake scored the lowest regarding orientation, and often stared towards the ground or hands during his interview. Simon consistently scored 100% of orienting to the speaker, both before and after intervention. Simon glanced at or near the speaker at least once during each ten-second interval for 100% of his sessions. Leo and Matt demonstrated orientation to the speaker between 70-80% of the sessions, both before and after intervention. Leo wore a pair of sunglasses in his first two interviews in the intervention phase, therefore data on his orientation for those sessions is unavailable. Percentage of nonoverlapping data points for each participant is as follows: Leo, Simon and Jake, 0%, and Matt, 16%.

Conversation Partner Survey Data. After each participant met with the conversation partner for their mock-interview, the interviewer would complete a brief Likert-scale survey on the participant's performance that included a total of 8 questions. In order to measure the survey, each response was designated a number from 1-5, as follows; 1-Strongly Disagree, 2-Disagree, 3-Neither Agree nor Disagree, 4- Agree, 5- Strongly Agree. One would be the lowest score the

participant could receive on a question, while 5 was the highest. In total, a survey with “strongly agree” responses for each question would have a total score of 40 points.

As seen in Figure 3, all four participants improved their average scores for all 8 questions. Leo improved from an average total of 29 points to 32.2 points, Matt improved from an average total of 23.3 points to 26 points, Simon improved from an average total of 21.3 points to 28.5 points, and Jake improved from an average total of 17.6 points to 21.6 points.

In addition to each participant improving their total scores, the overall average score of each question improved in pre- and post- intervention from 5%- 42% (Figure 4). The two questions with the most significant change were regarding the participant’s composure, at 42% improvement, and overall readiness to interview at 28% improvement.

Each individual participant improved in the following ways. Leo’s average scores for each question improved for 6 out of 8 areas (Figure 5). Leo’s target behavior, volume, was addressed in question 2, in which he improved by 25%. His greatest improvement was his readiness to interview, which increased by 35%. His two high scoring questions included fluency of speech, and content of answers. Leo’s scores regarding his secondary behavior, orientation, (Question 1) dropped slightly in the intervention phase by 4%. Question regarding Leo’s appearance, question 6, dropped dramatically in the intervention phase, 33%. This could be explained by Leo’s choice to wear sunglasses during 2 of the 3 interviews in the intervention phase.

Matt’s average scores for each question improved for 4 out of 8 areas (Figure 6). Matt’s target behavior, professional hands, was addressed in question 7, composure, which improved by 43%; his greatest improvement of all 8 questions. Matt’s secondary, untrained behavior, orientation, was addressed in question 1, which Matt increased by 9%. For question 5, regarding appropriateness of content, Matt’s score decreased by 25% in the intervention phase. There was

no change in three of Matt's scores for pre- and post- intervention. These included question 2, loudness of voice, question 3, body posture, and question 4, fluency of speech.

Simon improved in 7 out of 8 areas (Figure 7). Simon's target behavior, volume, was addressed in question 2 and increased by 30%. Simon's secondary behavior, orientation, increased by 9%. His greatest improvement was question 7, composure, which he increased by 71%. For question 5, appropriateness of content, Simon's score decreased slightly by 5%.

Jake's overall scores were the lowest of the four participants (Figure 8). Despite that, Jake did improve on 5 out of 8 areas. Jake's target behavior, professional hands, was addressed in question 7, composure, which he increased 26%. His secondary behavior, orientation, was addressed in question 1, which he increased by 43%. His greatest improvement was regarding question 3, body posture, which increased by 57%. Regarding question 4, fluency of speech, Jake's score decreased slightly by 7%. There was no change in two of Jake's scores pre- and post- intervention. This included scores regarding question 2, loudness of voice, and question 6, personal appearance.

Comparison Videos Data.

At the end of treatment phase for all participants, video clips of each participant were selected and assembled to compare phases of intervention for each participant. The five comparison videos were arranged in the following ways; Video 1: pre-intervention; post-intervention, Video 2: pre-intervention; pre-intervention, Video 3: post-intervention; post-intervention, Video 4: pre-intervention; post-intervention, Video 5: pre-intervention; post-intervention (Table 4). The videos were shown to first quarter graduate students in a special education program. A total of 24 students viewed the videos as they were presented to their class at the same time and were asked to respond to the following three questions for each video:

Question 1: On a scale of 1-3, 1 being no change, 2 being some change, and 3 being a lot of change, how much change in the participant's behavior did you see between Video A and Video B?

Question 2: What changes in behavior for the participant did you notice?

Question 3: Which of these videos would make you more likely to want to engage in a conversation with this individual? Video A, Video B, Both or Neither

Overall Results. Overall results for the videos are as follows (Figure 9): Regarding question 1, 70% of viewers correctly identified the video with change for the 5 videos. Regarding question 2, of those videos with change, 30% of viewers were able to identify the correct target behavior. Regarding question 3, 67% of viewers selected the intervention video as the video that they would prefer to engage in a conversation with that individual.

Participant Results. Three out of five of the video comparisons demonstrated "change," i.e. the clips selected were a pre-intervention clip followed by a post-intervention clip. Two of the five video comparisons demonstrated a "no change," where the videos selected were either pre- intervention and pre-intervention, or post-intervention and post-intervention. Each participant demonstrated a different level of change in each behavior, and therefore this data is broken up by participant, to demonstrate the social validity of each participant's behavior change as recognized by the untrained observer.

Change Data

Leo's target behavior data decreased from 80-90% to 0% during intervention. Video clips selected for each comparison video were consistent with this data, occurring 80% of the time in

the pre-intervention video, and 0% of the time in the post-intervention video. Twenty-three respondents answered all three questions for the comparison video. For Question 1, “How much change in the participant’s behavior did you see between Video A, and Video B?” all 23 respondents selected either “some change” or “a lot of change.” No one selected that they saw “no change” between the two videos (Figure 10). For Question 2, “What change in behavior for the participant did you notice, if any?”, 12 respondents identified that they noticed a change in the participant’s volume, or 52%. 17% selected the correct secondary behavior (Figure 11). For Question 3, “Which of these videos would make you more likely to want to engage in a professional conversation with this individual?”, 19 respondents selected the correct video, Video B. The remaining 4 respondents selected “Both,” which is considered a correct response. No one selected the pre-intervention video, Video A, nor did they select “Neither” (Figure 12).

Matt’s target behavior data was less dramatic than Leos’s, improving from 55-72% of opportunities pre-intervention, to 30-10% of opportunities post-intervention (Figure 1). Video clips for Matt’s comparison video were consistent with this. Twenty-four respondents answered all 3 questions regarding Matt’s comparison videos. For Question 1, “How much change in the participant’s behavior did you see between Video A, and Video B?” 20 respondents selected that they saw “some change” between the two videos, or 80%. Four respondents selected that they saw “no change” between the two videos. No one selected that they saw “a lot of change” (Figure 13). For Question 2, “What change in behavior for the participant did you notice, if any?” 10 respondents, or 42%, correctly identified that they noticed a change in the participant’s composure, noting that he “kept his hands out of his shirt,” or seemed “less fidgety.” 25% of respondents selected the correct secondary behavior for Matt (Figure 14). For Question 3, “Which of these videos would make you more likely to want to engage in a professional conversation with this individual?”, 14 respondents selected the correct video, Video B. Four

respondents selected “neither”, and one person selected “both,” which were considered correct answers, for a total of 79% correct responses. Five respondents selected the incorrect video, Video A (Figure 15).

