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Teaching Social-Emotional Learning to Children With Autism Using Animated Avatar Video Modeling

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A thesis submitted to the faculty of
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ABSTRACT

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People with a diagnosis of autism spectrum disorder (ASD) often have difficulties understanding or applying skills related to Social-Emotional Learning (SEL). An individual having a better understanding of SEL concepts is generally associated with more fulfilling connections with others and increased satisfaction in life. Since people with ASD tend to have greater success with learning in structured environments, we created a module to teach these skills using Nearpod. These modules were created with videos of a person embodying a cartoon dog face using Animoji for two reasons; because the animation was meant to appeal to children, and the creation was user-friendly enough for teachers to potentially create or replicate this model. Along with these videos, the modules also included multiple choice questions about content from the lessons and about scenarios portraying different emotions. Participants came to a research lab where they completed the modules at a computer while being supervised by researchers. Looking at the results from the intervention there was little to no trend between baseline and intervention sessions across four participants. While Nearpod is a tool that could be useful for parents or teachers to create and present video modeling lessons, participants had difficulty navigating the modules without support from the researchers due to length of the modules, getting easily distracted and difficulty with using the technology. Some directions for future research may include delivering similar content using animated avatars through shorter, more child-friendly delivery methods.

Keywords: autism spectrum disorder, social-emotional learning, video modeling, emotion recognition, empathy, animation

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DESCRIPTION OF THESIS STRUCTURE AND CONTENT

This thesis, *Teaching Social-Emotional Learning to Children With Autism Using Animated Avatar Video Modeling,* is written in a hybrid format. In this format, the traditional thesis requirements are combined with a journal publication format. The preliminary pages of this thesis match the requirements for submission to Brigham Young University. It is also presented as a journal article that meets the length and style requirements for submission and publication to education journals.

There are two reference lists in this thesis format. The first list includes references used in the article. The second reference list includes all the articles cited in the Review of Literature in Appendix A. Appendices B and C contain the Institutional Review Board approval for this thesis study and recruitment materials. Appendix D contains the questions included in a screening form that was sent to potential participants. The consent and release forms that were filled out by the participants and their parents for participation in the study are found in Appendix E. Appendix F contains all the multiple-choice questions and the answer key for the emotion scenarios that were used to take data for the study. Appendix G contains the surveys that were given to participants and their parents at the end of their final sessions to measure social validity. Appendix H contains the scripts that were used to create the videos that were used to teach social-emotional learning skills targeted by this study. Appendix I contains copies of the visual aid flyers that were given to participants to use as a reference as they engaged with the intervention. Appendix J shows screen shots from the PowerPoint and example module that participants engaged with before beginning the study to become oriented to the structure of the intervention. Appendix K includes a treatment fidelity list which was followed by all researchers who participated in running the experiment.

Introduction

Autism spectrum disorder (ASD) is a neurological disorder characterized by repetitive or obsessive behaviors, unusual reactions to sensory stimulation, and difficulty with social communication (Golan et al., 2009). One of the key components of ASD is having difficulty understanding social cues or relating to other people (Brosnan et al., 2015). This aspect of ASD causes many challenges for people with this diagnosis as they try to navigate everyday life. For example, it is often difficult for these individuals to notice and interpret non-verbal body language, maintain and understand relationships or keep up with social reciprocity in daily interactions (Ahlers et al., 2017). Even the most common human interactions are often full of many subtle intricacies, tones, and expressions that could require interpretation. These subtle and implicit mannerisms generally do not come naturally to people with ASD, as they tend to approach most things in an objective and predictable manner (Golan et al., 2009). Failure to understand these social cues can put people with ASD at a significant disadvantage in their personal or professional lives. Access to steady, well-paying jobs often comes through a network of connections to the right people or the ability for someone to present themselves as professional, personable, and competent during an interview process. It can be difficult for people with ASD to form and build the relationships necessary to obtain higher quality jobs and their deficit of social skills and awareness can often lead them end up in low-paying entry level jobs or unemployed (Arias et al., 2017). In their personal lives, it may be difficult for people with ASD to develop and maintain meaningful relationships, which can cause them to feel isolated and have a significant negative impact on their mental health (Russo-Ponsaran et al., 2014).

Specific teaching methods and curriculum have been developed to help people gain a better understanding of the nature of human interaction and certain social skills or social

cues. Social-Emotional Learning (SEL) refers to learning concepts of interpersonal interactions that can help a person better understand the emotional natures of themselves and others (Berard et al., 2017). Some examples of SEL concepts include recognition of emotions and facial expressions, displaying empathy for others, maintaining eye contact and knowing how to appropriately respond to their own or another person's emotions. These skills are helpful for people with ASD as they seek to become more fluent in navigating the social nature of the world around them.

Since people with ASD usually learn best in a structured and systematic setting, research has been conducted to explore using virtual methods to teach them SEL skills (Rice et al., 2015). Learning through computer-based interventions can help to reduce extraneous factors or any anxiety that could result from working with a teacher in person (Kandalaft et al., 2012). Virtual teaching has also become widely used during the COVID-19 pandemic where many students were required to learn remotely using their electronic devices. Numerous research studies have been focused on using animated materials to teach SEL skills to children with ASD, with the notion that animation would emphasize certain features and be more appealing to children (Brosnan et al., 2015).

One method of teaching using animation that has been used for populations with ASD is pre-recorded animation (Golan et al., 2009). Pre-recorded animation consists of a video clip of an animated character teaching the targeted skill.

Statement of the Problem

Pre-recorded animation appeals to people with ASD's preference for repetitive and predictable structure that has a more objective nature. A student could also replay parts of a pre-recorded video clip to potentially practice and internalize the concepts more thoroughly (Baron-

Cohen et al., 2009). For this reason, pre-recorded animation could be a beneficial tool for teaching difficult concepts, such as SEL, to children with ASD. Valuable insight could be gained from conducting further research to analyze the effectiveness of pre-recorded animation and the extent that those aspects appeal to children with ASD when teaching SEL concepts. Modern technology also includes access to inexpensive and accessible software that parents or teachers could use to create animated videos. It would also be helpful to verify to what extent pre-recorded animation interventions could be effective for teaching SEL skills when they are created using software that does not require animation expertise. If these modules were shown to be an effective teaching tool, this would allow the intervention to be more widespread and accessible.

Statement of the Purpose

The purpose of this study is to examine the effectiveness of pre-recorded animation as an intervention for teaching SEL skills, such as emotion recognition and empathy, to children with ASD. This study also aims to measure the effectiveness of using pre-recorded animation modules using accessible software that could be easily used by teachers or parents.

Research Questions

This study will address the following research questions:

1. Is pre-recorded animation an effective method for teaching SEL skills to children with ASD?
2. What is the social validity for pre-recorded animation as a method of teaching SEL skills among children with ASD and their parents/guardians?
3. Are Animoji and Nearpod effective tools for creating and delivering pre-recorded animation lessons?

Method

This study received university Institutional Review Board (IRB) approval. Implementation materials, intervention scripts, and scenarios used for collecting data were adapted from those used in the study conducted by Charlton and colleagues (2021). Participants were asked to be a part of this study on a voluntary basis and their data have been deidentified to protect their anonymity.

Participants

This study included four participants that were all children with a documented diagnosis of autism spectrum disorder (ASD) ranging from 8-11 years old. Participant 1 was 11 years old; Participant 2 was 10 years old and Participants 3 and 4 were eight years old. We recruited participants for this study by reaching out to families who provided their contact information to Brigham Young University (BYU) for the purpose of volunteering for research studies. We also responded to people who had voluntarily contacted the researchers after viewing a recruitment flyer for the study, which was posted in public groups on a social media website. Potential participants were sent a screening form before coming in for the baseline session to confirm that the intervention would be compatible with the participant's learning abilities. Every participant and their parent filled out consent and video release forms before participating in the study. The parents also provided documentation of their child's diagnosis, which provided the researchers with helpful background information about the participants.

After determining the participants, each child participated in the baseline phase of the study to demonstrate their existing knowledge of emotion recognition and empathy. There was also a fifth participant, who was 11 years old, that completed this study. According to the baseline data we collected, this participant had displayed sufficient knowledge of emotion

recognition and empathy averaging 90% accuracy across all the questions. Due to this elevated baseline competency, data gathered from this participant's responses were not included in the data for the emotion scenario questions in our analysis of the study. However, we did include this participant's and their parent's responses from the social validity survey. We felt that their feedback would still be valid since they had completed the intervention and had helpful comments about the strengths and weaknesses of this teaching format.

Participant 1

Participant 1 was an 11-year-old male whose parents had provided their contact information to the university for the purpose of volunteering to participate in research studies. His mother agreed to have him participate in the study after we reached out to her with details about the experiment. According to the screening form his mother completed, Participant 1 was able to independently read full sentences and follow one to three step directions. He could also express himself verbally and was comfortable with unfamiliar people. His mom said he would likely respond somewhat positively to learning from an animated character. She reported that he was able to recognize emotions in others, but when expressing his own emotions, they were "pretty subdued" besides being angry or happy. His mother also provided a copy of a psychological evaluation from 2014 when Participant 1 was first diagnosed with ASD. From this evaluation, we learned that he had a history of expressive and receptive language delays. He had also tested in the "deficit" range for his socialization abilities. Although his diagnosis was considered "autism spectrum disorder, level 1 (mild)," the report went into details about how Participant 1 had difficulties with communication, relating to or showing interest in other people, maintaining eye contact and understanding social contexts.

Participant 2

Participant 2 was a 10-year-old male whose parents had provided their contact information to the university for the purpose of volunteering to participate in research studies. His mother expressed interest and agreed to have him participate in when we reached out to her with information about this study. According to the screening form that was completed by his mother, he had the ability to independently read full sentences and verbally express his ideas and preferences, even to unfamiliar people. However, it did say that he was somewhat uncomfortable with unfamiliar people. The form also said that he is sometimes able to recognize others' emotions and that he is "just a little extra" when expressing his own emotions. His mother claimed he would likely respond positively to learning from an animated character. She provided a psychological evaluation report with the details of Participant 2's diagnosis from 2014, which contained information about his capabilities, temperament and personality when he was two years old. This analysis revealed that Participant 2 had experienced delays in social engagement and reciprocity from a young age, especially with people outside of his family. It was also reported that he had demonstrated significant difficulty with his own emotion regulation.

