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## Video Modeling for Social Communication in Adults with ASD

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Video Modeling for Social Communication in Adults with ASD

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Honors Project

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### **Abstract**

Individuals with autism spectrum disorder (ASD) can experience significant difficulty and psychosocial toll as a result of their impairments in social communication. Specifically for adults, this can have a negative effect on relationships and vocational stability. However, there is a lack of effective intervention for adults with ASD to assist in learning these social conventions. Video modeling is an intervention that has potential to help these individuals learn to be successful in social problem-solving situations. A pilot feasibility study (Hewitt & Kelliher, n.d.) was conducted to investigate the intervention of video modeling for adults with ASD. Coding was then necessary in order to assess treatment efficacy. This exploratory feasibility study was not designed with a priori outcome measures, therefore, the present work undertook to develop measures that could be valid and reliable to measure change in response to social communication intervention, and that could be applied in the future for other studies. This project addresses the following questions: 1) What outcome measures can be determined to measure the pragmatic goals of individuals with ASD, and to be applied reliably and validly to other social communication interventions? And 2) How does the participants' performance of these pragmatic skills compare to the models' performance? Findings include the developed coding measures for each participant, and comparison between participant and model performance. In addition, this paper presents a qualitative discussion of other various aspects of the video modeling intervention bearing on feasibility and measurement issues. Findings from this work may ultimately assist clinicians in designing video modeling to best meet the needs of each individual client.

## **Introduction**

A major impairment of autism spectrum disorder (ASD) is a deficit in social communication and interaction, which negatively impacts individuals with ASD in an array of contexts (American Speech-Language-Hearing Association, 2016; American Psychiatric Association, 2013). For adults with ASD, this impairment in social skills can create difficulties in their educational and vocational life. As a result, it has been indicated that college students with ASD may lack academic success, there are low employment rates among individuals with ASD, and many of these individuals may even report feelings of anxiety, loneliness, and depression (Hochhauser, Gal, & Weiss, 2015; Gelber, Smith, & Reichow, 2014; Hong et al., 2015). Therefore, it is clear that intervention for these adults must be implemented.

Much research has been done in regards to interventions for children with ASD, but there has been a lack of attention towards adults with ASD (Reichow & Volkmar, 2009). Interventions that are based on the principles of Applied Behavior Analysis (ABA), consisting of shaping, reinforcement, and modeling, have been empirically evaluated. Stemming from the concepts of ABA is a recently implemented intervention called video modeling (Nikopoulos & Nikopolou-Smyri, 2008). Video modeling consists of the individual watching videos of a model demonstrating the target behavior (Morlock, Reynolds, Fisher, & Comer, 2015). The model may be a peer (Kourassanis, Jones, & Fienup, 2015) an unfamiliar person, or even in the case of video self-modeling, the individual him or herself (Boudreau & Harvey, 2013). Sometimes the individual then attempts to replicate the behavior, and this replication may likewise be videoed. This way, they are able to watch the second video and critique their own behavior in order to learn what is desired (Deitchman, Reeve, S.A, Reeve K.F., Progar, 2010).

There are numerous advantages to video modeling (VM). It is more cost effective than in vivo modeling and there can be less reliance on an instructor (Spriggs, Knight, & Sherrow, 2014). Furthermore, watching videos could feel rewarding and more intriguing to the individual if they enjoy technology; not only has it been found to be enjoyable to individuals with ASD, but it also offers them a sense of independence in the intervention (Hochhauser et al., 2015). The teachers and parents of these individuals likewise support VM and believe that this technique benefits their student or child (Alzyoudi et al., 2014).

Literature has shown that video modeling can be an effective intervention for a number of social situations: the workplace (Burke et al., 2013; Strickland, Coles, & Southern, 2013); recreation-based contexts (Boudreau & Harvey, 2013; Kourassanis et al., 2015); and general communication skills (Deitchman, et al., 2010; Alzyoudi, Sartawi, & Almuhihi, 2014; Macpherson & Charlop, 2014; Ozerk, M. & Ozerk, K., 2015). Video modeling has been found to be an evidence-based practice (EBP) in systematic reviews (Hong et al., 2015; Reichow & Volkmar, 2009) and it also shows strong evidence of generalization of behaviors (McCoy, Holloway, Healy, Rispoli, & Neely, 2016; O'Handley, Radley, & Whipple, 2015). Therefore, although more research still must be done regarding video modeling, this intervention shows promise in helping individuals with ASD.

### **The Current Study**

A review of the literature reveals that video modeling is a more recently created intervention that still requires further inquiry into the effectiveness of the intervention, and how exactly to design it to be most beneficial to the individual. The research questions in the current study concerning video modeling for the intervention of individuals with ASD were: 1) What outcome measures can be determined to measure the pragmatic goals of individuals with ASD,

that can be applied reliably and validly to show progress from social communication intervention? And 2) How does the participants' performance of these pragmatic skills compare to the models' performance?

### **Participants**

Data from four participants were identified for this project; data had been originally collected as part of a related study that used video modeling as an intervention for social communication (Kelliher & Hewitt, 2015). The first participant, a 20-year-old female, was used as a pre-pilot and did not have an official diagnosis of ASD, so she was not used for the purposes of this project. Therefore, three of the participants were used, who have all received official diagnoses of ASD. Participant A, a female, age 47, voiced no concerns regarding communication, but explained that she did not understand social niceties, and felt that she is lying when using them in conversation. Participant B, a male, age 27, voiced his concerns as "getting my thoughts out," while his mother stated that he needed more frequent and natural interaction with others. Participant C, a female, age 57, listed more vocational-related concerns. For example, her concerns included conflicts with co-workers, difficulty communicating with her supervisor, and anxiety around performance evaluations. She further voiced her lack of social network and mentioned that she is sometimes perceived as a male, particularly in drive-thru scenarios and on the phone.

### **Methods**

During this study, each participant attended eleven sessions, which included three baseline sessions, six intervention sessions, one post-intervention follow-up session, and another follow-up session one month after intervention. Participants A and B attended sessions with the same clinician, while Participant C received intervention from a different clinician.

During baseline, standard speech and language elicitation devices were used in order to obtain a language and prosody measure for each participant, in order to assess the participants' inflection in speech, offering further insight into their pragmatics. These elicitation devices were phonetically balanced reading passages, including "The Cherry Tree," "The North Wind and the Sun," "The Caterpillar," and a collection of Mercer Mayer wordless picture books (i.e., Goodglass et al., 2001; Lowit et al., 2006; Mayer, 1969; Mayer, 1973; Mayer & Mayer, 1975; Patel et al., 2013).

Following the initial assessment, target sets of behavior were selected for each participant. In the intervention sessions, participants viewed a video of a model performing the behaviors that targeted those treatment goals. Then, the participants attempted to replicate the behavior, which was likewise recorded. Lastly, the participants viewed their attempted video, and joined in discussion, which included both feedback from the clinician as well as self-critique. The clinician asked the client to discuss their performance, and she then provided additional feedback after the client had identified significant aspects of the performance. This entire process was then repeated when the first attempts incorporated few or none of the targeted behaviors. For example, if the participant viewed a model showing politeness markers and there were no politeness markers in his/her attempts, it was continued up to a maximum of three times, and then another scenario was presented.

The clinicians created the video scenarios, and the videos were specifically tailored to fit the social scenarios that these participants typically encountered. There were two main categories of videos created; there were basic conversational scenarios, such as 'what one did over the weekend' and 'how are you?' discussions. The other main category was 'issue' scenarios in which a problem occurred; these scenarios included both 'simple' issues such as receiving the

wrong amount of change or receiving the wrong order at a restaurant, and also ‘higher order’ issues, such as a performance evaluation or asking a boss for a certain request.

A graduate student in speech-language pathology transcribed the video recordings. I designed the coding measures needed to measure change in those features of interest, as the rationale of this study was to find out whether reliable and appropriate outcome measures could be determined for these pragmatic goals. The purpose was to assist in devising measures that could then also be transferred and applied to other social communication interventions, potentially both clinically and in future efficacy studies. Once created, I used these coding criteria to measure the occurrences of the social behaviors in the participants’ video attempts. Videos of the models were coded as well, so that participant performance could be compared to model performance. Reliability coding is ongoing at this point in time and is not yet completed, but plans are ongoing to carry this out.