Simon’s target behavior data decreased from 50%-76% to 0%-1.7% during intervention. Video clips selected for each comparison video were consistent with this data, occurring 80% of the time in the pre-intervention video, and 0% of the time in the post-intervention video. Twenty-four respondents answered the first two questions, and twenty-three respondents answered the third question for the comparison videos. For Question 1, “How much change in the participant’s behavior did you see between Video A, and Video B?” 20 respondents, or 83% selected the correct answers; 11 selected “a lot of change,” and 9 selected “some change.” Four respondents selected an incorrect answer that they saw “no change” between the two videos (Figure 16). For Question 2, “What change in behavior for the participant did you notice, if any?”, 5 respondents. Or 21%, identified the correct behavior of a change in volume. No one selected orientation as the secondary behavior (Figure 17). For Question 3, “Which of these videos would make you more likely to want to engage in a professional conversation with this individual?”, 6 respondents selected the correct video, Video B. Nine respondents selected “neither”, and one person selected “both,” which were considered correct answers, for a total of 65% correct responses. Eight respondents selected the incorrect video, Video A (Figure 18).

No Change Data

Jake’s comparison videos were both taken from post-intervention, and therefore showed “no change.” Twenty-three respondents answered all three questions. For Question 1, “How much change in the participant’s behavior did you see between Video A, and Video B?” 14 respondents selected that they saw “no change” between the two videos, or 61%. Eight

respondents selected that they saw “some change,” and one person selected that they saw “a lot of change” (Figure 19). Question 2 was not included, since there was no behavior that “changed” in the videos to select. For Question 3, “Which of these videos would make you more likely to want to engage in a professional conversation with this individual?”, 9 respondents correctly selected “neither” and 4 respondents selected “both,” for 57%. Ten respondents selected either Video A or Video B, which were considered incorrect (Figure 20).

Comparison videos were also shown for Simon in pre-intervention phase, where both clips were from baseline demonstrating “no change.” For Question 1, “How much change in the participant’s behavior did you see between Video A, and Video B?”, only 5 respondents correctly selected “no change” for a total of 21%. Fifteen respondents selected that they saw “some change” and 4 selected that they saw “a lot of change” (Figure 21). Question 2 was not included in this data, as there was no specific behavior to identify as the behavior of change. For Question 3, “Which of these videos would make you more likely to want to engage in a professional conversation with this individual?”, only two respondents selected “neither.” Four respondents selected “both” which was considered correct, for a total of 25%. Four respondents selected Video B, and 14 selected Video A, both considered incorrect (Figure 22).

Post-Survey Data. The participant Post-Survey included the following questions regarding the study, to be answered using a Likert-scale with the following options; Strongly Agree, Agree, Neither Agree nor Disagree, Disagree, Strongly Disagree.

- Training: I found the training (first 20 minutes of session) helpful to improve my interview skills.
- Feedback: I found the feedback (last 20 minutes of session) helpful to improve my interview skills.
- Future Use: I would like to use this type of training again with other areas.

Three out four participants answered each question with “Strongly Agree”, and one answered “agree” to all three questions. In addition, each participant answered the following question: Do you feel you have the skills you need to perform well in an interview? With, “Yes, I feel ready to interview”, “No, I need more practice,” and “Not sure” as response options. Three of the four participants answered “Yes, I feel ready to interview”. One participant answered “No, I need more practice.” In addition, follow up with the participants showed that Leo and Simon had paid work, Matt was in a volunteer site, and Jake had not gained any work experience since the study.

Participant	Training	Feedback	Future Use	Ready to Interview	Current work
Leo	Strongly Agree	Strongly Agree	Strongly Agree	Yes	Paid work
Matt	Strongly Agree	Strongly Agree	Strongly Agree	Yes	Volunteer work
Simon	Strongly Agree	Strongly Agree	Strongly Agree	Yes	Paid Work
Jake	Agree	Agree	Agree	No	None

Discussion

Prior to intervention, all four participants demonstrated high levels of their target behavior. In the intervention phase, all 4 participants demonstrated immediate and dramatic improvements of the target primary behavior. However, none of the participants demonstrated a significant change in the level of the secondary behavior occurring. For those two participants that returned for follow-up sessions, they maintained their primary behavior at low levels, suggesting that the intervention made a significant change in the behavior long term.

In addition, all 4 participants demonstrated enough change in the target behavior for significant change to be shown in two separate social validity measures, the comparison videos

and conversation partner survey. This demonstrates the importance of targeting interfering behaviors; by reducing them, the overall quality of communication improved, which in an important setting like an interview, could lead to lasting and meaningful change for that person.

Matt and Jake both used a fidget during their intervention sessions, and reduced the intervals of the target behavior significantly. During the intervention, scores of the conversation partner survey were not affected by the use of the fidget. For example, if the fidget was a distraction to the interviewer, we may have noticed a low score in Question 1, Orientation, Question 3, Body Posture, and/or Question 7, Composure. However, for both Matt and Jake, they showed either the same or improved scores in all three of these categories, demonstrating that the fidget did not affect the conversation partner's perception of the participant's communication skills negatively. In addition, video clips of Matt and Jake using the fidget were used in the comparison videos, and no comments were made regarding the use of the fidget in any of the surveys. As fidgets have become more common in the past few years, there may be more acceptance towards their use. Having a discrete and accessible tool like a fidget can be helpful in interview settings.

By isolating nonverbal behaviors that were associated with social behaviors commonly identified as barriers to employment success, we are able to compare the success of the intervention to the impact it made to the conversation partners, as well as the naïve observers. All four participants improved in the area associated with their nonverbal behavior on the conversation partner survey. This demonstrates that not only did the intervention effectively create behavior change, better yet that change was significant enough that the conversation partner speaking with the participant noticed the change and rated their behavior higher because of it. Even though the intervention only focused on one singular behavior, all four participants demonstrated enough behavior change pre- and post- intervention that scores regarding the

interviewees readiness to interview (Question 8) raised significantly for each participant. This speaks to the clinical and practical success of this intervention. By reducing the most interfering nonverbal behavior, while not addressing any other type of interview behavior, conversation partners saw enough of a change in behavior that they suggested that the individuals were ready for competitive interviews. Research surrounding interview behavior for adults suggest much more involved and lengthy interventions to address interview behaviors. To demonstrate enough change in behavior for a communicative partner to say they are ready for interviews in a real setting by only addressing one behavior, with one simple intervention, suggests the value of addressing the most interfering nonverbal behavior as a major benefit to the individual.

In addition to the positive effects demonstrated in this study, there could be a greater impact on social skills in general, by isolating interfering nonverbal behaviors. Many approaches to addressing social skills for individuals with ASD combine multiple nonverbal behaviors into one target behavior or skill. By isolating these behaviors, and teaching the appropriate behavior individually, we may be able to demonstrate a much greater effect for individuals with ASD in social skill trainings.