Participant 3

Participant 3 was an eight-year-old male whose parents volunteered for him to participate in the study after seeing the recruitment flyer posted in a group on Facebook. According to the screening form completed by his mother, he had proficient abilities to verbally communicate, even to unfamiliar people. However, his mother did report that he had a tendency to be uncomfortable with unfamiliar people. His mother also reported that he could "mostly" read and comprehend full sentences independently. She indicated that he could follow one to three step directions and work for 20-30 minutes at a time. She also commented that one of his least

favorite things to do was having to sit and focus on a task with a lot of distractions around him. It was reported that he would likely respond “very positive[ly]” to learning from an animated character. She also expressed that he can identify others’ emotions but rarely voluntarily tells others how he feels. His parents provided a Patient Plan document from his pediatric doctor from his diagnosis assessment in 2017. From this document we learn that when he was two years and eleven months old, Participant 3 demonstrated expressive abilities at about an 18-month level and social abilities at a six-month old level. It also reported that he demonstrated significant tantrums and expressive-receptive language delays at this age.

Participant 4

Participant 4 was an eight-year-old male whose parents volunteered for him to participate in the study after seeing the recruitment flyer posted in a group on Facebook. Despite multiple reminders to complete the screening form before coming in for the first session, his parents did not provide answers to the screening questions. They did provide a diagnosis document obtained from an evaluation by his pediatric doctor from 2021. From this evaluation, we learned that he had demonstrated significant deficiencies in social skills such as making eye contact, demonstrating empathy, responding to others’ emotions, social reciprocity and allowing others to direct play or conversation. It was also stated that during his assessment he was “overactive” (climbing on tables, repeatedly standing up, etc.) and spoke rapidly. When they came in for sessions, his mother stated on multiple occasions that Participant 4 was intelligent in academic areas and learning objective concepts but had great difficulties understanding social contexts.

Setting

The study took place in a lab on BYU campus. There were at least two researchers present for each session. The researchers greeted the participants and their parent or guardian

upon arrival and helped direct participants into the lab where the intervention took place. The participant's parent or guardian was invited into the lab to observe the intervention. The lab had a place for the participant to sit, as well as seating for the participant's parent to observe throughout the room, a laptop on a desk for the participant to use for the intervention lessons, and one of the researchers sitting within three feet of the desk to guide the participant through the process if they experienced any technical difficulties. Video of each session was recorded through three cameras in the room as well as through a webcam and screen share feature on the laptop using Zoom.

Measures

Emotion Scenarios

For this study we used a bank of scenarios that was used in Charlton and colleague's (2021) study that described people feeling specific emotions. This bank included a selection of four scenarios per emotion category. Each scenario described a situation where a person would feel a certain emotion based on these emotion categories. The different emotion categories were happy, sad, fear, anger, disgust, embarrassed, excited, and bored. Some of the emotions were presented as if they were happening to the reader and some were presented as happening to a friend of the reader or another person.

These scenarios were used in a previous research study to measure participants' knowledge of emotion recognition and empathy (Charlton et al., 2021). That study used the participants' answers to the provided questions about these emotion scenarios as data to measure their knowledge of emotion recognition and empathy. Similar to this previous study, we recorded data based on the accuracy of participants' answers to questions about these emotion scenarios. We used the same questions that were asked in the previous study but converted the questions

into multiple choice format to avoid subjectivity for determining whether the participant had answered the question correctly or not.

The answer options for these questions were created by multiple researchers and evaluated interobserver reliability for validity. Researchers wanted to ensure that the multiple-choice options for the questions were reasonable for children to choose the correct answer without being too obvious. Two researchers created the multiple-choice questions and answer key, then each question was reviewed by three researchers who were familiar with the scenarios and one adult who was unfamiliar with the scenarios. When reviewing the questions, they picked the answer option they felt was most appropriate then compared their answer to the answer key. They provided written feedback about any discrepancies they found between their answer and the previously decided answer and also left any additional comments they had about a given question. The answer key was updated according to the feedback received from the four adults that reviewed the questions. We also slightly modified some of the scenarios to remove aspects that researchers found to be confusing when they reviewed them.

When we reviewed the data after the participants completed these emotion scenario questions, we further examined questions where most participants had marked the same incorrect answer. When these commonly missed questions were identified, four researchers reviewed the question and answer choices. If the researchers were in agreement that the commonly chosen answer was a reasonable interpretation of the question that was not considered when the answer key was originally created, they curved the answer as correct. A post-hoc analysis of the answers given by each of the participants allowed the researchers to notice patterns and have better insight of how the scenarios and answer options were perceived by children. Questions were curved if the four researchers agreed that a reasonable rationale could be given for the specific

answer. An example of this could be seen for questions where both “happy” and “excited” were given as answer options, but researchers agreed that the clues in the scenario were not reasonably distinct enough for a participant to identify the difference between the two options that were closely related. We ended up curving the answers for eight out of the 84 questions used for collecting data. The answers were not curved for the sake of altering the data, considering the curved questions had minimal effects on the overall data anyway, but they were curved to accommodate for questions that were more challenging than anticipated and where there was a reasonable rationale for the chosen answer, given the subjective nature of some of the question.

The data for this study were collected from the responses of participants answers to questions about the emotion scenarios integrated throughout the pre-recorded intervention module. For each emotion scenario, the participant was asked (a) “What do you think the person in the story is feeling?”, (b) “How could you tell they were feeling that way? Pick two answers”, and (c) “What would you do/say in this situation?” Each of the participants’ answers were recorded and coded according to their response based on a pre-existing answer key document for each scenario. Questions (a) and (c) were each worth one point, and question (b) was worth 2 points as there were two correct answers to be selected. Once the responses were coded, a total percentage was calculated for each emotion scenario based on the number of correct answers the participant selected for the questions about that scenario. The total percentage calculated for each emotion scenario was graphed as one datum point.

Social Validity Assessment

At the end of the study each of the participants and their parents were given a short survey asking them to evaluate how effective they felt the intervention was for teaching the targeted skills. There were two separate surveys, one to be given to the participants and one to be

given to their parents. The purpose of having two different surveys was to ensure that the participants were given a simplified version that could be easily understood by children. The questions and answer options were the same for each person who took the same version of the survey (participant or parent version) to ensure standardization of the procedure. The questions specifically asked each person to rate the degree they felt the intervention was effective in helping to teach emotion recognition, empathetic responses, and ability to identify clues to why a person would be feeling a certain emotion. They were asked to rate the effectiveness in a Likert scale format and were also given open-ended questions asking about what they liked, didn't like and what they would change about the intervention. The answers to these questions should provide accurate data to report the participants' and their parents' perceptions of the effectiveness of the intervention.

Intervention

Lesson Scripts

The intervention was run using explicit instruction scripts within lessons designed to teach emotion recognition and empathy. These scripts were developed based on Strong Kids curriculum (Carrizales-Engelmann et al., 2016) and were used in a previous research study. The previous study had piloted these scripts with neurotypical children before delivering them to children with ASD. The researchers that used these scripts in the previous study found them to be a useful tool for teaching emotion recognition and empathy skills to children. We also piloted these scripts with a neuro-typical child before using them in our study. Each of these lessons contained a starter activity with the animated character modeling the emotions or concepts, guided practice and independent practice. We slightly shortened and modified each lesson script for the purpose of remaining concise, maintaining participants' attention during the interventions

and to adjust for a pre-recorded delivery rather than a live interaction. The first lesson targeted teaching self-awareness, the second lesson taught about understanding others and the third lesson taught about relationship skills. The lessons were divided into different stages for data collection so the results could be compared and examined for patterns or differences between learning each of these concepts. Each lesson also included a color coordinated visual flyer for the participant to reference as they navigated through the lesson.

Animoji

Animoji is a feature that modern Apple products have included in their camera software. This feature allows the user to choose between many animated emojis, such as various animal faces, and then the selected animated face covers a human face while recording a video. The animated face matched any movement or facial expressions displayed by the person whose face it is covering. The animated faces display exaggerated versions of human facial expressions. This feature was meant to appeal to children with ASD because it displayed emotions in a more obvious manner than a human face. It was also anticipated that children would likely be more interested in watching a cartoon face than a human face. For this study, we recorded videos using Animoji through the Clips app on an iPad Pro. We used the animated dog face within Animoji, as that was the face used in Charlton et al.'s (2021) study of teaching SEL through live animation. We wanted to replicate this study maintaining the same variables as the original whenever possible to preserve consistency.

Pre-Recorded Animation Modules

The pre-recorded animation was delivered as video clips of a researcher presenting the lesson content while embodying an animated Animoji face. The Animoji face matched the facial expressions the researcher made in real-time. These videos included components of video

modeling where the Animoji character modeled how to express different emotions. The rest of the videos consisted of the Animoji character teaching about SEL concepts and discussing how to interpret situations and apply those skills. The video clips were presented in a module researchers created using Nearpod. This module allowed participants to watch each video clip then click on an arrow to proceed to the next clip when they were ready or return to a previous clip. The module also included multiple choice questions from the content in the video clips, allowing for an interactive aspect of the intervention. The emotion scenarios and questions for the scenarios used to collect data for the study were also embedded throughout the module.

At least one researcher was present in the room with the participant to observe their responses as they watched the lesson videos and completed the modules. Before they started the intervention, the participant was presented with a PowerPoint orientation for using Nearpod and a practice module to teach them how to pause the video or replay certain parts and become familiar with navigating the Nearpod modules. The ability to go at their own pace and rewind the content to get a better understanding was hypothesized to be helpful for participants to learn the content most effectively. Researchers ensured the participant felt confident using Nearpod before starting the intervention by asking if they were comfortable moving forward. The participants were also assured that the researcher could provide guidance during the intervention if necessary.

Procedure

For the first session, each participant came into the Preschool Lab to participate in a baseline session to collect data on their previous knowledge base of identifying emotions and expressing empathy by answering questions based on emotion scenarios. Ten data points were collected corresponding to the ten scenarios requiring the participants to provide responses in the Nearpod module. The ten scenarios employed for baseline data collection had been randomly

selected from the bank of emotion scenarios across all the emotion categories. The same scenarios were used for each participant and delivered in the same order.