## **Data Analysis**

### **Research Question 1**

In order to answer research question one, “What outcome measures can be determined to measure the pragmatic goals of individuals with ASD, that can be applied reliably and validly to show progress from social communication intervention?” coding measures were created that would be quantifiable regarding the behaviors of interest. First, to determine the coding measures, each participant was analyzed in order to determine the main intervention goals of each individual. Participant A’s goals were to appropriately make requests and incorporate social niceties into discourse. Participant B’s goals were to increase the complexity of his utterances and to show engagement for more natural interactions. Participant C’s goals were to increase politeness to enhance work communication and to reflect femininity through tone of voice and

discourse. Then, using the intervention goals, coding measures were chosen for each participant. Although some of the coding measures were consistent among participants, there nonetheless were different reasons for targeting those intervention goals. MLU in words was used as a rough estimate to determine the complexity of all of the participants' videos. For Participant A and Participant B, the non-verbal features of facial expressions and posture were coded, as these were previously missing or not prevalent in their social interactions. However, facial expressions and posture were not coded for Participant C, as she voiced a concern towards working on multiple social skills at one time. Politeness markers and indirectness in requesting were used as a coding measures for Participant A and Participant C, as both participants lacked these elements in their discourse, and they also lacked a full understanding of the purpose of these social elements. Participant B was not coded for politeness markers and indirectness in requesting, as these were not the focus of his video models in the intervention.

Specific definitions and examples were then developed for each coding measure in order to assist with clarity and ultimately to be used in training for future work investigating stability of the measures using new raters, to determine interrater reliability. Tables 1-3 in Appendix A contain each participant's coding measures, with the measures' definitions and examples. Once these measures were developed, each participant's video attempts were coded in order to examine whether evidence could be found to suggest that the intervention goals were improved in the individual by the end of the study.

### **Research Question 2**

In order to answer research question two, "How does the participants' performance of these pragmatic skills compare to the models' performance?" the videos of the models were coded, using the same coding measures that were developed for the participants. The coding of

the models' performances for each of the social scenarios can be viewed in Table 7 of Appendix C. This data was then used to compare model performance to participant performance, in order to determine whether or not the participants copied the models' social behaviors. Then, a brief summary was created, comparing observations of each participant's performance to that of the models' performance. In the current study, two videos for each participant were compared with model performance; performance was compared in one basic conversational scenario and then in one issue scenario.

For Participant A, the basic conversational scenario that was chosen to analyze was the 'Fourth of July conversation,' and the issue scenario that was chosen was 'Telling of a mistake at a restaurant.' For Participant B, the basic conversational scenario that was analyzed was the 'Fourth of July conversation' as well, and the issue scenario that was chosen was 'receiving the wrong change back.' Lastly, for Participant C, the basic conversational scenario that was analyzed was the 'Wendy's Drive Thru,' and the issue scenario that was analyzed was 'Unable to retrieve files (neuropathy).' These particular scenarios were chosen for the comparison, as they were specific scenarios from the participants' lives they had voiced concerns with.

## **Results**

### **Research Question 1**

For research question one, "What outcome measures can be determined to measure the pragmatic goals of individuals with ASD, and to be applied reliably and validly to show progress from social communication intervention?" once the measures were developed, results from the coding were analyzed to determine the reliability and validity of the measures. Tables 4-6 in Appendix B contain all of the raw data resulting from this coding. It should be noted that Participant C has more video attempts shown in the tables, which is due to her ability to practice

more scenarios during the sessions, as she was a higher functioning individual than Participant B and was more willing to make multiple attempts and respond to clinician direction than Participant A. In contrast, the other two participants have fewer video attempts. In fact, Participant A was resistant to some of the targeted behaviors, and because Participant B was lower functioning, he needed more time with each scenario.

Following is a brief summary of data found in the tables for each participant's coding measures. It was found that Participant A's MLU in words was shorter in the basic conversational scenarios at an average of 3.44, and MLU in words was longer in the issue scenarios at an average of 8.13. For facial expressions/posture, she had limited compliance with incorporating these into her discourse, which led to minimal change. It was noted that her smiles appeared more frequent in later sessions, although they were lacking in the issue scenarios; also, politeness markers were lacking in the issue scenarios. As for indirectness in requesting, there was some evidence that the participant exhibited an increase; for example, in the issue scenarios, she explained why the amount of change that she received was incorrect, rather than simply saying that it was incorrect.

Participant B's MLU in words was the lowest of the participants, at an average of 2.5. However, MLU in words became longer in the issue scenarios, at an average of 8. For facial expressions, his eyes were downcast in the beginning sessions, but eye contact was observed by Session 6. His smiles often seemed delayed and unnatural in the beginning sessions, but it was noted that his smiles became more consistent by the last three sessions. Posture movement was little to non-existent, until Session 9, in which he showed shifting of the shoulders in order to indicate active listening.

For Participant C, as for the other participants, MLU in words was greater in the scenarios that required extra explanations. As for her politeness markers, they were at first limited to “hi,” “thanks,” and “thank you,” and these responses were very delayed, often not being spoken until six to eight seconds after the other individual had spoken. However, other politeness markers were incorporated in the later sessions, such as “you too” and “no problem.” Lastly, for indirectness in requesting, which was one of her primary intervention targets, there was a large increase. For example, in one video scenario the participant was asked to retrieve files, but was unable to do so due to the pain in her feet from neuropathy. In the beginning sessions, she at first did not explain why she could not retrieve the files, but simply stated that she had recently been to that location. As the sessions continued, she incorporated greater explanations, explaining that her feet hurt so she could not retrieve the files. Finally, by the last few sessions, her explanations became more elaborate by explaining that due to her neuropathy, her feet hurt her, so she was unable to retrieve the files at that moment. She also offered a solution to the issue, such as going to retrieve them later that day.

## **Research Question 2**

To answer research question number two, “How does the participants’ performance of these pragmatic skills compare to the models’ performance?” coding results were compared and contrasted between the models’ performance and the participants’ performance, in a basic conversational scenario and an issue scenario. The following is a brief summary of the comparison that was done.

Participant A’s basic conversational scenario that was chosen to compare to the model was the ‘Fourth of July conversation.’ The model’s MLU in words was 2.67, while Participant A had an average MLU in words of 3.43. As for facial expressions and posture, the model

incorporated numerous nods and smiles, leaned backward and forward, tilted the head, grimaced, and crinkled the nose. The participant likewise incorporated head tilts and nods, leaned forward, and furrowed and raised her eyebrows numerous times, but showed a decreased number of smiles in comparison to the model. Lastly, for politeness markers, the model said two politeness markers, “Oh fun” and “That sounds great.” The participant said “awe” twice, “good,” “how nice,” and “great,” and had none present in one of the attempts.

For Participant A’s issue scenario, ‘Telling of a mistake at a restaurant,’ the model had an MLU in words of 7.75, while the participant had an average MLU in words of 6.5. For facial expressions and posture, both the model and the participant demonstrated leaning forward and backward, and they also both furrowed the eyebrows. Additional facial expressions and posture that the participant demonstrated, that the model did not, include head tilting and successive head nods. Another difference between the participant and the model was again in regards to smiling. The model showed a wider smile that was held for a longer amount of time; on the other hand, in one attempt the participant showed a very slight smile, and in the second attempt there were no smiles coded. For politeness markers, the model said, “excuse me,” “great,” and “thank you,” and the participant did not use any politeness marker words. Lastly, for indirectness in requesting, the model indicated indirectness by saying, “um” and “do you think.” The participant indicated indirectness by saying “oh,” “might be,” “I think,” “I thought,” and “could we.”