Furthermore, in this study, the effects of training on the primary target behavior are especially compelling considering the brevity of the training itself, and the lasting impact it made. There is a large body of work on evidence-based practices, such as DTT, that have been used effectively with the young ASD population. By demonstrating that DTT was used effectively with this population, it invites future research to employ other simple, effective evidence-based behavioral strategies with the adult work-based populations to make meaningful and lasting behavior change.

Lastly, one of the most important components of this study was the social validity measures. This quick, simple, intervention demonstrated change in many ways. The intervention

made enough of an impact that individuals not associated, or our naïve audience viewing the video clips of the study, were able to select and identify the target behavior. This shows the power that this simple intervention had on the level of behavior change that was demonstrated by our participants. Not only did these observers identify the video in which the behavior was occurring less, as well as the exact behavior that had changed at times, they also often chose the video that demonstrated the behavior occurring as less often as more likely for them to want to interact with the individual. With social communication being such an integral part of everyday life and having a direct impact quality of life, this study shows the importance of addressing and decreasing behaviors that may be reducing the likelihood of positive social communication.

In addition, by addressing just one target behavior in training, we were able to show enough of a change, that the conversation partner measured their overall communication effectiveness as higher. For an invisible disability such as ASD, perception of that person is incredibly important. For such a simple intervention to make such a positive effect on a very complex and pivotal behavior, communication, it demonstrates the power and overall success of this intervention.

Limitations. One limitation of the study is the possible practice effects and potential boredom of the participants required to meet the requirements of experimental rigor. Although all 4 participants in their post-survey stated that they enjoyed the aspects of the study and would want to use these approaches again in the future, during the intervention participants did make comments regarding the repetitiveness of the intervention. Despite mixing the questions up, participants were asked the same questions by their interviewers throughout the baseline and intervention phases. Responses to these questions often got shorter over time, as they had previously answered the same questions before and gave less authentic and sincere answers. Since there was no feedback given about the quality of answers the participants provided, there

was nothing in place to encourage the participants to make thoughtful responses to the questions, like you would in an interview setting. This could explain why, for some, their “responses to answers” scores on the conversation partner survey went down from pre- to post- intervention.

In addition, since no feedback was given regarding professional appearance as well, there were missed opportunities to reinforce appropriate professional dress choices, which is ultimately important in interview settings. For example, when Leo chose to wear sunglasses in his interview, the interviewer did not give him feedback on this choice. Also, at times, participants would attend their session without having showered or wearing dirty or baggy clothes, which would often have been addressed in other types of interview trainings. By adding a simple component to the study to outline basic guidelines on interview behavior at the beginning of each session, the study could have been improved each participant’s overall readiness to interview.

Lastly, although we did not notice enough of behavior change in the second untrained behavior to show significant change, there was still noticeable change in those areas associated with these behaviors by the conversation partner survey. As a whole the behavior associated with the untrained secondary behavior, Orientation (Question 1) improved by 12%. For those participants that showed some variability in their orientation behavior in baseline, unbiased observers did select that behavior as a behavior of change between 17%-25%. However, the measurement system did not recognize a change in the behavior. By using a ten-second partial interval method, behavior is marked as demonstrated whether it occurred once, or many times in the interval. This method of measuring often demonstrates an overestimate of the true occurrence of behavior (Fiske & Delmolino, 2012). A better form of measurement for this behavior may have been frequency, in that it would measure each individual response of the behavior, and better represent the change overall.

Implications for Future Research. One of the greatest outcomes of this study is that it shows the effectiveness of simple, practical behavioral strategies that make meaningful behavior change for this population. Isolating one component of the intervention, DTT, still had a significant effect on the target behavior. Because the data collection phase of the study occurred in the middle of the intervention session, (i.e., before the video feedback component was provided in the first intervention session), and all four participants demonstrated an immediate reduction of the target behavior with that component of the intervention alone, it should be pointed out that DTT alone was an effective intervention for these participants. This simple strategy could be isolated in the future with other interviewees as a booster session immediately before an interview or important conversation. This could make a major difference for other individuals with behaviors that may be interfering in their ability to communicate effectively.

In addition, it would be interesting to demonstrate how much change is necessary in a specific interfering behavior to demonstrate a positive change. As we saw with the secondary behavior, there was not significant behavior change demonstrated in the treatment phase, but change was demonstrated in the social validity measures. By determining how much change is necessary for those interacting with the individual to notice, we may be able to better plan for and implement treatment for interfering behaviors.

Conclusion

This study successfully demonstrated the importance and power of using simple, effective, behavioral strategies to reduce interfering nonverbal behaviors and the impact that behavior change had for each participant. By drawing from the Nonverbal Communication framework, this study demonstrated how important isolating interfering behaviors had on the overall effectiveness of communication for these four participants. By measuring and treating isolated nonverbal behaviors in social skills training in the future, practitioners may demonstrate

a greater impact in the behaviors they address. In addition, using approaches often associated with a younger population effectively with the adult population highlights the importance of practitioners adopting these simple strategies. This study also uses social validity in a number of ways that suggests the power and importance of behavior change. By demonstrating not only that these simple approaches successfully modified important behaviors, but also the impact it made to both the conversation partners they communicated with, as well as to naïve observers shows the importance of addressing interfering behaviors for individuals with ASD.

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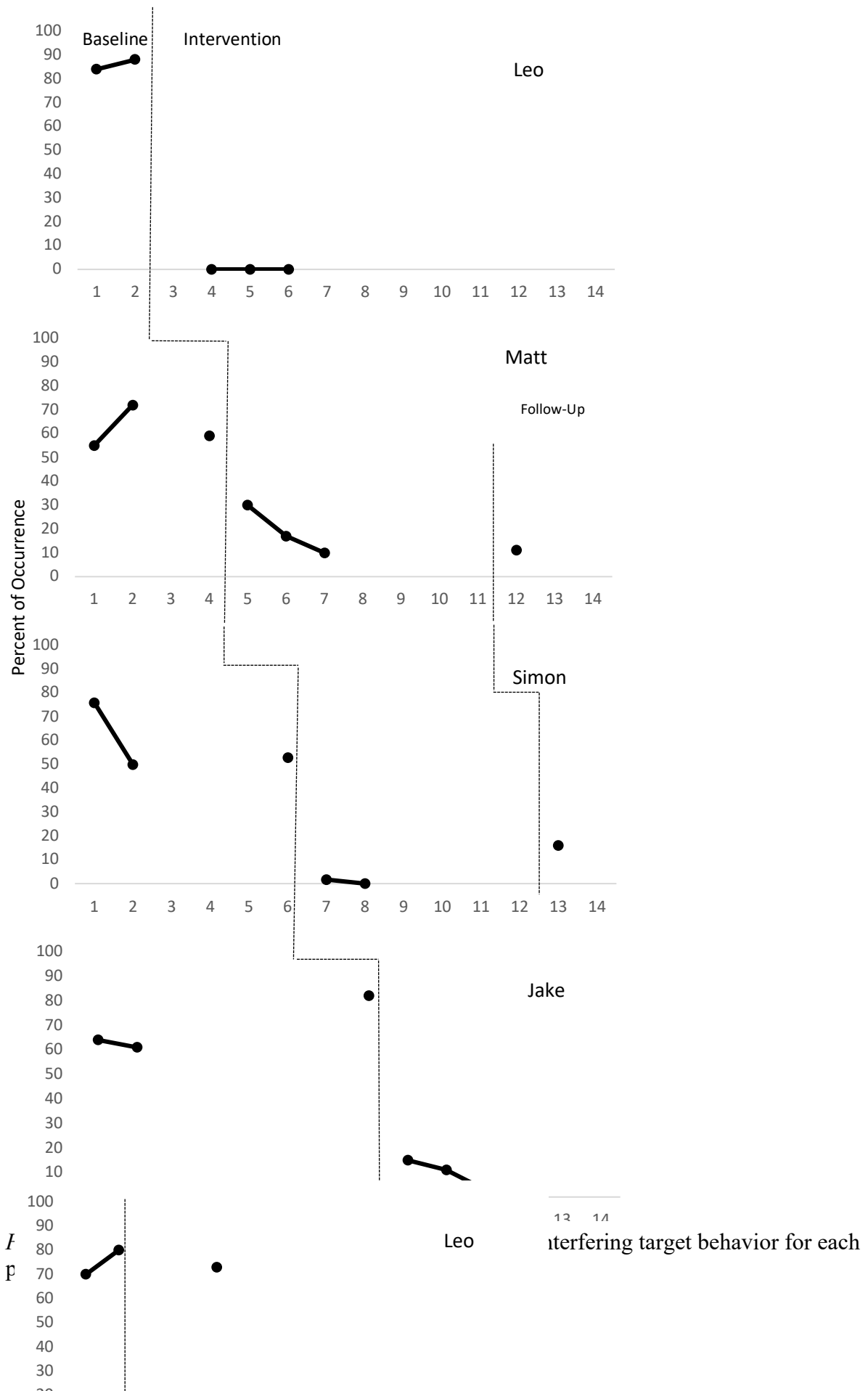