After the baseline session, participants engaged in three intervention sessions to cover the three emotion script lessons. The participants were led into the preschool lab where they engaged with the lesson modules on a laptop with a mouse at a desk with at least one researcher within three feet of the participant. The lesson content was delivered in the same order for each participant (e.g., the first lesson module was delivered during the first intervention session for each participant, and so on). Some participants engaged in the next session in the same day as the previous session after a brief break, while others completed each session on separate days. Each session was recorded allowing the researchers to review playbacks of the sessions and take notes on the participant's engagement with the content. Data were collected from each session by reviewing the participant's answers to the emotion scenarios that were recorded in the Nearpod modules. Researchers followed a treatment fidelity checklist to set up each session.

Baseline Session

The goal of the first session with each participant was to gather data establishing the participant's baseline capability and understanding of identifying emotions and displaying empathy. The researchers introduced themselves and gave a brief explanation of what the participant could expect throughout the study. Then the participant went through 10 emotion scenarios with multiple choice questions on the computer through Nearpod. The 10 emotion scenarios had been randomly selected from the bank across all eight emotion categories. Each participant was presented with the same 10 randomly selected emotion scenarios in the same order during baseline.

The Nearpod module included an audio file that read the emotion scenario, questions, and answer options to the participant while they viewed the text on the screen. The first question following each scenario asked participants to identify how the person in the scenario was feeling. After the participant selected an emotion out of four options, the next slide asked them for what clues caused them to believe the person in the scenario was feeling that way and the participants were instructed to select two answers out of six options. After the participant answered this question, the next slide gave the participant four options to select what they would do to help the person if they had been present during the scenario. The participants' responses to each of these questions were marked as correct if they selected the correct answer according to the answer key created by the researchers for the emotion scenarios. One participant demonstrated a 90% accuracy rate across the baseline questions and the data for his answers were not included for the rest of the study due to demonstrating sufficient emotional recognition ability.

Intervention Sessions

The intervention sessions consisted of the participant navigating a Nearpod module at their own pace to watch pre-recorded video clips of one of the researchers delivering the lesson script while embodying an Animoji face. At least one researcher was in the room with the participant at all times. At least one other researcher was always present either in the room, watching from an observation room behind a two-way mirror, or watched the participant and their screen through Zoom. The researcher was present to monitor the participant, provide guidance if necessary, and to resolve any technical difficulties that arose with the laptop or internet browser. The researcher reminded the participant that they could pause the videos or replay certain parts at any point that the participant felt was necessary. This allowed the participant the opportunity to take additional time to process the content, pause to respond to

non-multiple-choice questions asked by the Animoji character, or replay material to gain a better understanding. The researcher also reminded the participant to read all the answer options for emotion scenario questions, redirected the participant to the module or allowed them to take a break during the lesson if the participant was distracted.

Lesson Scripts in Nearpod Module. The researcher in the pre-recorded videos recited scripts from the lesson plan while controlling the Animoji face. For this study we added an additional "cartoon" filter over the video. During parts of the script where the Animoji character asked questions, the Animoji character either paused before moving on with the next part of the script, or a multiple-choice question was presented in the module. For the questions where the Animoji character paused after asking, the participant could have chosen to answer the question out loud think about the answer. A video of the researcher asking the question and reading off the answer options was present above the text for each multiple-choice question within the script. The module provided immediate feedback for whether the answers that participants selected for those questions were correct or incorrect.

Emotion Scenarios. Six different emotion scenarios followed by multiple-choice questions were embedded throughout each module. Unlike the multiple-choice questions that were a part of the lesson scripts, the slides with questions for the emotion scenarios did not include an animated video and the participant did not receive feedback for their answers. The slides with the emotion scenarios included an audio recording that read the scenario, questions, and answer options out loud while the text was on the screen. Six of the eight emotion categories were randomly selected to be used for each module. Each participant received the same emotion scenarios in the same order since they were embedded within the lesson modules. For each emotion scenario, the participant was presented the scenario slides and accompanying recording

and asked to select an answer out of four options for how they thought the person in the scenario was feeling. The second question asked them to choose two answers out of six options to tell what clues from the scenario made the participant think the person in the story was feeling a certain way. After that, the participant was asked to select an answer from four options that best described what they would do or say if they were present in the situation. The scenario was on each slide with questions about the scenario so that participants could easily reference it. The participants' responses to each of these questions were recorded in Nearpod and manually reviewed by researchers after each intervention session. Their answers were marked as correct if the participant selected the answers that were previously determined by the researchers to be correct according to the answer sheet created for the questions.

Social Validity Survey

After the participants finished engaging with the module on their last session, they were given a short Google Forms survey. The answers for the questions were formatted using a Likert scale using language that was appropriate for young children. The participants were asked if they felt they learned anything from the intervention, if they liked learning from an animated person in a video, if they preferred learning from the animated videos more than learning from a non-animated person and if they would want to learn about other things through similar video modules. The surveys also included four free-response questions asking the participants what they liked, disliked or would change about the intervention.

At the end of the last intervention session, the participants' parents were also given a Google Forms survey. The survey given to the parents also had answers formatted in a Likert scale. The parents were asked the degree to which they felt the intervention was successful for teaching emotion recognition, empathetic responses, and the ability to identify clues to why a

person would be feeling a certain emotion. They were also asked about the extent they felt that their child enjoyed the intervention, the likelihood that their child would generalize the skills they learned, the extent they felt that this form of intervention was an effective teaching tool in general, and if they would want their child to learn other skills using this type of intervention. The parent survey also included free-response questions asking what strengths and weaknesses they saw in the intervention and what changes they would want to make.

Research Design

This study was conducted using an A-B-C-D case study design. A-B-C-D is a variant of A-B-C design, where there are three similar but different types of intervention phases following the baseline phase (Kennedy, 2005). For this study, the baseline A represented data from the baseline session, B represented the stage for the first intervention session for the lesson about self-awareness, C represented the stage for the second intervention session where the participants engaged with the lesson about understanding others, and D represented the third intervention session where the participants engaged with the lesson about relationship skills. This study sought to provide a proof-of-concept validation for delivering these lessons and emotion scenarios via Nearpod and evaluated the feasibility of using these tools for remotely measuring SEL knowledge. In this study, the participants engaged with lessons about (a) self-awareness, (b) understanding others, and (c) relationship skills and then data were collected as the participants answered questions about emotion scenarios after. Baseline data were collected for each of the participants to establish a steady trend representing the participant's knowledge and skill level in navigating emotional based situations or understanding emotional concepts. This information was tracked before the intervention was introduced to see if the data gathered from the intervention showed any significant increases or stable changes in the trend of the knowledge

they displayed of these concepts. Each intervention stage represented the different lesson the participant engaged with. Seeing the changes from baseline to intervention is helpful for understanding if the intervention is effective, and the degree to which it could be effective for increasing the participant's knowledge in this area. We looked for patterns in effects demonstrated by each participant between the baseline and intervention sessions. We compared the effects between baseline and intervention sessions across multiple participants since the irreversibility of knowledge acquired from the intervention made it unreasonable to use a reversal design to measure differences between baseline and intervention multiple times for the same participant.

We could also examine the differences of the effectiveness of each lesson to see if there were any patterns across participants for scoring higher during one session than during other sessions, as each lesson taught different SEL concepts. This way we could evaluate if a lesson teaching one concept resulted in consistently higher data points than another lesson teaching a different SEL concept. The data points for each participant represented answers for the same emotion scenario questions in the same order. This allowed us to also examine any trends between the participants for individual emotion scenarios to see if there were any scenarios that participants typically missed more than others. We hypothesized that each intervention stage might average having higher data points than the previous intervention session, due to knowledge different SEL skills building up over different lessons. We considered this when evaluating the results and we examined each stage to see if there were any patterns in trend and variability associated with a specific lesson. We also analyzed the levels, trends, and variability of the data points across all the stages to see if building on the participants' SEL knowledge over multiple lessons resulted in higher data points by the end of the study.

Independent Variable

The independent variable for this study was the participant's engagement with the pre-recorded animation modules for teaching SEL skills. Data were recorded for each participant over three sessions as they completed the three pre-recorded animation modules that were designed to increase their knowledge of SEL skills.

Dependent Variable

The dependent variable for this study was the accuracy rate that the participant answered the questions about each emotion scenario. The emotion scenarios and questions were embedded throughout each module in the same order for each participant. The questions were displayed in the same format they were displayed in for the baseline session, and the idea was that engaging with the modules about SEL skills would have an impact on the way the participant answered similar questions.

Limitations

The effects between the baseline and intervention stages were presumed to be a result of engaging with the lessons, but there is a possibility of other factors unique to individual participants that could have impacted their scores between the baseline and intervention sessions that could not be measured (Ledford & Gast, 2018). These factors could include maturation effects, different times of day or different levels of focus the participant had as we collected the data. We made efforts to keep the structure of each session as similar as possible for each participant to try to minimize these potential effects. It should also be noted that it is more difficult to identify direct relationships between the baseline stage and the last two intervention stages because they do not directly follow the baseline condition (Kennedy, 2005). For this particular study, each lesson covered separate concepts, but each concept related to SEL skills

that could help participants have more insights when answering the emotion scenario questions. Since these concepts were all related to SEL in some way, we anticipated that the data points for each intervention stage could be influenced by the knowledge gained in the previous intervention stage. We took this into consideration when evaluating each stage and anticipated that the data points for each intervention stage may be influenced by the previous intervention stage. We also took this into account when we analyzed the data points across the entire study to look for trends or variability.

One limitation to this design was the potential for maturation in the time between intervention sessions where participants could potentially gain a better understanding of social concepts elsewhere. We tried to schedule the intervention sessions as close together as we could to avoid this possibility. Additionally, given that the participants all had been diagnosed with ASD, there was minimal likelihood that these participants would gain a substantially higher knowledge of SEL skills within that time between sessions, since these concepts tend to be an area in which children with ASD struggle.

There was also a risk of the baseline data not being an accurate representation of the participant's knowledge of the concepts due to too much variability between data points. Therefore, we included 10 data points for the baseline sessions to allow for enough data points to establish a stable pattern in accuracy rates.