Participant B’s basic conversational scenario that was compared to the model was the ‘Fourth of July conversation’ as well. The model had an MLU in words of 2.67, while the participant had an average MLU in words of 1.92. For facial expressions and posture, the model had a greater number of slight smiles, nodding, leaning the head back and forward, grimacing,

and crinkling of the nose. The participant showed slight head nods, eyebrow rising, and began to increase eye contact and smiles throughout the attempts.

Participant B's issue scenario that was compared was the 'Wrong change' scenario. The model had an MLU in words of 8.5, and the participant had an average MLU in words of 8. For facial expressions and posture, the model showed head tilting, a very slight smile, and then another smile at the end. The participant had no facial expressions present in the first attempt, and then showed a very slight smile at the end of the conversation

Participant C's basic conversational scenario that was chosen to compare to the model was the 'Wendy's drive thru' scenario. The model's MLU in words was 8.33, while the participant's MLU in words was an average of 5.48. For politeness markers, the model used the word "please" twice. The participant had no politeness markers present in the first attempt, said "hi" and "thank you," and had no response at the end of the second attempt. She then said "thanks" and "thank you" with a seven second delay at the end of the conversation of the third attempt. Lastly, for indirectness in requesting, the model suggested indirectness by saying, "can I," and the participant had none present.

Participant C's issue scenario that was chosen for comparison was the 'Unable to retrieve files (neuropathy)' scenario. For the model, MLU in words was 8.75. The participant's MLU in words was an average of 9.7, and there was a major increase between the last two attempts, from a MLU in words of 7.8 to a MLU in words of 14.67. For politeness markers, the model said, "I'm so sorry," "I promise," and "no problem." The participant used the politeness markers "please," "thank you," "thanks a lot," and had no politeness markers present in two of the attempts. Lastly, for indirectness in requesting, the model for this scenario said "oh," "um," offered another solution to the problem, and specifically explained why she could not retrieve the

files. The participant indicated indirectness by saying, “well um,” “oh,” “uh,” and “actually.” She also offered explanations as to why she could not retrieve the files, and she showed a steady increase in the complexity of these explanations as the sessions progressed.

### **Discussion**

The purpose of this exploratory study was to begin to identify appropriate outcome measures for complex social communication interventions. The study developed measures that are quantifiable regarding the behaviors targeted in intervention, and these measures were used to evaluate participant progress, and to compare participant performance to model performance.

In developing the coding measures for the research question “What outcome measures can be determined to measure the pragmatic goals of individuals with ASD, that can be applied reliably and validly to other social communication intervention?” during the course of data analysis it became apparent that the measures differed in complexity when attempting to code the videos. In particular, coding for facial expressions was found to be challenging because of the rapid transitions from one facial expression to the next. Therefore, coding for facial expressions requires greater time and very detailed consideration. On the other hand, MLU in words is a straightforward measurement, and could even be computed just using software. Similarly, once politeness markers are identified, they only need to be isolated and counted. Overall, reliability measures have yet to take place, but it is predicted that those measures that have a rapid occurrence are likely to have a lower reliability.

Based on the results from the coding of Participant A, it is suggested that this participant still struggled to understand the concept of using social niceties in multiple conversation topics, even those situations where one may not want to be polite. This is indicated in the lack of politeness markers and smiling in the issue scenarios, which is due to her limited compliance

with incorporating these into her discourse. It should be noted that if a client is not willing to attempt a social skill that is otherwise ‘uncomfortable feeling’ to them, then there is not likely to be any therapeutic change. However, it appeared that this participant showed an ability to increase the complexity of her utterances when further explanations were needed; this increase in complexity is evident in the ‘wrong change’ example, in which she thoroughly explained why the amount of change she received was incorrect, providing the other person with a shared point of view.

Evaluating the results of the coding of Participant B, it is suggested that he was able to increase the length of his utterances in situations where explanations were needed to solve a problem, based on his increase in MLU in words for these scenarios. Also, it appeared that the participant became more comfortable in integrating eye contact and smiles into the social scenarios, as both features became more consistent throughout the sessions. Finally, posture movement appeared to be the most significant observation for this participant, as it was incorporated in one of later sessions after never being observed beforehand.

In evaluating the results of the coding of Participant C, the delayed responses in her speech were very notable, and these delays can clearly create discomfort in a conversation. However, for politeness markers, it is found that she incorporated new phrases in the later sessions, rather than only being limited to the basic ones she used initially. Finally, the intervention target of indirectness in requesting appeared to be the most significant improvement for this participant, as she showed the ability to add detailed explanations to offer another individual a shared point of view to understand the problems that resulted from her neuropathy.

It is possible that there may be some speculation regarding a difference between the intervention Participant C received and what Participants A and B received. This is because

Participant C interacted with a different clinician, in which there appeared to be greater counseling incorporated into the sessions. Furthermore, this participant asked many questions during intervention and showed more concerns in regards to altering her social skills. Both of these factors could have had a significant impact on the results for this participant.

Comparing the models' performances to the participant's performances offers some insight into whether or not the participants copied the models. However, only two scenarios were chosen for each participant, a basic conversational scenario and an issue scenario. Therefore, this analysis is a pilot for future work that will compare more samples, eventually adding greater insight.

In evaluating the results of the comparison for Participant A's basic conversational scenario, the 'Fourth of July conversation,' participant's MLU in words was slightly larger than the model's, but not substantially. Also in this scenario, it appeared that she was able to follow many of the same facial expressions/posture that the model did, but the major facial expression difference is in regards to smiles; the participant incorporated a lower number of smiles in her attempts. Lastly, although the politeness markers that the participant said slightly differed from the model's politeness markers, they were still very similar phrases. In fact, this shows that the participant had ability to spontaneously use her own politeness markers, rather than only copying the phrases that the model used.

Evaluating the comparison between model and participant performance for the issue scenario of 'Telling of a mistake at a restaurant,' Participant A had a slightly lower MLU in words, but once again, it was not a substantial difference. For facial expressions, it appeared that the participant incorporated additional facial expressions/posture that the model did not (head tilting, successive head nods). However, as also seen in the basic conversational scenario, the

participant showed little to no smiles, as she was noncompliant, which greatly differed from the model's demonstrated smiling. Lastly, indirectness in requesting appeared similar between participant and model, but politeness markers differed; the model used three different phrases, but the participant showed none, showing that she was unable to master that goal for this scenario.

In evaluating the results of the comparison for Participant B's basic conversational scenario, the 'Fourth of July conversation,' MLU in words was slightly lower than the model's, but not significantly lower. In facial expressions/posture, the participant was similar to the model in nodding. However, the model showed a greater number of smiles, and likewise incorporated posture movement, which the participant did not. Therefore, posture movement was found to be rarely or non-existent in the participant's social interactions.

For Participant B's issue scenario, the 'Wrong change' scenario, MLU in words was very close between model and participant. For facial expressions/posture, the model showed limited use of this measure, with head tilting, and two smiles. The participant did not show head tilting, but he did incorporate smiling at the end of the second attempt; in the first attempt, there were no facial expressions present. It can be summarized that this participant likely found smiling to be uncomfortable, and he also did not incorporate posture movement into his discourse as the model did, which was commented on in the above scenario.

In evaluating the results of the comparison for Participant C's basic conversational scenario, the 'Wendy's drive thru' scenario, MLU in words was lower than the model's MLU in words by 2.85, so it is possible that her utterances were not as elaborative as the model's. Interestingly, the model's politeness markers only consisted of "please" twice, while the participant's politeness markers consisted of "hi," "thanks," and "thank you." Therefore, the

participant actually incorporated appropriate politeness markers that the model did not. However, a weakness for the participant was her delay in saying “thanks” or “thank you” at the end of the conversation, and she also never incorporated “please.” Lastly, for indirectness in requesting, the model suggested indirectness by saying, “can I,” while the participant did not use indirectness. However, it should be noted that indirectness in requesting is not as necessary to incorporate in these basic conversational scenarios, while it becomes much more necessary to use in the issue scenarios.