Figure 2. The percent of occurrence each session for the secondary nonverbal behavior.

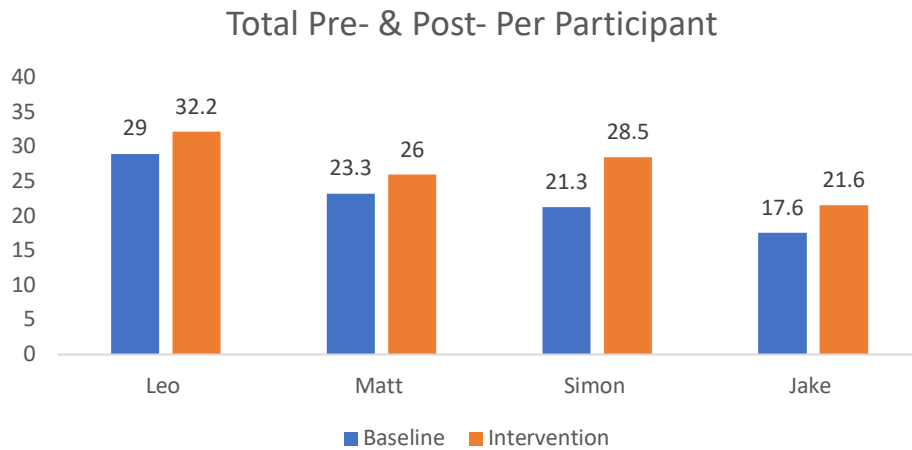


Figure 3. Average total points scored on conversation partner survey for pre- and post-intervention.

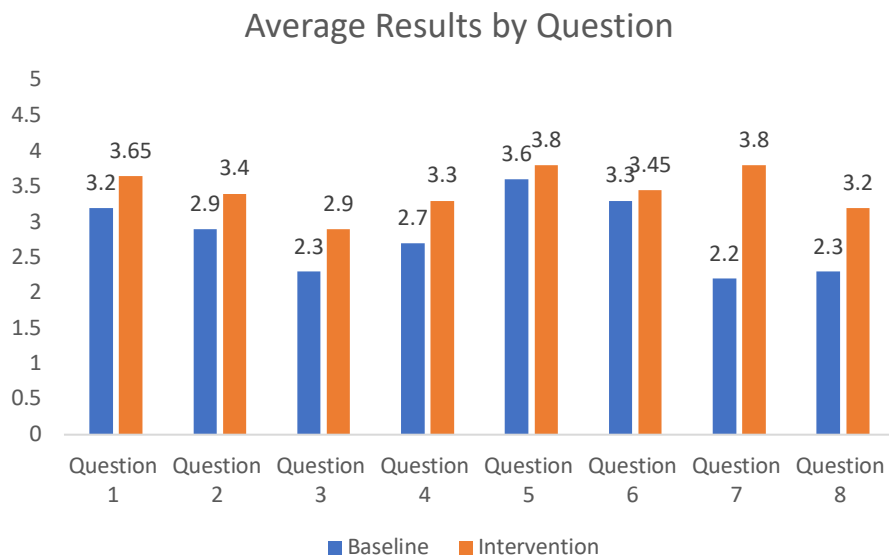


Figure 4. Average results by question for all four participants on conversation partner survey for pre- and post- intervention.

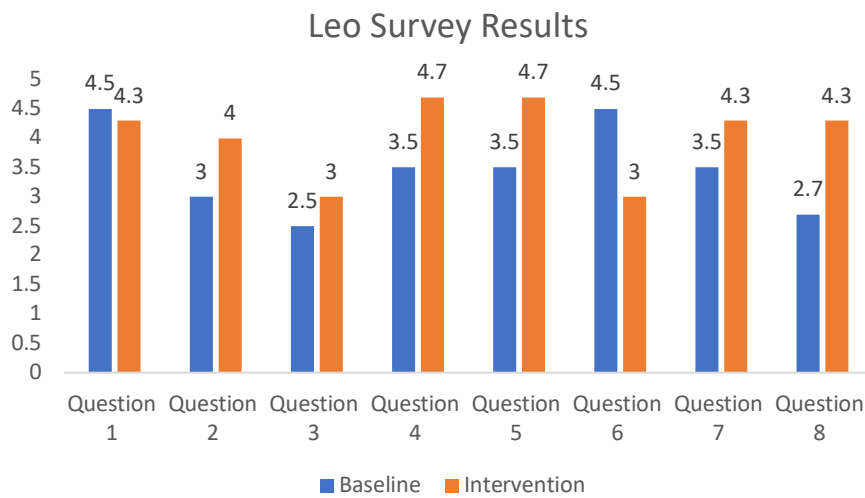


Figure 5. Leo’s average pre- and post- conversation partner survey scores by question.

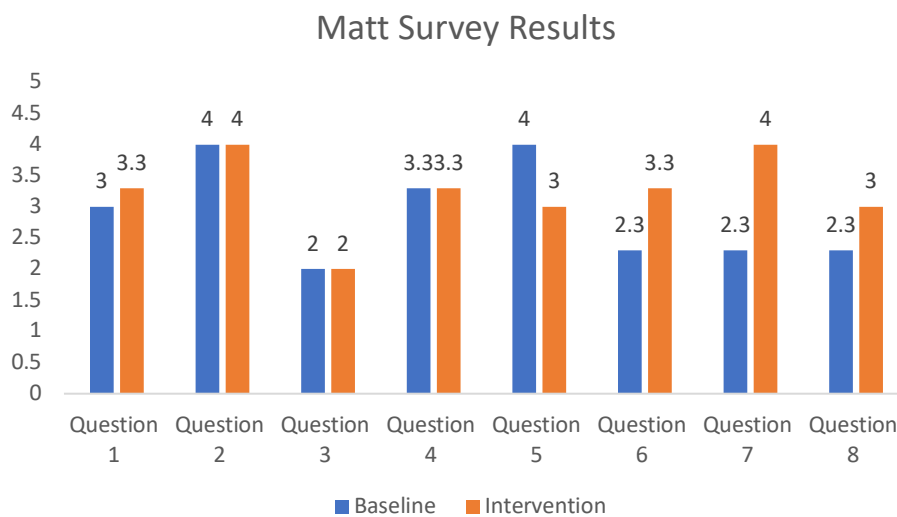


Figure 6. Matt’s average pre- and post- conversation partner survey scores by question.