A final limitation was the fact that the measurements did not come from the exact same questions, and there is a possibility that a participant would be more likely to score well on questions for one scenario than for another. We addressed this by using a selection of scenarios that were created using the same structure and relative difficulty, and we believe that relevant data could be accurately tracked through patterns of the way participants answered these

different scenario questions. We also avoided using the same scenarios multiple times to avoid the participant becoming more familiar with the questions and answers from viewing them previously. We were also able to compare the participants' answers with each other, and if we noticed there was a specific question that a majority of the participants were missing more than other questions, we evaluated that question to see if it was reasonable to curve the answer due to the question being more difficult than other questions.

Data Analysis

Data points were collected and displayed graphically based on the accuracy of the participant's answers about each emotion scenario. Each scenario contained four possible points from three questions, meaning each datum point was a summary of the participant's accuracy for answering questions about that specific emotion scenario. The graphs were evaluated using visual analysis and descriptive statistics. Level, trend, and variability were visually evaluated between the baseline and intervention phases as well as between the different intervention phases to analyze for any significant differences in the participant's performance after applying the interventions. We also examined for any trends or changes in level within each individual stage of the experiment to see if there were any noticeable patterns with how different participants responded after engaging with certain lessons.

When using descriptive statistics, we measured the level by calculating the mean of the participants' data points within a given session. We compared the mean accuracy levels between the different stages of the study to measure for changes that could determine any trends between the baseline and different intervention stages. Trends were also measured using the split middle method, where each stage of the study was divided in half and a line was drawn between the median datum point for each half. Variability was measured through a calculated stability

envelope, where the median datum point from each phase was examined and all other data points were evaluated based on whether they fell within 25% higher or lower than that median point.

Any instrumentation effects that could result from this method of data collection were addressed by the randomization of the scenarios and assuring that a participant did not answer questions for the same scenario multiple times.

Results

This study sought to measure the effectiveness of pre-recorded animation as an intervention to teach SEL skills to children with ASD. This effectiveness was measured through the data collected from the multiple-choice questions that corresponded with the 28 emotion scenarios that each participant was presented, answering three questions per scenario. We also sought to analyze the social validity of teaching using this method, which we analyzed from survey data collected from participants and their parents as well as researchers' first-hand observations of the intervention sessions. The study also evaluated the effectiveness and usability of Nearpod and Animoji for creating animated modules for teaching skills to this population.

Pre-Recorded Animation Intervention

Overall, the intervention sessions did not appear to have a significant impact on the participants' accuracy rates of answering questions about emotion scenarios throughout the study. When analyzing the graphs for data collected of the participants' accuracy for answering questions for the emotion scenarios (Figures 1-4), there was no noticeable trend across any of the participants' graphs.

Due to the manner through which the participants' accuracy for each scenario was scored, the only possible percentages for each scenario were 0%, 25%, 50%, 75% and 100%. This factor causes graphs to show significant variability in the participants' results because missing a single

answer caused a datum point to drop 25%. Each answer was heavily weighted in creating the data points; therefore, the graphs seemed to display more drastic variability than there was in reality. When visually examining the variability in the baseline stage, we noticed that each participant demonstrated at least 50% variability between data points, with Participant 1 showing the highest level of variability with 100% difference between his highest and lowest points. When we created a stability envelope for each participants' baseline stage, we still found that the data were variable. Participant 1 had a median point of 75%, with one point falling below the range surrounding that median. Participant 2 had a median of 62.5% with two data points below the 25% range of that median. Participant 3 had a median point of 50% and all of his data points fell within 25% of that median. Participant 4 had a median of 62.5% with two data points scoring more than 25% higher than this median.

Looking at the graph for the first intervention session, we noticed that Participant 1's level of variability significantly decreased, showing he only had a 25% difference between his highest and lowest data points. He demonstrated a median of 87.5% and all of his data points fell within 12.5% of that median. We noticed that the rest of the participants still displayed at least a 50% difference between their data points for this session, with Participant 2 showing a 100% difference between his highest and lowest data points. When we measured the variability with the stability envelope, his median for this phase was 62.5% and three out of six of his data points fell outside of the 25% range of that point. Participant 3 had a median point of 50% and all his data points fell within 25% of that point. Participant 4 had a median point of 75% and all his data points fell within 25% of that point.

When analyzing the graphs for the second intervention session we noticed that there was less overall variability, considering that Participant 1 and Participant 4 only had a 25% difference

between their highest and lowest data points. When we measured for the stability envelope, their median points were 62.5% and 87.5% respectively, and neither of them had any data points that fell outside of the 25% range of their median. When we looked at Participant 3's graph, we noticed that he also had only a 25% difference between five out of six of his data points for this session, with only the first two data points showing a 50% difference. His median for this session was 37.5%, with one datum point falling more than 25% higher than that median. The consistent variability was still noticeable for Participant 2, considering that he still showed a 75% difference between his highest and lowest data points for that session. The median of his data points for this session was 50% and he had one datum point that scored more than 25% higher than that point.

For the final intervention session, Participant 1 and Participant 4 displayed a 50% difference between their highest and lowest data points, Participant 3 displayed a 25% difference between his highest and lowest data points and Participant 2 displayed a 75% difference between his highest and lowest data points. The median of Participant 1's data for this session was 62.5% and he had two data points that scored lower than 25% from that point. Participant 2's median point for this session was 50% and he had one datum point that fell below 25% of that point. The median point for Participant 3 for this session was 50% and all of his data points fell within 25% of that point. Participant 4's median point for this session was 100%, with two of his data points falling more than 25% below that point.

When looking at the data across the entire study, Participant 2 demonstrated the highest rates of variability, seeing as for each session he demonstrated at least a 75% difference between data points. His baseline data points displayed lower levels of variability than his data points during any of the intervention sessions, even though the variability range of 75% remained

consistent. When evaluating his data with the stability envelope, he always had at least one datum point above or below 25% of his median datum point for the given phase. Throughout the study the other participants had an average of a 50% difference between their data points within a single session. Participant 3 demonstrated the lowest levels of variability which decreased as the study progressed, considering his first two stages he displayed a 50% difference between his data points and the last two sessions he displayed only a 25% difference between his data points. When his data were measured with the stability envelope, he did not have any data points that fell 25% higher or lower than his median point for any given phase. However, by the end of the study, Participant 3's data remained at a consistently low level between 25-50% accuracy.

The level of the data points for each participant remained in relatively similar ranges throughout the study. Participants 1 and 4 performed at relatively moderate to high levels and showed increases in, Participant 2 displayed a great deal of variability which averaged at a moderate level and Participant 3 performed at a relatively low level.

Most of the participants did not display strong trends when we visually examined the data points across the entire study. Participant 3's data displayed a consistent but slight negative trend, Participants 1 and 4 displayed slight positive trends across the study, and Participant 2 did not display any noticeable trends across his data. but some trends were found within each of his intervention stages. Each of the participants performed at a moderate level during the baseline stage and did not display prominent trends, since any high data points were followed and preceded by lower data points which evened out any trend. When we analyzed the levels for the baseline stage using descriptive statistics, we found that Participant 1 scores averaged out to 67.5% accuracy, Participant 2's scores had an average of 55% accuracy, Participant 3 scored an average of 52.5% accuracy, and Participant 4 scored an average of 67.5% accuracy. All of these

mean scores were considered to be a moderate level. When we measured the baseline data using the split-middle method, Participant 1 showed a decreasing trend between his median score from the first half of the session (75%) to his median score from the second half of the session (50%). Participant 2 showed the same negative trend during baseline, having a median of 75% during the first half of the session and a median of 50% for the second half of the session. Participant 3 did not display any trend in his baseline data according to the split-middle method, considering that his median score for both halves of the session was 50%. Participant 4 displayed a positive trend during baseline, having a median datum point of 50% during the first half and a median point of 75% during the second half of the session.

During the first intervention stage, Participant 2 and Participant 3 appeared to demonstrate consistent positive trends, however Participant 2's final data point for that session was 0%, which significantly skewed that trend. Participant 2's average accuracy for this intervention stage was 54.2%, which was nearly identical to the 55% he scored during baseline, showing there was no significant trend between the baseline and this intervention stage. When evaluating the trends in his data within this intervention session using the split-middle method, we saw a positive trend between the median points of the first half and the second half of the session, which were 50% and 75% respectively. Participant 3 displayed an average accuracy rate of 45.8%, showing a 7.3% decrease from the accuracy level he performed at during the baseline session, which could show a slight negative trend between sessions. However, we did find through visual analysis that he displayed a positive trend for the data points within this intervention session. When we measured trends within this session using the split-middle method, we found that participant 3 displayed a positive trend between his median score from the first half of the session (25%) to the second half of the session (50%). Participant 4 demonstrated

similarly variable data in the first intervention session as he showed during the baseline stage, where there initially seemed to be a positive trend, but this was soon followed by a noticeable negative trend. He started and ended this intervention stage with data points of 50% accuracy, in between those points he had climbed to a datum point of 100% accuracy before scoring declining data points down to 50% again. His overall average for his accuracy rate was 75% for this intervention stage, which shows a slight positive trend of 7.5% higher than his average score during baseline. When we measured the trend of his data for this session using the split-middle method, we found a negative trend from his median score during the first half of the session (100%) to his median score for the second half of the session (75%). During this first intervention stage Participant 1 performed at a noticeably higher level than he had during the baseline stage, with an accuracy rate of 87.5%, which was a 20% increase from his average score during the baseline stage. When we visually analyzed the data points for this session, we did not find a prominent trend in his data within the first intervention session because his scores consistently alternated between 75% and 100% accuracy. When we measured his data for this session using the split middle method, we found that his median scores for both halves of the session were 100%.