For Participant C’s issue scenario that was chosen for comparison, the ‘Unable to retrieve files (neuropathy)’ scenario, the participant showed a greater MLU in words than the model, by about 1. Major progress is evident through the progression of the participant’s attempts, based on the 6.87 increase between the second to last attempt and the last attempt. The participant significantly increased her explanations in this scenario, and so this is reflected in the increase in MLU in words. For politeness markers, the words used differed between participant and model; this does not mean that the participant’s performance was incorrect, but it could be argued that more ‘sincere’ terminology was used in the model’s speech, in the model saying “I’m *so* sorry” and “I promise.” Lastly, for indirectness in requesting, the participant’s performance very closely aligned with the model’s performance by the end of the intervention. Although explanations may have slightly been lacking in the initial attempts, during the later portion of the intervention the participant eventually learned to follow the model’s example of adding extra explanations, to provide the listener with a better-shared point of view.

Further information about the feasibility and validity of this study can be gleaned from examining the informal interviews conducted with each participant at the close of intervention. In general, participants responded favorably regarding the intervention. However, with further

discussion, participants revealed concerns about certain challenges of video modeling that they suggested need refinement. One mentioned problem is that it is difficult to find ways to generalize the scenarios from the videos to everyday life scenarios. For example, some situations in life are not as simple as rehearsing how to ask for the right amount of change or not wanting ice in your drink. Therefore, it is important to devise example videos that will have more generalizable scenarios to make it clear to the client that the social skill can be used in a number of situations. This can be difficult to accomplish, especially due to the fact that individuals with ASD often interpret things very literally, and may not understand the general use of a particular social skill.

Another comment was that there is a lack of resources for adults with ASD, and the focus for intervention is typically on younger individuals. As for the resources for adults with ASD that do exist, they often lack a counseling aspect to determine the individual's specific needs. This participant perspective closely aligns with the literature today (Reichow & Volkmar, 2009). Therefore, there must be continued advocacy for adults with ASD, with a particular focus on resources that can assist them with vocational skills. Employment is important for both finances and personal fulfillment, so supports must be given to adults with ASD so that the unemployment rates that exist among this population decrease, as they are among the highest out of all individuals with Intellectual and Developmental Disabilities (IDD) (Burke et al., 2013). Specific to the topic of video modeling, it could be beneficial to incorporate job interview skills and common workplace conversations/ situations into the models to better equip the individual.

A positive aspect of the intervention noted by participants was its one-on-one nature. Participants noted that therapy options such as group therapy might not have high popularity because individuals with ASD can be uncomfortable with group situations. It was suggested that

these interventions could often appear frightening and intimidating. A potentially negative aspect of the approach was mentioned by one participant, who pointed out that some clients might be overly sensitive and not open to the feedback that results from this type of intervention; in other words, the participant must be willing to undergo constructive criticism for this intervention to be successful.

### **Future Directions**

This study discussed in this paper has some limitations that are important to note. First, because it was a feasibility study lacking in experimental control, it is impossible to determine if any changes noted are attributable to the intervention. On one hand, a participant may have truly benefited from the video modeling intervention. However, on the other hand, they may have simply showed some of targeted social skills simply because they started to become more comfortable with the clinicians. It should also be noted that it is unknown whether these participants adequately learned the purpose behind these social skills, or if they instead only learned to exactly copy the models' performances. If they were only copying at the moment when request to do so, it might be difficult for the participants to generalize these social behaviors to everyday life situations, when a situation is not guaranteed to be a certain way. Another limitation is the difficulty in coding for some of the targets. For example, coding facial expressions proved to be challenging, as a great number of facial expressions can be shown in a very limited amount of time. As a result, it can be difficult to adequately code for all of the facial expressions that an individual may show. Also, some codes have the potential to fit under more than one category. For example, an indirect request could also be considered a politeness marker, as both are used when trying to be polite. Therefore, there is potential for some ambiguity when determining which code to give a particular behavior or utterance. Lastly, another limitation is in

regards to the differences in clinicians, as one of the participants interacted with a different clinician. It is likely that differences in clinician style had somewhat of an effect on the participants' results. Clinician style was not controlled, which should be addressed in future studies.

To improve upon the current study, coding training is being conducted to obtain interrater reliability numbers. In the future, other coding measures could be created to look more in depth into how the video modeling affected each participant. Also, video modeling could be implemented for a greater amount of time in order to look for any longer lasting effects of the intervention. Future research incorporating experimental control would be needed to determine efficacy. Findings from the present work could assist other clinicians in finding coding measures to determine the efficacy of video modeling and in order to determine the clients' strengths and weaknesses, as well as to design future studies. Based on the observations that resulted from coding for this study, some improvements appeared to be evident in the participants, but it is unknown whether these observed skills were a direct result of the video modeling, and it is also unknown whether the skills continued and improved past the intervention.

## **Conclusion**

Although the results of this current study are based on a pilot study looking at only three individuals, there are still some insights into the intervention of video modeling that could influence clinical practice. If clinicians consider all of the necessary factors that lead to success, then this intervention can be molded to fit the specific needs of every individual. First, the psychosocial toll that these individuals may experience as a result of their social impairments must be noted and understood by clinicians. Similarly, clinicians must fully understand the social scenarios that their clients are commonly placed in, so that videos can be properly created to

match these scenarios. Furthermore, it must be remembered that when working on these social skills in therapy, the skills do not come naturally to these individuals, so it is important to not overwhelm them by targeting numerous intervention goals at one time.

As for the coding that was conducted in this current study, although it is difficult to pinpoint whether or not there was true improvement as a result of the video modeling, the measures may still be used in other social communication interventions as well to measure client progress. Overall, the results of this study bring to light the potential that video modeling has in improving the social communication of adults with ASD. The findings from this work may help clinicians design video modeling to best fit the needs of each individual client.

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## Appendix A

**TABLE 1 – Participant A Coding Measures**

<b>Measure</b>	<b>Definition</b>	<b>Examples</b>
<b>MEAN LENGTH OF UTTERANCE (MLU) IN WORDS</b>	A measure of linguistic production that is calculated by counting the number of words in each utterance, summing these numbers together, and dividing by the number of utterances to find the average.	P2 Oh, I think I gave you fifty dollars, so I don't think this change is enough.  P2 Thank you.  Total words = 18 18 words divided by 2 utterances = <b>9</b>
<b>FACIAL EXPRESSIONS/POSTURE</b>	Any change in the face that is a result of listening or accompanies speaking, and other movements in posture that indicate active listening, such as the body moving forward, head movements, etc.	-Raising/furrowing of eyebrows -Opening/Closing of the mouth (without speaking) -Eyes widening/narrowing -Smiling -Lips pursed, pulled up or down
<b>POLITENESS MARKERS IN SPEECH/ INDIRECTNESS IN REQUESTING</b>	Politeness markers are any words that are added to spoken discourse to make it appear more 'polite' to the listener.  Indirectness involves communicating wants and needs by giving reasons and providing background information.	<i>Politeness markers:</i> -"Hi" -"How are you" -"Thank you" -"Please" -"I see; tell me more"  <i>Indirectness:</i> -"Um" -"Oh, uh" -Any added reasoning/background information provided

**TABLE 2 – Participant B Coding Measures**

<b>Measure</b>	<b>Definition</b>	<b>Examples</b>
<b>MEAN LENGTH OF UTTERANCE (MLU) in</b>	Mean length of utterance in words is a measure of	P2 Oh, I think I gave you fifty dollars, so I don't think

<b>words</b>	linguistic production that is calculated by counting the number of words in each utterance, summing these numbers together, and dividing by the number of utterances to find the average.	this change is enough.  P2 Thank you.  Total words = 18 18 words divided by 2 utterances = <b>9</b>
<b>FACIAL EXPRESSIONS/POSTURE</b>	Any change in the face that is a result of listening or accompanies speaking, and other movements in posture that indicate active listening, such as the body moving forward, head movements, etc.	-Raising/furrowing of eyebrows -Opening/Closing of the mouth (without speaking) -Eyes widening/narrowing -Smiling -Lips pursed, pulled up or down