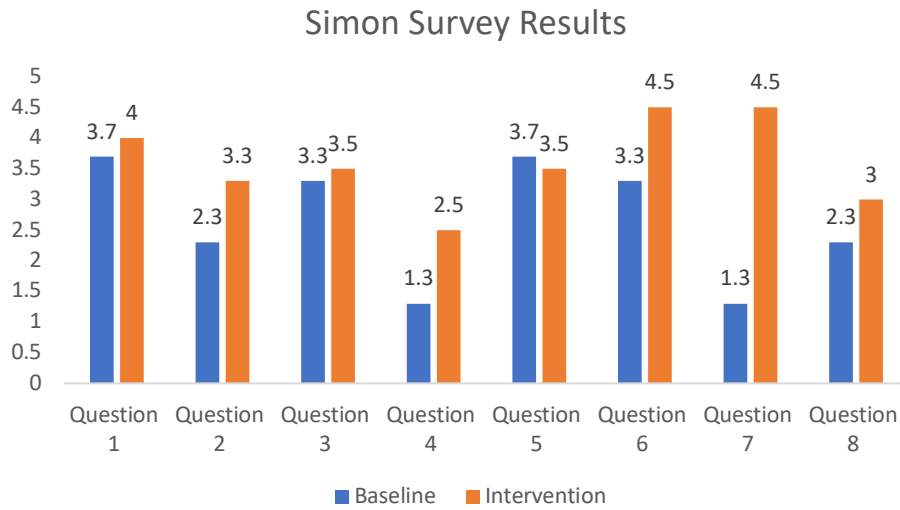


Figure 7. Simon’s average pre- and post- conversation partner survey scores by question.

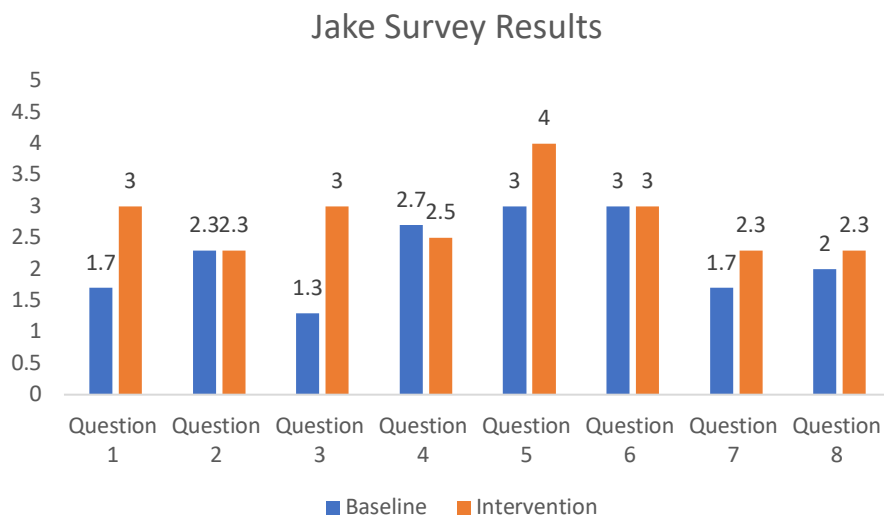


Figure 8. Jake’s average pre- and post- conversation partner survey scores by question.

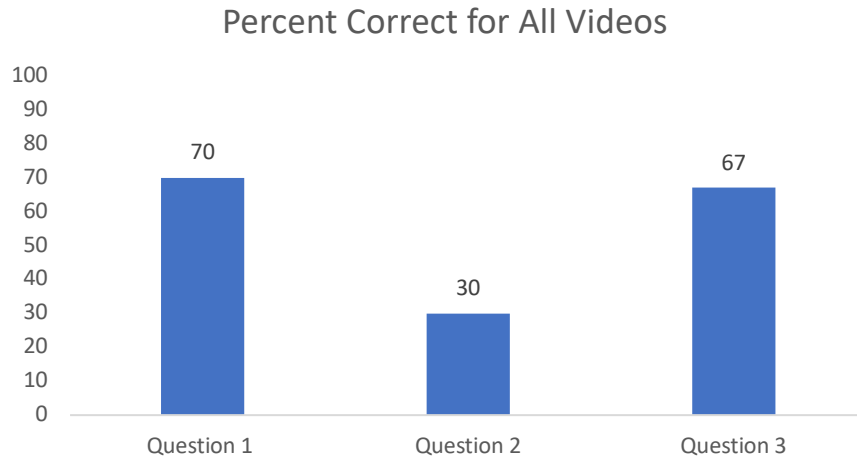


Figure 9. Percent correct for comparison video survey results for all videos.

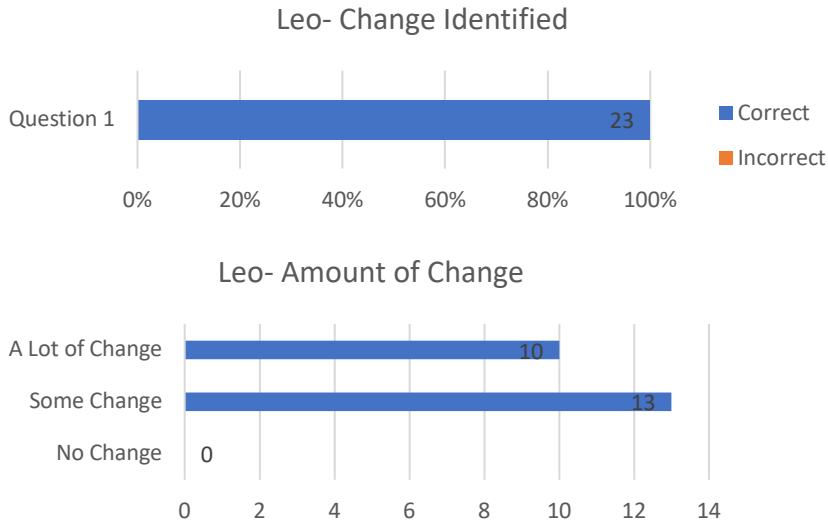


Figure 10. Responses for Question 1 on Leo’s “change” video, including change accurately identified, and level of change responses.