During the second intervention stage, Participant 1 displayed a consistent negative trend, starting from the point he left off with for his previous session then steadily decreasing. When measuring his scores for this session using the split-middle method, we found a negative trend between his median score for the first half of the session (75%) and the median score for the second half of the session (50%). His data points for this session averaged 62.5% accuracy, which was lower than his scores for baseline and the first intervention stage and displaying a negative trend between the first and second intervention stages. For this second intervention

stage Participant 2's data visually displayed a similar trend that he had shown during the first intervention stage, starting with the same two data points he started with for the first intervention stage (50% then 25%) followed by a steady increasing trend with his final datum point at 100%. His average accuracy rates displayed by his data points for this session was 58.3%, which showed a 4.1% increase from the data points from the previous intervention, which shows a very slight positive trend between these two interventions. When we used the split-middle method to measure for trends within this intervention stage, we found the same positive trend he had demonstrated during the first intervention session, with the median score for the first half of the session being 50% and his median score for the second half of the session being 75%. Participant 3 started the second intervention session with the same datum point level he had ended the previous session with (75%) but then showed a negative trend to alternating scoring between 25% and 50% for the rest of this intervention stage. When we measured this using the split-middle method, we found a negative trend from his median point of 50% during the first half of the session to his median point of 25% during the second half of the session. His accuracy rate for this session was 41.7%, which was a 4.1% decrease from his accuracy rate during the first intervention stage, therefore continuing the slight negative trend of his overall data since the baseline stage. Participant 4's data points visually displayed a positive trend from his final point in the previous session, and he consistently scored between 75% and 100% during this whole intervention stage. When we used the split-middle method for the data points within this session, we found a positive trend from a median point of 75% during the first half of the session to a median point of 100% during the second half of the session. He scored an overall 87.5% accuracy rate for this intervention stage, which was a 12.5% increase from his average during the

first intervention stage. This continued the positive trend of his increasing accuracy levels, even if the order of the data points made the data appear variable.

For the third intervention stage Participant 1's data points varied between 50% and 100%, scoring 100% for half of the total data points for this session. This displayed a positive trend of his scores from the previous intervention, seeing as his accuracy rate increased to 79.2%, which was 16.7% higher than his accuracy level in the second intervention stage. This continued the slight positive trend he visually displayed across most of the study, despite having a lower average score during the second intervention stage. His average accuracy score for his final intervention session was 11.7% higher than his average accuracy score for his baseline session, which is why we can still see a slight positive trend, despite having a lower average score during the second intervention stage. It is interesting to note that even though Participant 1's scores showed an overall positive trend, when we used the split-middle method on his data points within the third session, we found a negative trend from a median point of 100% during the first half of the session to a median point of 50% during the second half of the session. Participant 2 displayed a distinct negative trend for this intervention stage, which was also a negative trend from his scores during the previous intervention stage. His first datum point for this session was 75%, and his final two data points were 0% and 25%. When we measured this with the split-middle method, we saw a negative trend between hid median score for the first half of the session (50%) to his median score for the second half of the session (25%). His overall accuracy rate for this session was 41.7%, which was 16.6% lower than his scores for the previous intervention session and 13.3% lower than his average scores during the baseline stage. Participant 3 did not show any change in trend from his data points for the previous session, as all his data points for this session were also between 25% and 50%. When we used the split-

middle method to look for a trend in his data, we found that his median point for the first half of the session and for the second half of the session were both 50%, not displaying any trend within this stage. His accuracy rate for this session was 41.7%, which was the same accuracy rate he displayed during the previous intervention stage. During this session most of Participant 4's data points were 100%, but he did have two 50% data points, which initially showed a decreased trend from the previous session and added variability to the data. His accuracy rate for this intervention session was 83.3%, which was a 4.2% decrease from his accuracy rate from the previous intervention session but would still be considered performing at a high level. When we measured his data using the split-middle method we did not find any trends in the data since his median point for the first and the second half of the session were both 100%.

Social Validity

Our team gathered data to determine the social validity of the study by having each of the participants and their guardian fill out Google Forms surveys. The participants' responses to the multiple-choice portion of this survey can be found in Table 1. Reviewing the responses from the participants revealed that one participant said they "really enjoyed" the intervention, two participants said they "enjoyed the intervention," one participant said they "sort of enjoyed" it and one participant said they "sort of did not enjoy" it. When asked how much they felt like they had learned from the study, responses were similar to the responses to the previous question, with one participant saying they "really felt like they learned something," two participants saying they "felt like they learned something," one participant saying they "felt like they sort of learned something" and one participant saying they "felt that they sort of didn't learn something." They were then asked if they liked learning material from the cartoon character, to which two participants said they "really liked it," one participant said they "liked it," one participant said

they “did not think anything of it,” and one participant said they “did not like it.” Four out of the five participants we collected responses from said they would rather learn from a non-cartoon character than a cartoon character. When asked if they would like to learn about other concepts using the same intervention method, one participant said they “would really like that,” one participant said they “would like that,” two participants said they “would sort of like that,” and one participant said they would “not like that.”

The participants’ answers to the free response questions in the survey can be seen in Table 2. When given the opportunity to leave comments about what they liked about the intervention, participants commented that they liked learning about how other people feel and that the videos “calmly explained things that were slightly complicated.” When they were asked what they did not like about the intervention, participants expressed that it was “long and boring” and that there was no background music in the module. When they were given the opportunity to express what they would change about the intervention, multiple participants commented about wanting to be able to choose a different Animoji face to learn the material from. For the section asking for any additional comments, one participant said they enjoyed watching the Baby Shark video in the tutorial Nearpod module in the beginning, and another participant commented the lessons were a great way to learn specific things.

The parents’ responses to the multiple-choice portion of the survey can be found in Table 3. When the parents were asked about how effective they felt that the intervention was for teaching emotion recognition, three parents felt it was effective, one parent felt it was somewhat effective and one parent felt that it was somewhat ineffective. Similarly, when they were asked how effective they felt that the intervention was for teaching empathetic responses, three parents felt that it was effective, and two parents felt that it was somewhat effective. When asked how

effective they felt the intervention was for teaching how to identify clues for why someone would be feeling a certain emotion, four parents felt that it was effective, and one parent felt that it was somewhat effective. When they reflected on if they thought that their child enjoyed the intervention, two parents said they believed their child enjoyed it, one parent said their child somewhat enjoyed it and two parents said that their child somewhat did not enjoy it. When they reported how likely they thought that their child would use the skills they learned, three parents said it was likely and two parents said they were not sure. When asked if they felt that the intervention was an effective tool for teaching kids with ASD, two parents said yes and three said maybe. When they evaluated if they felt that the intervention was user-friendly for children, four parents said yes and one parent commented that it "could be, but it would need to be more exciting and less reading." When considering if they would like their child to learn other skills using this format, three parents said yes, one parent said it depends, and one parent said no.

The parents' answers to the free response questions in the survey can be found in Table 4. When asked about what strengths they saw about the intervention, parents commented that they liked how concepts were repeated so that the kids could catch on, the fun and engaging animation, the use of technology to appeal to children, the length of the sessions, and the way that the animation could be a helpful bridge to strengthening real-life interpersonal relationships. When asked about weaknesses they saw during the study, parents commented that the videos moved too quickly without giving their child enough time to respond to open-ended questions, that the avatar's expressions were limited, that there was too much reading for their child, as well as comments about their child seeming easily distracted or bored. When they were given the opportunity to express what they would change to make the intervention better, parents suggested requiring recorded vocal responses to questions in the videos to help build verbal

communication, using a cartoon character with more pronounced expressions and facial features, turning the intervention into a game somehow and not having participants sit in a swivel chair while engaging with the intervention. For the section allowing for any other feedback, parents commented that it could be beneficial to let the child choose the avatar they watch, to provide more corrections and clearing up confusion as guidance throughout the intervention, following up with the participants about the handouts discussed in the videos, making it an app "that's more fun like a game," and that it could be helpful to have the participants watch the emotion scenarios as videos to internalize it better than just hearing or reading about the scenarios.

Discussion

The purpose of this study was to evaluate the effectiveness of using pre-recorded animated avatars to teach SEL skills to children with ASD. We used modified versions of scripts that were used in Charlton et al.'s (2021) study where they piloted an interactive avatar in real-time to teach the same content. Charlton et al. (2021) found their participants demonstrated improvement in their accuracy of answering questions about emotion scenarios after engaging with the intervention. When we ran this study with a pre-recorded video avatar teaching about the same content, the participants' accuracy rates were relatively variable for the same emotion scenarios. Based on these results, we cannot declare this intervention as it was delivered in this study as particularly beneficial for teaching these concepts to children with ASD. Possible modifications to strengthen the intervention are highlighted below.

Analysis of Data From Emotion Scenarios

After analyzing the graphs of the participants' answers to the emotion scenarios (Figures 1-4), we have determined that the data is variable overall. The variability of this data means that we are unable to determine the extent to which the pre-recorded animated avatars effectively

taught the content. One reason the data looks variable could be attributed to the fact that each datum point only had the possibility of being 100%, 75%, 50%, 25% or 0%. This means that if a participant missed a single question, their datum point would decrease by 25%, which is shown as a significant decrease on the graph. Due to this, small variations in performance could cause the graphs to show the data as more severely variable than they are in actuality.

Participant 1 and Participant 4 had scored 100% on at least one data point during the baseline session, making it more difficult to see noticeable progression throughout the study. Overall, they both had average accuracy rates that displayed a moderate level during the baseline session, seeing as they both scored 67.5% as their mean score. Participant 1 scored noticeably higher data points during the first intervention stage than in the baseline stage, climbing from an average accuracy level of 67.5% to 87.5% and not having any data points below 75%. This could have been a result of learning relevant content through the intervention. Both of those participants scored between 50% and 100% for each datum point during the final session, with more frequent 100% data points than they had displayed during the baseline session. Their average accuracy scores were both more than 10% higher during the final intervention session than in their baseline sessions. This example highlights that these participants did experience a slight increase in their accuracy rates during the intervention. Both participants showed a steady, slight positive trend throughout the study, despite both of them having one intervention session that scored lower than the intervention session preceding it. However, they still had data points that dropped below 100% spread out throughout the intervention contrasting many of the higher data points, which weakened the trend we saw in their data.

Participant 2 and Participant 3 had lower data points and overall accuracy averages during the last intervention than they had scored during baseline. Overall, their data were

variable throughout the study, especially Participant 2, but it is interesting to note that these participants ended with a tendency for lower data points than when they started. Participant 2's variable data points evened out to about the same moderate accuracy level for each phase of the study, including baseline, but his average accuracy rate during the final intervention stage was his lowest score at 41.7%. Participant 3 also had an average accuracy score of 41.7% for the last two intervention stages and had displayed a slight decrease in his average across every stage, resulting in a slight negative trend in his data. This, as well as other data decreases in the study could possibly be due to factors such as participants carelessly answering questions because they were anxious to finish the session. As needed, researchers reminded participants to read all the options before selecting an answer, but the participants did not always follow these directions. During such instances, participants were offered an opportunity to take a break from the intervention in the hopes they would return with increased focus. Another possible factor contributing to data variability could be due to the varying times of day participants came for each session to accommodate the participants' and researchers' schedules. In some cases, a participant may have come for one session in the morning and another session in the late evening. The participants also had varying amounts of time that had passed between sessions. Some participants had a week between two sessions, some of them only took a 10-minute break between some sessions, and so on.