**TABLE 3 – Participant C Coding Measures**

<b>Measure</b>	<b>Definition</b>	<b>Examples</b>
<b>MEAN LENGTH OF UTTERANCE (MLU) in words</b>	Mean length of utterance in words is a measure of linguistic production that is calculated by counting the number of words in each utterance, summing these numbers together, and dividing by the number of utterances to find the average.	P2 Oh, I think I gave you fifty dollars, so I don't think this change is enough.  P2 Thank you.  Total words = 18 18 words divided by 2 utterances = <b>9</b>
<b>POLITENESS MARKERS IN SPEECH/ INDIRECTNESS IN REQUESTING</b>	A politeness marker is any word that is added to spoken discourse to make it appear more 'polite' to the listener.  Indirectness involves communicating wants and needs by giving reasons and providing background information.	<i>Politeness markers:</i> -“Hi” -“How are you” -“Thank you” -“Please” -“I see; tell me more”  <i>Indirectness:</i> -“Um” -“Oh, uh” -Any added reasoning/ background information provided

## Appendix B

**TABLE 4 - Participant A Coding Tables****MLU in Words**

<b>Video Number/Name</b>	<b>MLU in Words</b>
<b>Session 5 Part 1</b> (Fourth of July conversation)	<b><u>Attempt 1:</u></b> 4.8 <b><u>Attempt 2:</u></b> 4.17
<b>Session 5 Part 2</b> (Fourth of July conversation)	<b><u>Attempt 1:</u></b> 0 <b><u>Attempt 2:</u></b> 4.75
<b>Session 6 Part 1</b> (Asking for help at store)	4.25
<b>Session 6 Part 2</b> (Telling of a mistake at a restaurant – no ice)	5.5
<b>Session 6 Part 3</b> (Telling of a mistake at a restaurant – no mustard)	7.5
<b>Session 7</b> (Receiving the wrong change back)	<b><u>Attempt 1:</u></b> 10.5 <b><u>Attempt 2:</u></b> 9

**Facial Expressions/Posture**

<b>Video Number/Name</b>	<b>Facial Expressions/ Posture Observed</b>
<b>Session 5 Part 1</b> (Fourth of July conversation)	<p><b><u>Attempt 1:</u></b></p> <ul style="list-style-type: none"> <li>-Head tilted to right side</li> <li>-Lips pursed</li> <li>-Eyebrows furrowed in concentration</li> <li>-Eyebrows raised while nodding</li> <li>-Eyebrows furrow with a one-sided smile (out of surprise)</li> <li>-Head tilt back to middle</li> <li>-Eyebrows furrow</li> <li>-Frown with head nod</li> <li>-Head tilts back with smile</li> <li>-Leans forward and rests chin in hands</li> <li>-Eyebrows furrow, fingers intertwined and continue to hold up chin</li> <li>-Nod with a smile</li> </ul> <p><b><u>Attempt 2:</u></b></p> <ul style="list-style-type: none"> <li>-Head tilted to left, eyes widened</li> <li>-Head tilts forward, eyebrows raise</li> <li>-Lean forward, eyes widen</li> <li>-Head tilts to left, eyebrows furrow</li> <li>-Head leans forward eyes widen</li> </ul>

	<ul style="list-style-type: none"> <li>-Smile and body leans forward</li> <li>-Eyes widen, head nod, and eyebrows raise</li> <li>-Head tilts to left, lips pursed</li> <li>-Eyebrows furrow, eyes squint, head nods</li> <li>-Smile with head nods</li> </ul>
<b>Session 5 Part 2</b> (Fourth of July conversation)	<p><b><u>Attempt 1:</u></b></p> <ul style="list-style-type: none"> <li>-Head tilted to side</li> <li>-Eyebrows furrowed, then raised</li> <li>-Head nodding</li> <li>-Head tilt</li> <li>-Eyebrows furrowed</li> <li>-Head nodding</li> <li>-Head nodding</li> </ul> <p><b><u>Attempt 2:</u></b></p> <ul style="list-style-type: none"> <li>-Head nodding</li> <li>-Eyebrows raise</li> <li>-Eyes widen</li> <li>-Head nod</li> <li>-Hold head up with hand</li> <li>-Head tilted</li> <li>-Eyebrows furrowed</li> <li>-Eyebrows raise</li> <li>-Eyebrows furrowed</li> <li>-Eyes roll around</li> <li>-Leaning forward</li> <li>-Hand under chin</li> <li>-Eyebrows furrowed</li> <li>-Smirk</li> <li>-Head nod</li> </ul>
<b>Session 6 Part 1</b> (Asking for help at store)	<ul style="list-style-type: none"> <li>-Head tilts to left</li> <li>-Head leans forward</li> <li>-Eyebrows raise</li> <li>-Eyebrows furrow</li> <li>-Head nods</li> <li>-Head leans back</li> <li>-Eyes widen</li> <li>*Note- smile (most genuine looking one observed yet in the participant)</li> </ul>
<b>Session 6 Part 2</b> (Telling of a mistake at a restaurant – no ice)	<ul style="list-style-type: none"> <li>-Lean body back</li> <li>-Eyebrows raised</li> <li>-Leans body forward</li> <li>-Soft eyes</li> <li>-Head tilted to the left</li> <li>-Slight smile</li> </ul>

<p><b>Session 6 Part 3</b> (Telling of a mistake at a restaurant – no mustard)</p>	<ul style="list-style-type: none"> <li>-Eyebrows furrowed</li> <li>-Head tilted back</li> <li>-Eyes widen and eyebrows raise</li> <li>-Head nod with eyebrows raised</li> <li>-Eyebrows furrowed with lips pursed</li> <li>-Head tilted to left</li> <li>-Eyebrows raised and eyes widened</li> <li>-Multiple successive head nods</li> </ul>
<p><b>Session 7</b> (Receiving the wrong change back)</p>	<p><b><u>Attempt 1:</u></b></p> <ul style="list-style-type: none"> <li>-Eyebrows furrowed</li> <li>-Looking up and down successively</li> <li>-Bites lip</li> <li>-Eyes Squinted</li> <li>-Head shaking</li> <li>-Soft eyes with eyebrows raised</li> <li>-Head nods</li> </ul> <p><b><u>Attempt 2:</u></b></p> <ul style="list-style-type: none"> <li>-Eyebrows furrowed</li> <li>-Eyebrows raised, looking up and down from other person’s face to the “money”</li> <li>-Head shakes back and forth</li> <li>*No facial expressions to accompany end utterance</li> </ul>

**Politeness Markers**

<p><b>Video Number/Name</b></p>	<p><b>Politeness Markers Observed</b></p>
<p><b>Session 5 Part 1</b> (Fourth of July conversation)</p>	<p><b><u>Attempt 1:</u></b></p> <ul style="list-style-type: none"> <li>-Awe</li> <li>-Awe</li> <li>-Good</li> </ul> <p><b><u>Attempt 2:</u></b></p> <ul style="list-style-type: none"> <li>-How nice</li> </ul>
<p><b>Session 5 Part 2</b> (Fourth of July conversation)</p>	<p><b><u>Attempt 1:</u></b></p> <ul style="list-style-type: none"> <li>-None (no utterances)</li> </ul> <p><b><u>Attempt 2:</u></b></p> <ul style="list-style-type: none"> <li>-Great</li> </ul>
<p><b>Session 6 Part 1</b> (Asking for help at store)</p>	<ul style="list-style-type: none"> <li>-Excuse me</li> <li>-Please</li> <li>-Please</li> <li>-Thank you</li> <li>-Great</li> </ul>

<b>Session 6 Part 2</b> (Telling of a mistake at a restaurant – no ice)	-Softened tone at the end of utterance
<b>Session 6 Part 3</b> (Telling of a mistake at a restaurant – no mustard)	*Note- none present- overall, not as polite of an approach as previous videos had shown
<b>Session 7</b> (Receiving the wrong change back)	<b><u>Attempt 1:</u></b> *No politeness markers present  <b><u>Attempt 2:</u></b> -Thank you (at end of conversation)