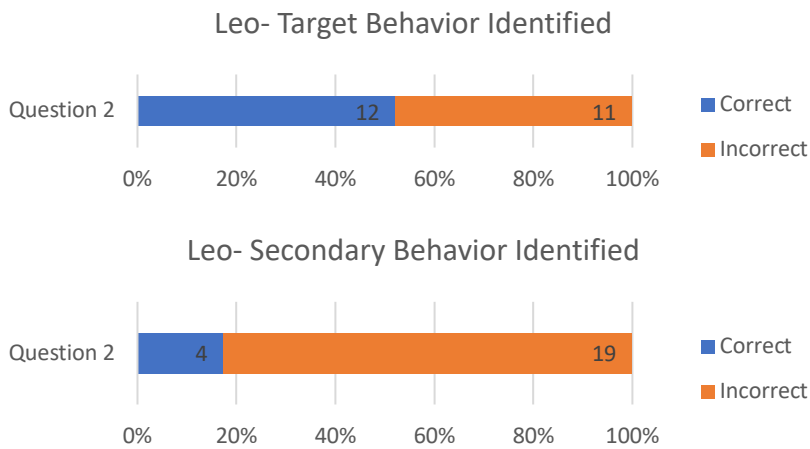


Figure 11. Responses for Question 2, identifying target behavior, for Leo’s primary and secondary behaviors.

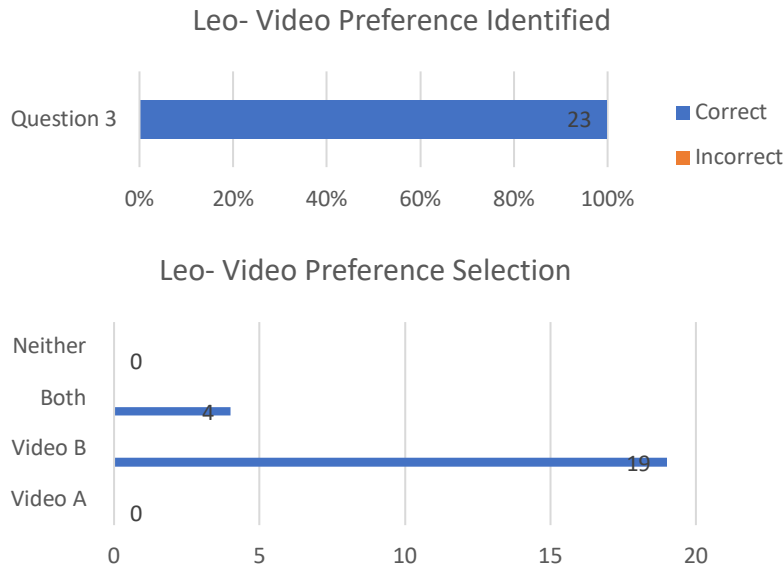


Figure 12. Responses for Question 3, video preference identified and selection for Leo.

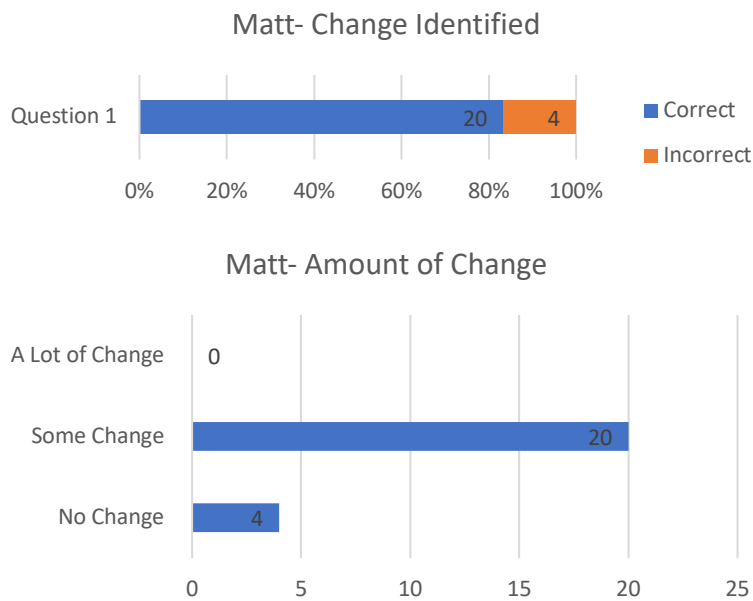


Figure 13. Responses for Question 1 for Matt regarding change identified, and amount of change shown.

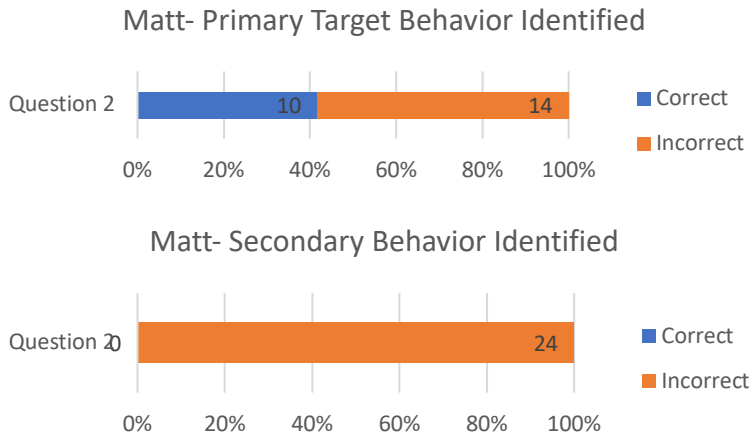


Figure 14. Responses for Question 2, identifying primary and secondary target behaviors for Matt.

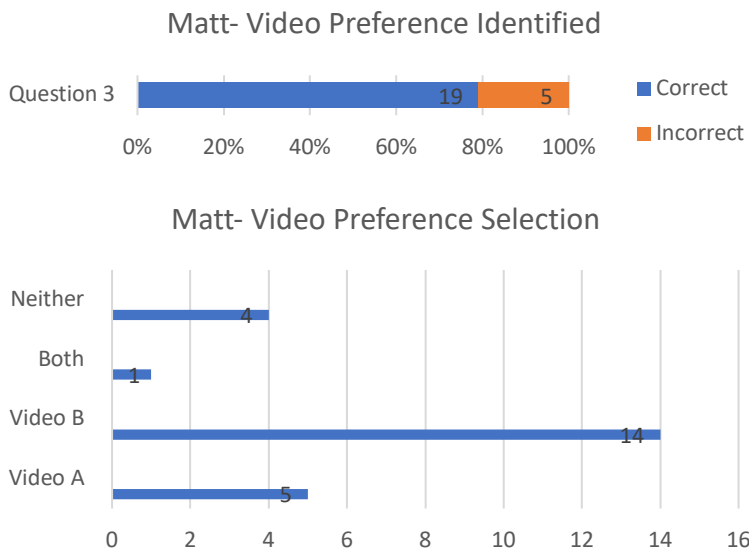


Figure 15. Responses for Question 3, video preference selection and preference for Matt.