One thing that was interesting to note about some of the individual intervention stages was that some participants showed prominent positive trends just within a certain intervention stage. Participants 2 and 3 both displayed noticeable positive trends in the data points within the first intervention stage, where both of their early data points had been plotted at a similarly low level as the final data points recorded for each of them at the end of their baseline sessions. It is

possible that the visual increases in data during that session could be correlated with the participants learning more relevant content as they progressed through the intervention. It is also interesting to notice that Participant 2 displayed a very similar pattern during his second intervention session, where his data points started low and noticeably increased over the duration of the session. It is possible that he started the second intervention with a low datum point again due to forgetting information between sessions or possible difficulty with retaining or applying the information he learned in the previous stage in the time between sessions. But the similar positive trend displayed in his data within the first and second intervention phase could also be evidence that he answered questions more accurately as he gained more knowledge of the concepts as he progressed through the lesson.

Interpretations Based on Social Validity Surveys and Observations

After reviewing the feedback from participants and their parents, as well as the researchers' notes of specific behaviors that participants demonstrated during each session, we were able to draw conclusions about factors that strengthened the intervention and other factors that had possibly created weak points in the experiment. This information allowed us to evaluate the extent that the programs for creating the modules (Animoji and Nearpod) were beneficial for delivering the lesson content to see if this format would be a helpful tool to recreate for teaching similar concepts. We also reviewed the feedback from the social validity surveys to analyze how well this format was received and see if it could be a positive method for children of similar ages with ASD.

Animoji Avatar

Based on the data we collected from the social validity surveys, we concluded that the use of an Animoji avatar to teach the material was overall well received by participants and their

parents. Three out of five participants reported that they "enjoyed" or "really enjoyed" learning information from a cartoon character. Even the participant that responded that they only "sort of enjoyed it" had instances during the study where he replayed sections of the video repeatedly and was laughing and making positive comments about the dog face's expressions. One interesting result from the surveys was that despite positive reception to the animation, four out of five participants answered that they would rather learn material from a non-cartoon person. It is interesting to compare this to Charlton et al (2020)'s study that taught social skills using a live animated avatar. In their study, four out of the five participants said they "preferred speaking with an avatar over a teacher or clinician." This could possibly indicate that while there was an appeal to the animated avatars, perhaps interactive lessons, whether it's from a human or a cartoon, have a greater appeal to children with ASD than the animation alone. It is possible that the participants answered that they would prefer to learn from a non-cartoon person with the assumption that it would be a live person rather than a pre-recorded video since this was not specifically stated in the question. It would have been helpful to have included an additional question on the survey asking participants to explain why they preferred learning from either a non-cartoon person or a cartoon.

Three out of five of the parents responded that they would want their child to learn other skills in this format, and one of the other parents responded that "it depends." Multiple parents also listed the animation as a strength of the intervention in their additional comments, saying the animated dog was fun and engaging. One parent commented that using an animated avatar was a great way to bridge the gap for using the same social skills to build interpersonal relationships in real life. Conversely, another parent commented that she felt that the dog face did not have very pronounced expressions or facial features, and that a different animated avatar could have been

more effective. In conjunction with this, multiple parents and participants made comments about wanting the option to choose a different avatar face to learn from.

Nearpod

We chose to deliver the intervention materials through Nearpod because of the option for participants to move through the material at their own pace. This way they could take the time they needed to process the material, and to be able to replay parts of the videos as needed. Part of the appeal of using computer-based interventions was to appeal to children with ASD's tendency to prefer structured and predictable environments as they learned this material. Watching these pre-recorded videos and being able to replay them as needed was helpful for participants to have the potential to learn the material at their own pace in a structured format with few social demands placed on them (Golan et al., 2007). We also wanted to see if it was an effective method for children with ASD to learn from because of its potential for parents or teachers to easily create lesson materials in a format that children could navigate on their own. These modules could include videos, lessons, and comprehension questions to measure understanding. Another helpful feature in the Nearpod modules was that it did not allow participants to skip past videos before they finished watching them or allow them to skip questions without selecting an answer. This helped to ensure that participants did not miss critical parts of the intervention due to impatience or otherwise trying to take a shortcut through the intervention. It also ensured that we did not miss any opportunities to gather data from the participants as they worked through the module.

We found that this format was not able to be used as a completely independent learning module the way that we had anticipated, considering that nearly all the participants required guidance and redirection throughout the intervention from researchers, or even, in some cases,

from their parents. The researchers needed to frequently remind some participants to read all the answer options before answering emotion scenario questions or to be sure to select two answers for the questions that required this. We also needed to remind parents not to paraphrase emotion scenarios or give participants hints that would affect the way they answered the questions we were collecting data from.

It was difficult for participants to stay focused and engaged during the duration of the lesson without becoming restless. All the participants expressed fatigue or boredom from the amount of reading required for the modules, especially for the emotion scenario questions. Some participants got to a point where they answered emotion scenario questions without reading the full scenario or all the answers, even when redirected. These participants required breaks in the middle of a lesson to have the motivation to finish the session. We offered these participants breaks in hope that they would come back and put more consideration into the questions we were collecting data on.

Participants who had more difficulty with reading appeared more overwhelmed with the intervention. There were audio files included in the slides with the questions to read all the material to the participants, but participants were often annoyed that the audio re-read the emotion scenario before asking questions about the scenario, making it take longer to answer the questions. In some cases, participants had researchers, or their parent read the material to them out loud so they could move through the questions more quickly or have someone show them where to follow along as the material was read to them.

We also found that Nearpod was not a particularly user-friendly format for children. The modules were presented in a Google Chrome browser, where participants were occasionally distracted by clicking other areas of the browser that were not a part of the controls for the

module and required redirection. The computer also interrupted participants with irrelevant pop-ups that researchers needed to close as they came up. On a few occasions the participants accidentally refreshed the page, or clicked on the "notes" tab, or accidentally exited the browser window, requiring the researcher to reset the module back to where the participant had left off. The participants also had difficulty with navigating the mouse on the laptop to click on the desired answer or would accidentally or intentionally highlight all the text on the page. This distraction required the researchers to redirect the participants to stay on task. While the structure concept of the modules appeared to have a promising layout, it would need to be delivered using a different format or software with less distracting or complicated variables in order to be more effective for children with ASD to use. The more the intervention could be simplified, the more it could potentially appeal to children with ASD who typically have success in controlled and structured environments with fewer distractions (Chen & Bernard Opitz, 1993).

One benefit that we saw from using Nearpod was observing participants utilizing the rewind and pause features in the videos to try to better understand the content. We specifically witnessed one of the participants reading some of the module questions then going back to rewatch part of the video before answering the questions. At other times, that participant went back to change his answers to previous questions once he got more context as he proceeded through the module. This highlighted one of the main benefits to using pre-recorded videos to teach the content, showing that there could be more potential effectiveness in using videos for teaching purposes.

Another benefit that we saw from using these modules was that participants were motivated to figure out the correct answers for comprehension questions within the script when they gave the participant immediate feedback for their answers. While the emotion scenario

questions that we took data on did not provide the participant with any feedback about their answers, the multiple-choice questions embedded within the original script immediately showed the participant if they answered correctly or incorrectly and allowed them to try answering the question again if they wanted. Most of the participants wanted to continue attempting to answer these questions until Nearpod said they had gotten the answer correct before they moved on to the next part of the module. Researchers did not prompt the participants to re-do any of these questions, rather the participants were motivated by the feedback given by Nearpod. The participants also made positive comments and appeared more motivated to keep going through the module when they were frequently shown that they were getting answers correct and were rewarded through praise for it. This factor shows that positive reinforcement and praise helped keep participants motivated and more engaged with the learning materials. It is possible that the participants may have had an easier time completing the modules if the multiple-choice questions for the emotion scenarios had also given immediate feedback.

Overall Reception of the Intervention

Overall, most of the participants and their parents reported that the intervention was enjoyable. The two participants that were eight years old rated the intervention as the least enjoyable, reporting that they sort of enjoyed it and sort of did not enjoy it. We speculated that the younger participants rated the intervention the lowest because it was harder for them to read and attend to the intervention for long periods of time. The association with doing a lot of work and reading for an average of 30 minutes at a time may have caused these participants to have more negative associations with the intervention if they felt it was difficult to stay on task and complete the modules. Researchers also recognized this during the sessions when multiple participants required frequent redirection to the module or became fatigued and needed to take

breaks during the interventions. Some parents also specifically reported that the length of the sessions and the amount of reading was challenging for their child and that the intervention could be more child-friendly if it was more like a game and required less reading. This structure of delivering the lessons may have been too strenuous for the attention spans of many children with ASD, especially considering that most of the participants required frequent guidance and redirection to the material. A shorter, modified version of the intervention may be more beneficial to use for children.

Limitations

This study may have a limited scope of the effectiveness of animated avatar video modeling due to the small sample size used for data collection, especially given the variability of the data that were collected. There also may be other aspects of the intervention influencing the data besides the effectiveness of the video modeling, considering many participants struggled with the length of the sessions and the amount of data collection questions that were embedded throughout the lesson module. These factors detracted from the participants' focus on the videos and put more emphasis on answering questions, which was a less preferred task for multiple participants. Engaging in the longer, less preferred tasks could have caused participants to rate their impression of the intervention more negatively.

Some other limitations of this study included the difficulties that we faced with standardizing the structure for each session between participants. Each participant varied with the time of day they came in for each session and the length of time between their sessions. Some participants completed some sessions with only a 10-minute break between them, while other participants had more than a week between two consecutive sessions due to their schedules. It also became difficult to control having the exact same session structure for each

participant due to different levels of guidance each participant needed. Some participants required breaks during a session to have the motivation to finish, some required more redirection to the intervention or needed material re-read to them more frequently. For a couple sessions, participants that required more guidance requested that their parent sat closer to them and read the questions to them, or parents voluntarily tried to help their child through the intervention. Researchers reminded parents on multiple occasions not to paraphrase any of the reading or make any comments that would influence the way their child answered the questions.