### **Indirectness in Requesting**

<b>Video Number/Name</b>	<b>Indirectness in Requesting Observed</b>
<b>Session 5 Part 1</b> (Fourth of July conversation)	<b><u>Attempt 1:</u></b> -Oh  <b><u>Attempt 2:</u></b> -Oh -Oh -Oh -Oh
<b>Session 5 Part 2</b> (Fourth of July conversation)	<b><u>Attempt 1:</u></b> -None (no utterances)  <b><u>Attempt 2:</u></b> -Oh -Oh -Oh
<b>Session 6 Part 1</b> (Asking for help at store)	-Uh
<b>Session 6 Part 2</b> (Telling of a mistake at a restaurant – no ice)	-Oh (utterance held out for longer period of time) - <i>Might</i> be
<b>Session 6 Part 3</b> (Telling of a mistake at a restaurant – no mustard)	-I think -I thought -Could we
<b>Session 7</b> (Receiving the wrong change back)	<b><u>Attempt 1:</u></b> -Oh (utterance held out for long period of time) -Um -I think -Oh -Giving extra explanation as to why she received the wrong change  <b><u>Attempt 2:</u></b>

	<ul style="list-style-type: none"> <li>-Oh (utterance held out)</li> <li>-I think</li> <li>-Giving extra explanation as to why she received the wrong change</li> <li>-I don't think</li> </ul>
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**TABLE 5 – Participant B Coding Tables****MLU in Words**

<b>Video Number/Name</b>	<b>MLU in Words</b>
<b>Session 4</b> (Fourth of July conversation)	<u>Attempt 1:</u> 1 <u>Attempt 2:</u> 1.67 <u>Attempt 3:</u> 2 <u>Attempt 4:</u> 3
<b>Session 5 (Set 1)</b> (Basic conversational scenario)	<u>Attempt 1:</u> 2 <u>Attempt 2:</u> 2.25 <u>Attempt 3:</u> 2 <u>Attempt 4:</u> 2.25 <u>Attempt 5:</u> 2 <u>Attempt 6:</u> 2
<b>Session 5 (Set 2)</b> (Receiving the wrong change back)	<u>Attempt 1:</u> 7.5 <u>Attempt 2:</u> 8.5
<b>Session 6</b> (Basic conversational scenario)	<u>Attempt 1:</u> 2.5 <u>Attempt 2:</u> 2.5 <u>Attempt 3:</u> 2.5 <u>Attempt 4:</u> 2.33 <u>Attempt 5:</u> 2.67
<b>Session 6a</b> (Basic conversational scenario)	<u>Attempt 1:</u> 2.5 <u>Attempt 2:</u> 2.5 <u>Attempt 3:</u> 2.5 <u>Attempt 4:</u> 2.5 <u>Attempt 5:</u> 2.33 <u>Attempt 6:</u> 2.67 <u>Attempt 7:</u> 2.67 <u>Attempt 8:</u> 2.33 <u>Attempt 9:</u> 2 <u>Attempt 10:</u> 2
<b>Session 8</b> (Basic conversational scenario – what happened over the weekend)	<u>Attempt 1:</u> 2.25 <u>Attempt 2:</u> 2.33 <u>Attempt 3:</u> 2 <u>Attempt 4:</u> 2 <u>Attempt 5:</u> 3.74 <u>Attempt 6:</u> 4.22 <u>Attempt 7:</u> 2

<b>Session 9</b> (Basic conversational scenario – what happened over the weekend)	<u><b>Attempt 1:</b></u> 2.25 <u><b>Attempt 2:</b></u> 2.25 <u><b>Attempt 3:</b></u> 2 <u><b>Attempt 4:</b></u> 2.75 <u><b>Attempt 5:</b></u> 2.67 <u><b>Attempt 6:</b></u> 4.2 <u><b>Attempt 7:</b></u> 3.8
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### Facial Expressions/ Posture

Video Number/Name	Facial Expressions/ Posture Observed
<b>Session 4</b> (Fourth of July conversation)	<u><b>Attempt 1:</b></u> -Very slight head nod -Very slight head nod -Eyes cast downward  <u><b>Attempt 2:</b></u> -Smile -Slight head nods -Eyes cast downward -Slight smile -Eyes raised -Slight eyebrows raised  <u><b>Attempt 3:</b></u> -Head tilted backward -Eyes raised/squinted -Slight smile arises while listening *Note: no other facial expressions present while listening to the speaker, only during speaking -Smile -Smile  <u><b>Attempt 4:</b></u> -Head nods (more pronounced nods than usually shown) -Smile at the end of utterance
<b>Session 5 (Set 1)</b> (Basic conversational scenario)	<u><b>Attempt 1:</b></u> -Smile  <u><b>Attempt 2:</b></u> -Raises eyebrows -Widens eyes -Waves with right hand -Smile

	<p>-Smile</p> <p><b><u>Attempt 3:</u></b> -Slight one-sided smile</p> <p><b><u>Attempt 4:</u></b> -Eyes widen -Eyebrows rise -Smile</p> <p><b><u>Attempt 5:</u></b> -Smile (only at end of conversation)</p> <p><b><u>Attempt 6:</u></b> -Very slight smile -Slight nod at end</p>
<p><b>Session 5 (Set 2)</b> (Receiving the wrong change back)</p>	<p><b><u>Attempt 1:</u></b> *No facial expressions present</p> <p><b><u>Attempt 2:</u></b> -Very slight smile at end of conversation</p>
<p><b>Session 6</b> (Basic conversational scenario)</p>	<p><b><u>Attempt 1:</u></b> -Slight head nodding -Smile</p> <p><b><u>Attempt 2:</u></b> -Smile -Slight nod -Slight nod -Slight Smile -Smile at end</p> <p><b><u>Attempt 3:</u></b> -Hand wave with right hand -Smile -Smile at end of conversation -Eye contact held throughout</p> <p><b><u>Attempt 4:</u></b> *Note: no facial expressions evident</p> <p><b><u>Attempt 5:</u></b> *Note: no facial expressions evident</p> <p><b><u>Attempt 6:</u></b> -Smile</p>

	<p><b><u>Attempt 7:</u></b> -Smile</p> <p><b><u>Attempt 8:</u></b> -3 consecutive nods -4 more consecutive nods -Slight smile</p>
<p><b>Session 6a</b> (Basic conversational scenario)</p>	<p><b><u>Attempt 1:</u></b> -Quick smile -Slight nod -Smile</p> <p><b><u>Attempt 2:</u></b> -Slight smile -Slight nod -Slight nod -Slight nod</p> <p><b><u>Attempt 3:</u></b> -Smile</p> <p><b><u>Attempt 4:</u></b> *Note: no facial expressions present</p> <p><b><u>Attempt 5:</u></b> *Note: no facial expressions present</p> <p><b><u>Attempt 6:</u></b> -Smile -Smile (looks forced)</p> <p><b><u>Attempt 7:</u></b> *Note: no facial expressions</p> <p><b><u>Attempt 8:</u></b> -Slight successive head nods -Slight smile</p>
<p><b>Session 8</b> (Basic conversational scenario – what happened over the weekend)</p>	<p><b><u>Attempt 1:</u></b> -Wave with right hand -Smile -Slight nod</p> <p><b><u>Attempt 2:</u></b> -Wave with right hand -Smile</p>

	<ul style="list-style-type: none"> <li>-Eyes widen</li> <li>-Eyebrows raise</li> <li>-Slight movement of head backwards</li> <li>-Slight successive head nods</li> <li>-Smile</li> </ul> <p><b><u>Attempt 3:</u></b></p> <ul style="list-style-type: none"> <li>-One-sided smile</li> <li>-Eyes widen</li> <li>-Eyes widen</li> <li>-Smile</li> <li>-Slight successive head nods</li> <li>-Very slight smile at end</li> </ul> <p><b><u>Attempt 4:</u></b></p> <ul style="list-style-type: none"> <li>-Wave with right hand</li> <li>-Smile</li> <li>-Slight nod</li> <li>-Smile</li> <li>-Slight nods</li> <li>-Slight nods</li> </ul> <p><b><u>Attempt 5:</u></b></p> <ul style="list-style-type: none"> <li>-Wave with right hand</li> <li>-Slight nod</li> <li>*Note: eyes seem to wander/concentration seemed to be lost</li> <li>-Slight nod</li> <li>-Smile</li> <li>-Smile</li> <li>-Smile</li> <li>-Slight nod</li> <li>-Smile</li> <li>-Slight nod</li> <li>-Slight smile</li> <li>-Shaking head side to side</li> </ul> <p><b><u>Attempt 6:</u></b></p> <ul style="list-style-type: none"> <li>-Wave with right hand (delayed reaction)</li> <li>-Forced smile</li> <li>-Shaking head back and forth</li> <li>*Note: not many facial expressions evident in this video</li> </ul>
<p><b>Session 9</b> (Basic conversational scenario – what happened over the weekend)</p>	<p><b><u>Attempt 1:</u></b></p> <ul style="list-style-type: none"> <li>-Eyes widen</li> <li>-Eyebrows raise</li> </ul>