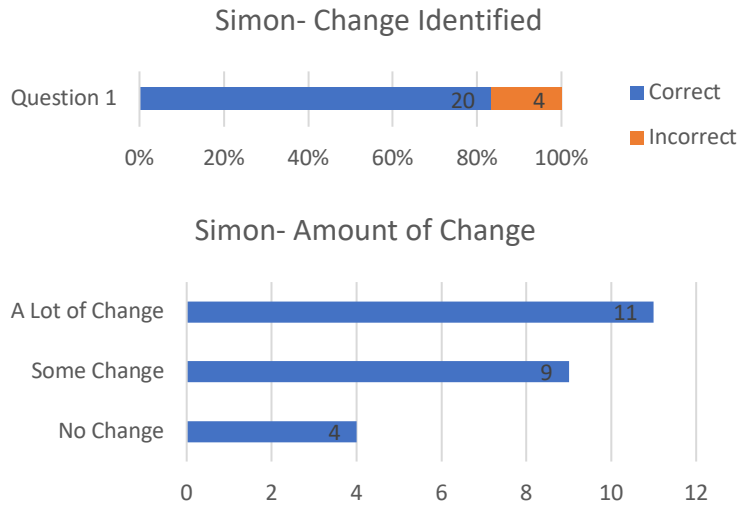


Figure 16. Responses to Question 1 for Simon, regarding change identified, and amount of change shown.

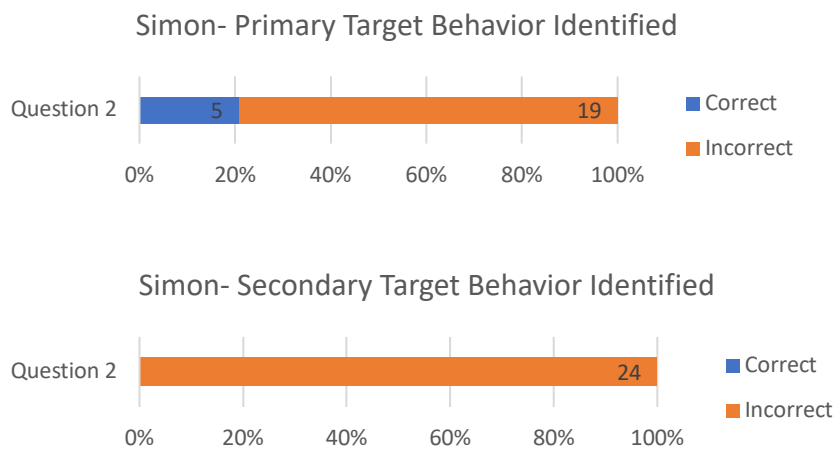


Figure 17. Responses for Question 2, identifying primary and secondary target behaviors for Simon

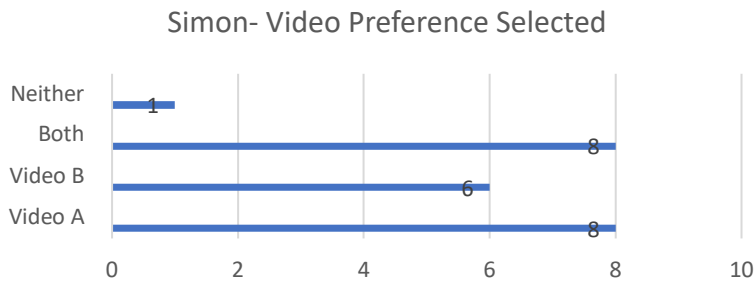
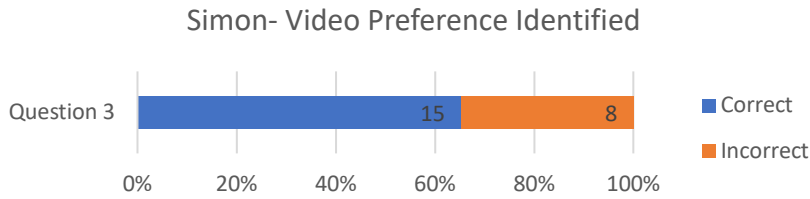


Figure 18. Responses for Question 3, video preference and selection for Simon.

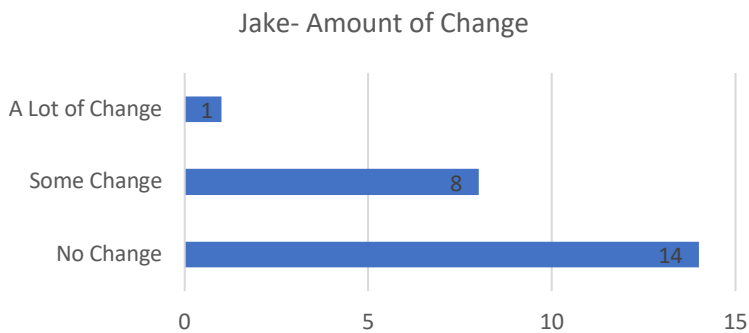
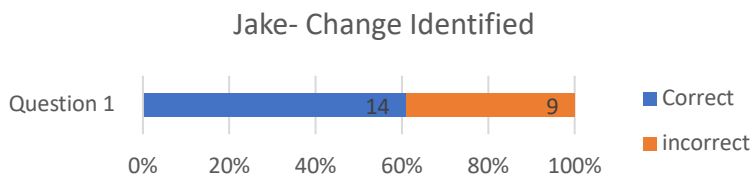


Figure 19. Responses for Question 1, change identified and amount of change shown for Jake.

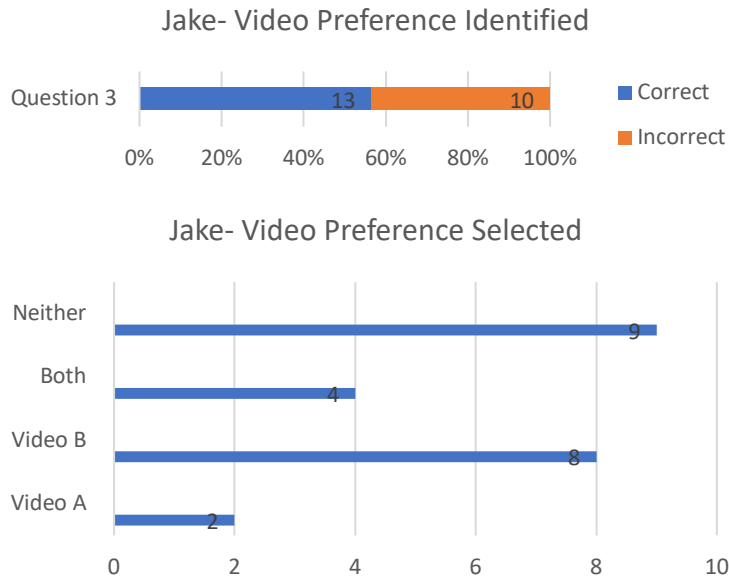


Figure 20. Responses for Question 3, video preference and selection for Jake.

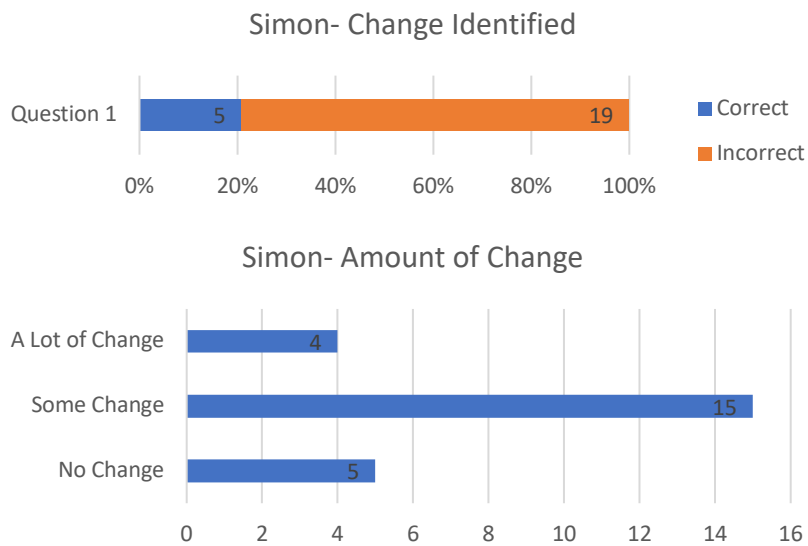


Figure 21. Responses for Question 1, change identified and amount of change, for Simon.