Implications for Future Research

Multiple aspects of this study could be modified to make the intervention stronger or to produce more consistent data. The biggest barrier to keeping participants engaged and enjoying the sessions was the amount of reading required between videos for the data collection questions in addition to the questions that were a part of the lesson scripts. Reading and answering the emotion scenarios between the lesson materials caused the sessions to last longer and for participants to be spending more time on less preferred activities, which potentially created negative associations with the intervention. The number of multiple-choice questions in the module also detracted from the focus of the avatar video models. The participants were motivated and reinforced by the immediate feedback provided with the multiple-choice questions that were a part of the lessons but appeared less motivated to answer the emotion scenario questions that did not provide feedback for their answers. For future experiments it could be beneficial to ask questions for collecting data after the participants have completed the entire module to avoid dragging out the lesson process. In Charlton et al. (2021)'s study they used the same emotion scenario questions and lessons as we used in this study, but they asked all the emotion scenario questions after their participants had finished engaging with the lessons. In

their study, they also asked the participants open ended questions about the emotion scenarios and had researchers evaluate the responses as correct or incorrect afterwards. For this study we wanted to convert the questions to a multiple-choice format in an attempt to reduce potential subjectivity with the data, and in an effort to embed the data collection questions within the modules. We wanted to embed the data collection questions within the modules because we wanted to be sure to collect enough data points to visually analyze the results for each session but did not want the participants to become restless with having to answer questions about six scenarios in a row after they completed each lesson. In Charlton et al (2021)'s study they collected approximately 12 data points for each participant across all the lessons, whereas for this study we wanted more data points for each session to measure the effects from each lesson. This is why we wanted to spread out the data collection to not exhaust the participants with so many consecutive questions for each stage. It turned out that participants still had difficulty with the amount of data collection questions we included, even when we spread them out. One parent suggested that it could be more helpful or interesting for children if they were shown videos of the emotion scenarios rather than having to read them. This could also be a helpful tactic for making the process of collecting data less aversive for the participants, so they could answer more questions before burning out. Asking all of the data collection questions after the participant completes the module could be helpful for putting more emphasis of the intervention on the animated videos than on the data collection questions. Additionally, it might be more engaging for the participants if a higher proportion of the videos involved the avatar making exaggerated expressions rather than having the avatar deliver the material with neutral expressions. This could allow more of the beneficial aspects of video modeling to be present in the lessons, which has been an effective tool for teaching children with ASD other skills. The

visual demonstration of the desired skill has allowed children to imitate and acquire the skill themselves (Cardon & Wilcox, 2010). Some parents also made comments in the surveys about how it would be beneficial to create videos that were more engaging and interactive to keep their children more excited about the lessons. Suggestions to implement this included having the module record responses that participants said out loud to the avatar's questions or pausing long enough to ensure that the participant would respond to questions asked by the avatar before moving on. Another parent commented that the intervention would be more engaging for children if it was presented as a game.

Another barrier we encountered during the study was that many of the participants struggled with using Nearpod. Participants often became distracted by other parts of the internet browser, pop-ups that would come up on the computer, or they accidentally clicked on things that were not necessary for the lessons or refreshed the page so that researchers needed to reload the module for them. The intervention may have more potential to run smoothly and effectively if it were delivered in a more child-friendly, simplified format to eliminate these distractions, such as an app created specifically for the intervention that the participants would not be able to exit on their own. Part of the appeal of using these animated avatars was to simplify the method that the content was delivered so that children with ASD would not need to be as distracted by trying to navigate as many social demands and could process the material at their own pace in a simplified form (Golan et al., 2007). To follow this similar concept, it would be beneficial to make the intervention as simplified and free of distractions as possible so that participants could put more focus on the actual content of the lessons. This could also potentially increase the possibility of creating an intervention that could be more self-paced and require less guidance from adults, as we hoped would have been the case with the Nearpod modules. Another

adjustment to the structure of the modules that may well be beneficial would be finding a way to make the audio files reading the questions follow the text in a way that would allow for even weaker readers to have more independence when moving through the modules. The audio files we included for the questions about the emotion scenarios re-read the whole scenario before reading each question about the scenario, which was frustrating for some participants who wanted to skip to the questions and answers because they remembered the scenario from the previous question. This could be addressed through having a separate button for participants to press if they wanted to hear the scenario again and a separate button to play the audio for the questions and answers. It could also be beneficial for participants with weaker reading abilities to have an option for the words to highlight as the audio read them allowing the participants to follow along. Through such changes, participants may require less clarification or re-reading from adults when answering multiple choice questions. The two youngest participants, who were both eight years old (Participant 3 and Participant 4) required the most guidance and breaks throughout the intervention, and also rated the intervention with the lowest levels of enjoyment. Therefore, it could be helpful to run this study with older children with potentially higher reading levels and ability to complete an intervention with less redirection.

When the surveys asked what they would change about the intervention, multiple participants and parents made comments about having the option to choose the animated avatar to teach the content. One parent commented that they felt the dog face used in the intervention had a limited range of expressions and that it could be beneficial to use an avatar with more pronounced facial features. Additionally, many of the participants commented with ideas for different Animoji avatars that they would personally rather learn from. If this lesson format were to become more widely used, there could potentially be multiple versions of the lesson modules

created using different Animoji faces so that participants could have a choice for which version of the module they learned from based on their Animoji preference. Researchers could also further explore the different Animoji avatar options to thoroughly determine which avatar had the most pronounced expressions. The options do not have to end with Animoji, either; other experiments could also be run using a different software to create the animated avatars.

Another interesting concept that could be explored in future studies might be to directly compare the effectiveness of using pre-recorded animation avatars to the effectiveness of using live-animation avatars to teach the same content. Since Charlton et al. (2021)'s study used the same emotion scenarios and found live-animation avatars to be an effective intervention, this could possibly provide a helpful reference for evaluating the effectiveness of using the pre-recorded animation and directly highlight the benefits of using this format as opposed to live animation.

Conclusion

This study sought to measure the effectiveness of using pre-recorded animation avatars for teaching SEL skills to children with ASD. We also investigated if Animoji and Nearpod were effective tools for delivering this type of intervention, since they would be easy for parents and teachers to use if they wanted to create similar lessons. After running the intervention and evaluating data from four participants, we found the results measuring their knowledge of SEL material were too variable to make any firm claims about the effectiveness of the pre-recorded animation.

The lesson modules were overall well received by the majority of the participants and their parents; all but one of the participants who completed the survey reported that they at least "sort of enjoyed" the study. The two eight-year-old participants and their parents rated the

intervention the lowest, which indicates that this lesson format may be less suitable for younger children. The primary concern seemed to be that the lessons took too much time and required too much reading, making it difficult for children to stay focused and engaged, particularly the younger participants. We discussed ways that future research could alter the intervention format to make it better at maintaining children's attention, such as asking all the data collection questions after the participants have completed the intervention modules, so that the lessons themselves do not drag out as long.

Each of the participants required some degree of guidance or redirection from the researchers, showing that the modules created with Nearpod were not as much of an independent teaching tool as we had anticipated. Participants experienced some technical difficulties and distractions while completing the modules in the Google Chrome browser, so in the future it would be better to deliver the interventions through a simpler software without irrelevant and extraneous distractors.

The positive feedback given by Nearpod whenever the participant answered a question from the lesson correctly was well-received and appeared to motivate the participants to learn the correct answers. Nearpod was also helpful by allowing participants to replay parts of the videos as needed, which was one of the intended benefits of using pre-recorded animation. Multiple participants replayed parts of the videos, and one participant even replayed the videos after reading the questions to help him answer them. This showed that there are potential benefits to this method of teaching. The participants having the option to review the material could appeal to the tendency for people with ASD to want to systemize concepts to learn them. If they can review the content in a systemized, predictable manner, it could be easier for children with ASD to make sense of subjective concepts such as empathy or other SEL skills (Golan et al., 2009).

Overall, the results of our study did not show a functional relation between the use of pre-recorded animation avatars and the outcomes, but there are potential benefits that could be continuously explored through future research.

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Tables

Table 1

Participants' Multiple Choice Social Validity Answers

Participant Number	How did you enjoy watching the videos and answering the questions for this study?	How much do you feel that you learned from being a part of this study?	How did you like learning the information from a cartoon character?	Would you have preferred to learn the same things from the cartoon character or from a regular, non-cartoon person?	Would you like to learn about other things through similar videos with cartoon characters?
1	I enjoyed it	I feel like I learned something from this study	I liked learning from the cartoon character	Non-cartoon person	I would sort of like that
2	I really enjoyed it	I really feel like I learned something from this study	I really liked learning from the cartoon character	Cartoon character	I would really like that
3	I sort of enjoyed it	I sort of feel like I learned something from this study	I didn't think anything of the cartoon character	Non-cartoon person	I would sort of like that
4	I sort of didn't enjoy it	I sort of don't feel like I learned anything from this study	I didn't like learning from the cartoon character	Non-cartoon person	I would not like that
5 (Emotion scenario data excluded from study)	I enjoyed it	I feel like I learned something from this study	I really liked learning from the cartoon character	Non-cartoon person	I would like that

Table 1

Participants' Free Response Social Validity Answers

Participant Number	What did you like about learning from the cartoon character videos?	What did you not like about learning from the cartoon character videos?	Is there anything that you would change about the videos?	Do you have anything you want to say about the videos or the study?
1	"I liked it when they calmly explained things that were slightly complicated."	"It did not have background music in the video but it was still OK."	"No."	"I'd like to say that it was a great place to learn specific things throughout the program."
2	"Idk"	"Idk"	"Yes. Some were my favorite, some were not my favorite."	"I liked the baby sharks questions"
3	"I think they were boring."	"Because of how long it took"	"I would like a poop head in it. Or a tiger head."	"Idk"
4	"Nothing!"	"Everything!"	"EVERYTHING!"	"NO!"
5 (Emotion scenario data excluded from study)	"I liked learning about how others feel"	"I liked it all nothing I didn't like"	"I would like the dog to a robot instead"	"No, not really."