	<p>-Slight smile -Very slight smile</p> <p><b><u>Attempt 2:</u></b> -Smile (larger than usual for participant) -Smile (starting to look more natural) -Smile at end of conversation</p> <p><b><u>Attempt 3:</u></b> -Eyes widen -Eyebrows raise -Slight smile -Slight smile at end *Note: larger, more genuine smiles would be more fitting at the end of a conversation</p> <p><b><u>Attempt 4:</u></b> -Slight smile -Slight smile -Widening of eyes -Head nod -Larger smile -Head nod</p> <p><b><u>Attempt 5:</u></b> -Slight nod -Slight successive nods -Widening of eyes -Head leans slightly back -Slight nod *Head tilted slightly to left side (first time head tilt observed) -Slight smile</p> <p><b><u>Attempt 6:</u></b> -Smile -Slight nod -Half smile -Eyes widen -Head nod -Slight successive nods -Slight smile -Smile</p> <p><b><u>Attempt 7:</u></b> -Smile</p>
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	<ul style="list-style-type: none"> <li>-Eyes widen</li> <li>-Smile</li> <li>-2 successive head nods</li> <li>-Slight successive nods</li> <li>-Smile</li> <li>-Slight successive nods</li> <li>-Slight successive nods</li> <li>-Slight smile</li> </ul>
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**TABLE 6 – Participant C Coding Tables****MLU in Words**

<b>Video Number Name</b>	<b>MLU in Words</b>
<b>Video 1/ My Movie 1</b> (Wendy's drive thru)	6.33 *Note: only one utterance from the participant
<b>Video 2/ My Movie 3</b> (Wendy's drive thru)	5.75
<b>Video 3/ My Movie 4</b> (Wendy's drive thru)	3.67
<b>Video 4/ My Movie 6</b> (Unable to retrieve files)	8
<b>Video 5/ My Movie 7</b> (Unable to retrieve files)	8.33
<b>Video 6/ My Movie 8</b> (Asking about bill)	5.5
<b>Video 7/ My Movie 9</b> (Working in customer service)	10.5
<b>Video 8/ My Movie 10</b> (Working in customer service)	10.67
<b>Video 9/ My Movie 11</b> (Receiving the wrong order/ requesting a change)	9
<b>Video 10/ My Movie 12</b> (Work schedule conflict)	8.33
<b>Video 11/ My Movie 13</b> (Work schedule conflict)	6.4
<b>Video 12/ My Movie 14</b> (Work schedule conflict)	8
<b>Video 13/ My Movie 16</b> (Performance Evaluation)	13
<b>Video 14/ My Movie 17</b> (Performance Evaluation)	10.7
<b>Video 15/ My Movie 18</b> (Wendy's drive thru)	6.33
<b>Video 16/ My Movie 19</b> (Asking about	5.71

bill)	
<b>Video 17/ My Movie 20</b> (Receiving the wrong order/ requesting a change)	5.75
<b>Video 18/ My Movie 21</b> (Unable to retrieve files)	7.8
<b>Video 19/ My Movie 22</b> (Performance Evaluation)	13.8
<b>Video 20/ My Movie 23</b> (Unable to retrieve files)	14.67
<b>Video 21/ My Movie 24</b> (Wendy's drive thru)	5.33
<b>Video 22/ My Movie 25</b> (Working in customer service)	7.4
<b>Video 23/ My Movie 26</b> (Receiving the wrong order/ requesting a change)	6.75
<b>Video 24/ My Movie 27</b> (Asking about bill)	4.5
<b>Video 25/ My Movie 28</b> (Wrong amount of change back)	5.5
<b>Video 26/ My Movie 29</b> (Performance Evaluation)	9.8

### Politeness Markers

<b>Video Number/Name</b>	<b>Politeness Markers Observed</b>
<b>Video 1/ My Movie 1</b> (Wendy's drive thru)	*None present
<b>Video 2/ My Movie 3</b> (Wendy's drive thru)	-Hi -Thank you *Note: no response at end/no ending "thank you"
<b>Video 3/ My Movie 4</b> (Wendy's drive thru)	-Hi -Thanks -Thank you (at end of conversation; 7 second delay)
<b>Video 4/ My Movie 6</b> (Unable to retrieve files)	-Please -Thank you (at end of conversation; 6 second delay)
<b>Video 5/ My Movie 7</b> (Unable to retrieve files)	-Thanks a lot
<b>Video 6/ My Movie 8</b> (Asking about bill)	-Hi -Thank you -Thanks again
<b>Video 7/ My Movie 9</b> (Working in customer service)	-Hi

<b>Video 8/ My Movie 10</b> (Working in customer service)	-You're welcome
<b>Video 9/ My Movie 11</b> (Receiving the wrong order/ requesting a change)	-Thank you
<b>Video 10/ My Movie 12</b> (Work schedule conflict)	*None present
<b>Video 11/ My Movie 13</b> (Work schedule conflict)	-Thank you -Thanks
<b>Video 12/ My Movie 14</b> (Work schedule conflict)	-Thank you
<b>Video 13/ My Movie 16</b> (Performance Evaluation)	*None present
<b>Video 14/ My Movie 17</b> (Performance Evaluation)	-Thank you
<b>Video 15/ My Movie 18</b> (Wendy's drive thru)	-Hi -Thanks -Thank you
<b>Video 16/ My Movie 19</b> (Asking about bill)	-Thank you -Thank you -Bye *Note: did not use a complex ending to the conversation
<b>Video 17/ My Movie 20</b> (Receiving the wrong order/ requesting a change)	-Thank you
<b>Video 18/ My Movie 21</b> (Unable to retrieve files)	*None present
<b>Video 19/ My Movie 22</b> (Performance Evaluation)	-Thank you -Thank you
<b>Video 20/ My Movie 23</b> (Unable to retrieve files)	*None present
<b>Video 21/ My Movie 24</b> (Wendy's drive thru)	-Hi -Please -Thanks -Thank you
<b>Video 22/ My Movie 25</b> (Working in customer service)	-Hi -Bye
<b>Video 23/ My Movie 26</b> (Receiving the wrong order/ requesting a change)	-That's alright
<b>Video 24/ My Movie 27</b> (Asking about bill)	-Thank you -You too
<b>Video 25/ My Movie 28</b> (Wrong amount of change back)	-Thank you -No problem
<b>Video 26/ My Movie 29</b> (Performance Evaluation)	-Thank you