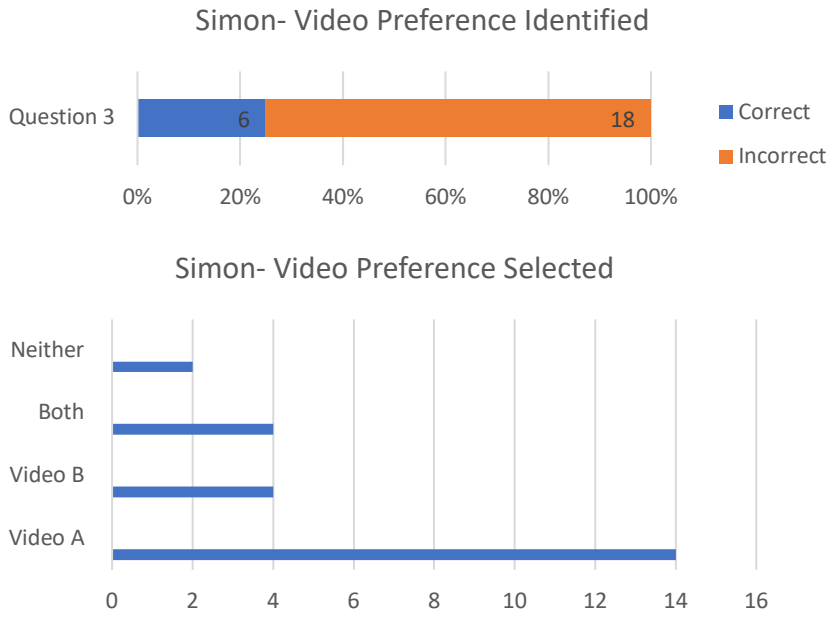


Figure 22. Responses of Question 3, video preference identified and selection for Simon.

Appendix B

Pre-Study Survey

Name: _____

Age: _____

Gender: Female Male

Race:

 African American Asian Hispanic Native American Pacific Islander White Multi-racial Other _____

Not included in this study, approximately how many interviews have you had? (include intern, volunteer and paid employment): _____

Have you previously held a(n) (check all that apply):

 part-time job internship full-time job volunteer position none

Approximately how much paid work experience do you have? (Include any part-time and full-time work experience)

 none 1 to 6 months 6 to 12 months 1 to 2 years 3 to 5 years 5+ years

Have you received feedback regarding your conversation skills prior to this training?

- Yes
 No

Have you received video feedback before this study?

- Yes
 No

How comfortable are you accepting feedback?

- Very comfortable
- Not very comfortable
- I have never received feedback

How confident are you in your interview skills?

- My interview skills are great
- My interview skills are okay
- My interview skills could use some work

Do you feel that you have the skills you need to perform well in an interview?

- Yes, I feel ready to interview
- No, I still need practice to feel ready to interview
- I am not sure

The thing(s) that I am most confident with in an interview is (select all that apply) my:

- Professional appearance
- Posture and mannerisms
- Connection with the interviewer (orientation to speaker, friendly demeanor)
- Manner of speaking (clarity, tone, volume)
- Answers to questions

The thing(s) that I am least confident with in an interview is (select all that apply) my:

- Professional appearance
- Posture and Mannerisms
- Connection with the interviewer (orientation to speaker, friendly demeanor)
- Manner of speaking (clarity, tone, volume)
- Answers to questions

REDUCING INTERFERING BEHAVIORS FOR ADULTS WITH ASD

Appendix C

This rating scale is intended for use immediately after completing a mock interview with research participant. Using the Likert scale, select one response for each item based on your perception of the interview.

Participant ID: _____ Reviewer Name: _____ Date: _____ Time of Interview: _____		Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
	1. Orientation. Generally maintained appropriate orientation when speaking or listening to the interviewer.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2. Loudness of voice. Spoke with clarity and appropriate volume without whispers or shouts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	3. Body posture. Sat erect, used appropriate hand gestures, facial expression appropriate to verbal message.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	4. Fluency of speech. Spoke spontaneously, used words well, was able to articulate thoughts clearly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5. Appropriateness of content. Responded concisely, cooperated fully in answering questions, stated personal opinions when relevant, and kept to the subject at hand.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	6. Personal appearance. Neat and clean in appearance, and appropriately dressed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	7. Composure. Appeared at ease during the interview, comfortable and relaxed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. Interview Readiness. Shows skills necessary to attend interview for a competitive job of interest.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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REDUCING INTERFERING BEHAVIORS FOR ADULTS WITH ASD

Appendix D

Part 1: Video A & B

1. On a scale of 1-3, 1 being no change, 2 being some change, 3 being a lot of change, how much change in the participant's behavior did you see between Video A and Video B?

1. No change

2. Some Change

3. A Lot of Change

2. What change in behavior for the participant did you notice, if any?
-

3. Which of these videos would make you more likely to want to engage in a professional conversation with this individual?

Video A

Video B

Both

Neither

Part 2: Video A & B

1. On a scale of 1-3, 1 being no change, 2 being some change, 3 being a lot of change, how much change in the participant's behavior did you see between Video A and Video B?

1. No change

2. Some Change

3. A Lot of Change

4. What change in behavior for the participant did you notice, if any?
-

5. Which of these videos would make you more likely to want to engage in a professional conversation with this individual?

Video A

Video B

Both

Neither

Part 3: Video A & B

1. On a scale of 1-3, 1 being no change, 2 being some change, 3 being a lot of change, how much change in the participant's behavior did you see between Video A and Video B?

1. No change

2. Some Change

3. A Lot of Change

4. What change in behavior for the participant did you notice, if any?
-

5. Which of these videos would make you more likely to want to engage in a professional conversation with this individual?

Video A

Video B

Both

Neither

Part 4: Video A & B

1. On a scale of 1-3, 1 being no change, 2 being some change, 3 being a lot of change, how much change in the participant's behavior did you see between Video A and Video B?

1. No change

2. Some Change

3. A Lot of Change

4. What change in behavior for the participant did you notice, if any?
-

5. Which of these videos would make you more likely to want to engage in a professional conversation with this individual?

Video A

Video B

Both

Neither

Part 5: Video A & B

1. On a scale of 1-3, 1 being no change, 2 being some change, 3 being a lot of change, how much change in the participant's behavior did you see between Video A and Video B?

1. No change

2. Some Change

3. A Lot of Change

4. What change in behavior for the participant did you notice, if any?
-

5. Which of these videos would make you more likely to want to engage in a professional conversation with this individual?

Video A

Video B

Both

Neither