**Indirectness in Requesting**

<b>Video Number/Name</b>	<b>Indirectness in Requesting Observed</b>
<b>Video 1/ My Movie 1</b> (Wendy's drive thru)	*None present
<b>Video 2/ My Movie 3</b> (Wendy's drive thru)	*None present
<b>Video 3/ My Movie 4</b> (Wendy's drive thru)	*None present
<b>Video 4/ My Movie 6</b> (Unable to retrieve files)	-Well um -Explains that she cannot go retrieve the files because: "my feet are really killing me right now" *Note: does not explain that it is due to neuropathy) -Oh -Uh
<b>Video 5/ My Movie 7</b> (Unable to retrieve files)	-Well -Actually -Explains that her request being made is appreciated: "That helps me out"
<b>Video 6/ My Movie 8</b> (Asking about bill)	*None present
<b>Video 7/ My Movie 9</b> (Working in customer service)	-Explains why she cannot help the customer: "Actually I don't have access to be able to do that"
<b>Video 8/ My Movie 10</b> (Working in customer service)	-Explains why she cannot help the customer: "Well actually I don't have rights to be able to help you with that"
<b>Video 9/ My Movie 11</b> (Receiving the wrong order/ requesting a change)	-Uh -Actually
<b>Video 10/ My Movie 12</b> (Work schedule conflict)	-Oh -Actually *Note: unsure how to respond in middle of conversation ("I don't know what to say to that") *Note: no response at end of conversation
<b>Video 11/ My Movie 13</b> (Work schedule conflict)	-Well -Actually -Explains that the conflict exists because her classes are on the same day she was scheduled to work -Maybe -Elaborates how she is doing her a favor: "That would help out a lot"
<b>Video 12/ My Movie 14</b> (Work schedule	-Well

conflict)	-Actually -Uh -Explains why she cannot work those shifts -Offers another solution: "Could I work on Friday instead?"
<b>Video 13/ My Movie 16</b> (Performance Evaluation)	-Explains how exactly she has improved in her job *Note: no response two different times
<b>Video 14/My Movie 17</b> (Performance Evaluation)	-Offers a large amount of detail regarding how she has improved as an employee -Also offers many suggestions for further training (the most said thus far)
<b>Video 15/ My Movie 18</b> (Wendy's drive thru)	*None present
<b>Video 16/ My Movie 19</b> (Asking about bill)	*None present
<b>Video 17/ My Movie 20</b> (Receiving the wrong order/ requesting a change)	-Well -Actually
<b>Video 18/ My Movie 21</b> (Unable to retrieve files)	-Oh -Actually -Offers explanation as to why her feet hurt -Offers a solution -Elaborates on how waiting helps her
<b>Video 19/ My Movie 22</b> (Performance Evaluation)	Oh -Well -Elaborates a large amount on how she has improved as an employee -Offers explanation for why more training would be beneficial
<b>Video 20/ My Movie 23</b> (Unable to retrieve files)	-Well -Um -Explains why she cannot get the files *Note: after 8 second silence, admits that she does not know how to end the conversation
<b>Video 21/ My Movie 24</b> (Wendy's drive thru)	*None present
<b>Video 22/ My Movie 25</b> (Working in customer service)	-Offers another solution to help
<b>Video 23/ My Movie 26</b> (Receiving the wrong order/ requesting a change)	-Oh -Actually -Um
<b>Video 24/ My Movie 27</b> (Asking about bill)	-Uh -Well
<b>Video 25/My Movie 28</b> (Wrong amount of	-Uh

change back)	-Asks if she could double-check the money
<b>Video 26/ My Movie 29</b> (Performance Evaluation)	-Uh -Um *Note: does not know how to respond and is silent for 6 seconds

## Appendix C

**TABLE 7 – Model Coding Tables**

<b>Video Number/Name</b>	<b>MLU in words</b>	<b>Facial Expressions/Posture</b>	<b>Politeness Markers</b>	<b>Indirectness in Requesting</b>
<b>Bill Model 1</b>	6.17	-Leans forward -Raises eyebrows -Smiles -Squints eyes -Slightly furrows eyebrows -Slightly leans head back -Widens eyes/raises eyebrows -Slight head nod -Shakes head back and forth -Smiles widely	-Hi -Thank you -Great -Thank you so much	*None present
<b>Bill Model 2</b>	5.57	-Smiles widely -Raises eyebrows -Slightly raises eyebrows -Raises eyebrows again -Slightly smiles -Slightly leans head back -Raises eyebrows -Slight head nod -Smile	-Hello -Thank you so much -Thank you	-Um
<b>Login Model</b>	9	-Smiles widely -Leans head slightly forward -Slight head nod -Slightly shakes head back and forth -Leans forward -Raises eyebrows -Places hands on chest -Nods head	-What can I do for you	-Offers a solution for being unable to help the customer

		-Smiles widely -Continues to nod head		
<b>Neuropathy Model</b>	8.75	-Leans head back -Furrows eyebrows (out of apology) -Leans forward -Furrows eyebrows again (out of apology) -Raises eyebrows -Head nod -Small successive head nods -Furrows eyebrows/Wrinkles forehead (out of apology) -Shakes head from side to side -Raises shoulders -Raises eyebrows -Smiles widely	-I'm so sorry -I promise -No problem	-Oh -Um -Offers another solution (retrieving the files later) -Specifically explains why she cannot retrieve the files (neuropathy)
<b>Performance Evaluation Model</b>	10.78	-Head nod -Leans head back and looks up (as if thinking) -Raises eyebrows -Uses numerous hand gestures -Tilts head to right side -Continues use of hand gestures for emphasis -Shrugs -Tilts head to the right -Nods head -Multiple small head nods -Smiles slightly -Head nod -Enthusiastic head nod	-“That would be really, really helpful to me” -Great -Thank you	-Well -I feel like -Um -Offers very specific solutions to better training

		-Smile		
<b>Restaurant Model</b>	7.75	-Leans forward -Furrows eyebrows (confused look) -Leans backward -Softens face -Smiles widely	-Excuse me -Great -Thank you	-Um -Do you think
<b>Wendy's Drive-Thru Model</b>	8.33	N/A	-Please -Please	-Can I
<b>Wrong Change Model</b>	8.5	-Slightly furrows eyebrows -Slight smile -Raises eyebrows -Smiles	-Thank you	-Uh -I don't think -Can you
<b>Without Ice Model</b> <b>(Participant 2 Session 4,6)</b>	4	-Raises eyebrows -Tilts head up -Looks over to left side -Raises eyebrows again -Smiles -Nods	-Excuse me	-Oh
<b>Fourth of July Model</b> <b>(Participant 2 Session 5)</b>  <b>(Participant 3 Session 4)</b>	2.67	-Nods -Slightly smiles -Leans head back -Smiles -Continues slightly nodding -Nods -Smiles widely -Head tilted to right -Leaned slightly forward -Nods -Leans head back -Grimace -Nods -Crinkles nose -Nods	-Oh fun -That sounds great	*None present
<b>Grocery Store Model</b> <b>(Participant 2)</b>	3.5	-Face soft -Smiles -Leans slightly forward	-Excuse me -Please -Thank you -Great	-Could you

<b>Session 6)</b>		-Smiles -Nods -Smiles widely		
<b>Wrong Change Model</b>  <b>(Participant 2 Session 7)</b>  <b>(Participant 3 Session 5)</b>	5.33	-Face soft -Tilts head to the right -Very slight smile -Face soft -Smiles	-Thank you	-Oh I think -Explains why it is not the correct amount of change
<b>Wrong Name Model</b>  <b>(Participant 2 Session 8a)</b>	3.33	-Leans forward -Raises eyebrows -Slightly smiles -Wide smile -Nods twice -Smiles -Nods	-Laughs in order to help other person not feel bad for the mistake -Of course	-Oh (held out for long period of time)
<b>Flight Problem Model</b>  <b>(Participant 2 Session 8b)</b>	6	-Leans head back -Smiles -Furrows eyebrows -Moves head to left then right -Grimace -Leans head forward when adding emphasis to words	-Hi -Please -Thank you	*None present
<b>Weekend Conversation</b>  <b>(Participant 3 Session 6, 7, 8, 9)</b>	1.33	-Head tilted to left -Wide smile -Hand wave -Nod -Nod -Nod Multiple successive nods -Mouths "oh" -Nods -Raises eyebrows -Raises eyebrows -Smiles -Nods	-Hi (held out) -How are you -Good (in response to how the other person is doing) -Says "okay" between comments to let her know she is still paying	*None present

			attention -Wow	
<b>Basic Conversation  (Participant 3 Session 5, 7, 9)</b>	2.67	-Raises eyebrows -Smiles -Shrugs shoulders -Quickly moves head to right and back to center -Smiles -Slight nod -Smile	-Hi -How are you? -Great	*None present