Table 2

Parents' Multiple Choice Social Validity Answers

Participant /Child Number	How effective do you feel this intervention is for teaching your child emotion recognition?	How effective do you feel this intervention is for teaching your child empathetic responses?	How effective do you feel this intervention is for teaching your child how to identify clues to why a person would be feeling a certain emotion?	Do you think your child enjoyed this intervention ?	How likely do you think that your child will use the skills they learned from this intervention in their daily life?	Do you feel like this intervention is an effective tool for teaching children with autism?	Did you think that this intervention was user-friendly for children?	Would you want your child to learn any other skills using this form of intervention ?
1	Effective	Effective	Somewhat effective	They enjoyed it	Likely	Maybe	Yes	Yes
2	Effective	Effective	Effective	They somewhat enjoyed it	Likely	Yes	Yes	Yes
3	Somewhat Effective	Somewhat Effective	Effective	They somewhat did not enjoy it	Not sure	Maybe	"I think it could be but it would need to be more exciting and less reading for a child"	No

Participant /Child Number	How effective do you feel this intervention is for teaching your child emotion recognition?	How effective do you feel this intervention is for teaching your child empathetic responses?	How effective do you feel this intervention is for teaching your child how to identify clues to why a person would be feeling a certain emotion?	Do you think your child enjoyed this intervention ?	How likely do you think that your child will use the skills they learned from this intervention in their daily life?	Do you feel like this intervention is an effective tool for teaching children with autism?	Did you think that this intervention was user-friendly for children?	Would you want your child to learn any other skills using this form of intervention ?
4	Somewhat ineffective	Somewhat effective	Effective	They somewhat did not enjoy it	Not sure	Maybe	Yes	Depends
5 (Emotion scenario data excluded from study)	Effective	Effective	Effective	They enjoyed it	Likely	Yes	Yes	Yes

Table 3

Parents' Free Response Social Validity Answers

Participant/ Child Number	What were some strengths you saw from this intervention?	What were some weaknesses that you saw from this intervention?	Is there anything that you would change about this intervention?	Do you have any other feedback about the intervention or about this study? (Things that you liked, ideas for improvement, any other observations, etc.)
1	"It repeated the concepts so he could catch on"	"It moved too fast so he didn't have time to respond."	"The dog face didn't allow for much emotion. For example, it talked about raising eyebrows but the dog didn't have eyebrows. A character with pronounced facial features to manipulate would be more effective."	"I think you were just gathering raw responses so it was fine. It would have been more effective for his learning if you had corrected him or cleared up confusion but that's more therapy and I don't think that is your purpose. I plan to talk to him about these concepts and try to apply them to his situations, but maybe you can encourage parents to do this and give them handouts of the skills that were taught."
2	"The animation, the scenarios, length of sessions"	"The moving chair he sat in :)"	"No"	"No"
3	"The animated dog showing the kids how to use proper expressions was fun and engaging."	"Too much reading."	"Make it into a game somehow"	"I think if this is going to be an app that you want kids to turn to then I suggest it to be more like a fun game."

Participant/ Child Number	What were some strengths you saw from this intervention?	What were some weaknesses that you saw from this intervention?	Is there anything that you would change about this intervention?	Do you have any other feedback about the intervention or about this study? (Things that you liked, ideas for improvement, any other observations, etc.)
4	"Helped his reading skills"	"He got distracted easily and seemed bored with it."	"No swivel chairs"	"Instead of so many stories that are read to the child, have them watch the interaction play out and have them explain what they think as they are seeing the emotions play out on people's faces. Reading about it and seeing it are very different."
5 (Emotion scenario data excluded from the study)	"Technology based intervention appeals to children, especially those with Autism. Avatar is friendly and may serve as a bridge to building true interpersonal relationships."	"The avatar's own expressions are limited."	"Require a recorded verbal response to questions asked by the avatar before moving on in an effort to build verbal communication skills."	"Allow the child to choose the avatar"

Figures

Figure 1

Data From Emotion Scenarios for Participant 1

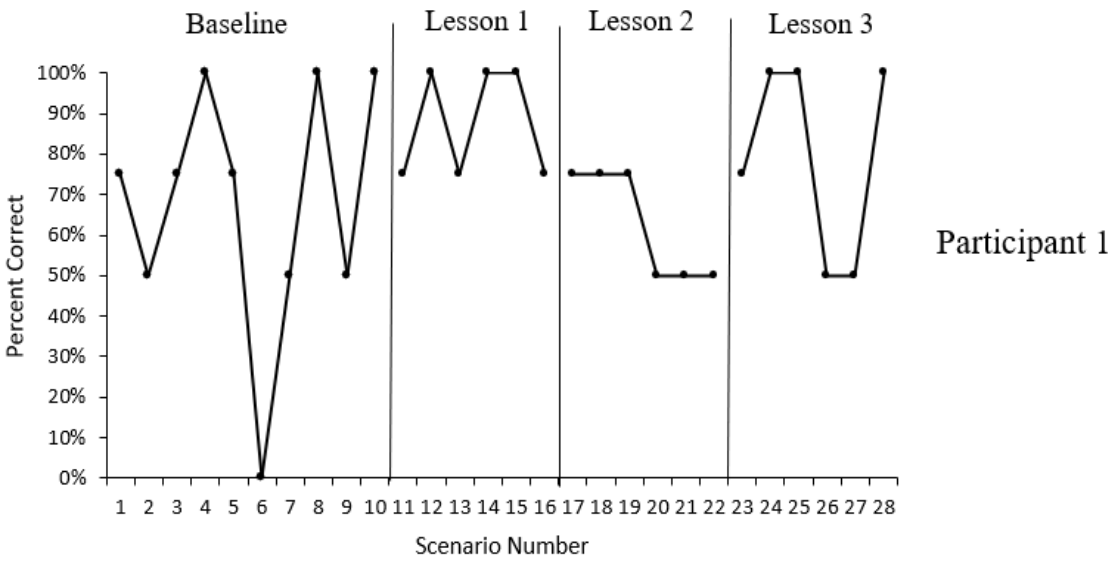


Figure 1

Data From Emotion Scenarios for Participant 2

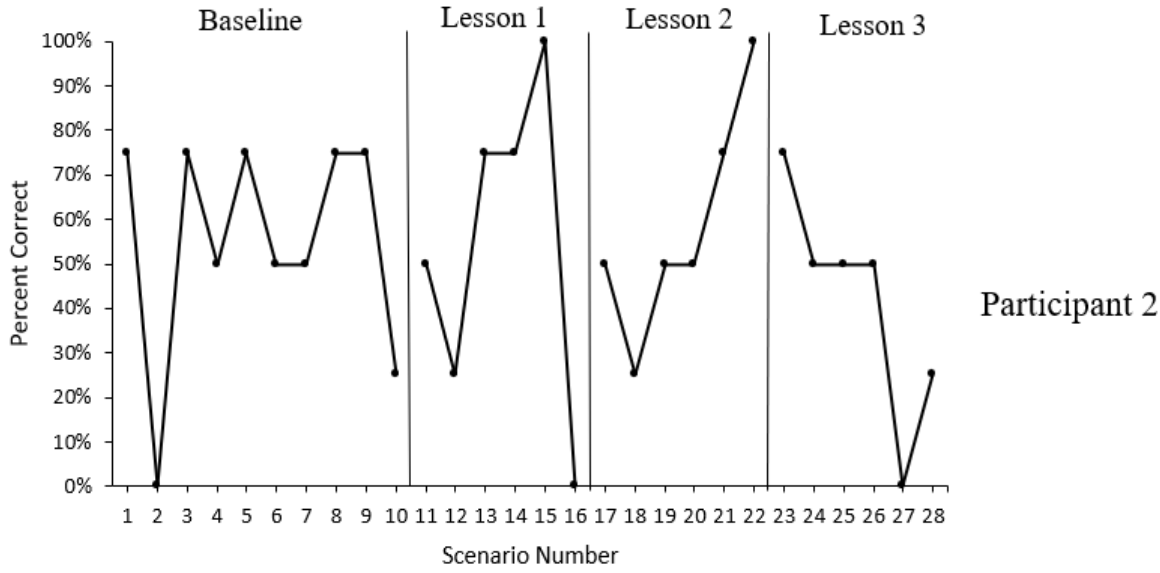


Figure 3

Data From Emotion Scenarios for Participant 3

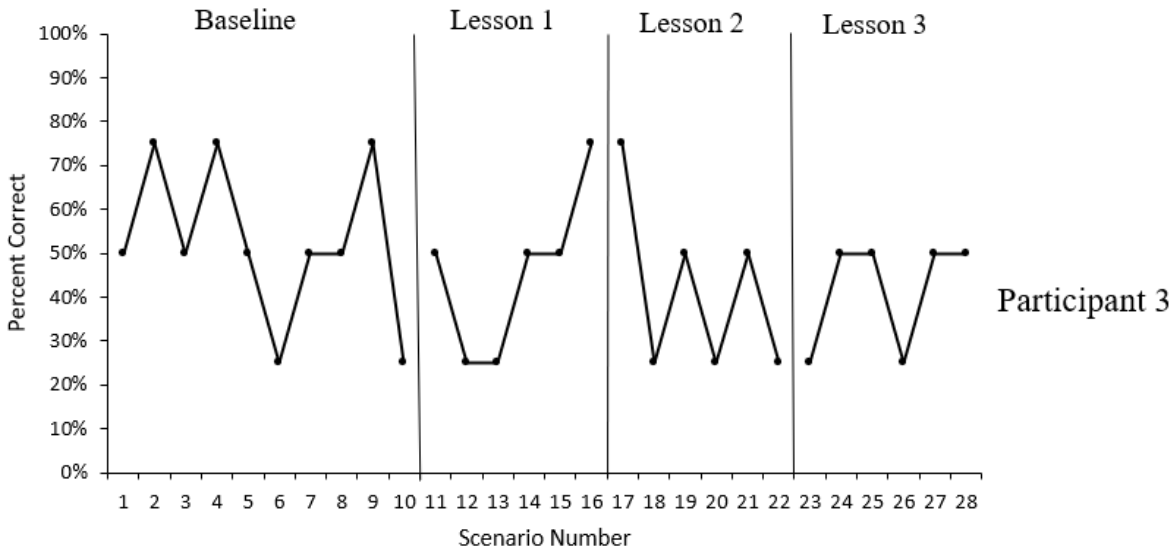
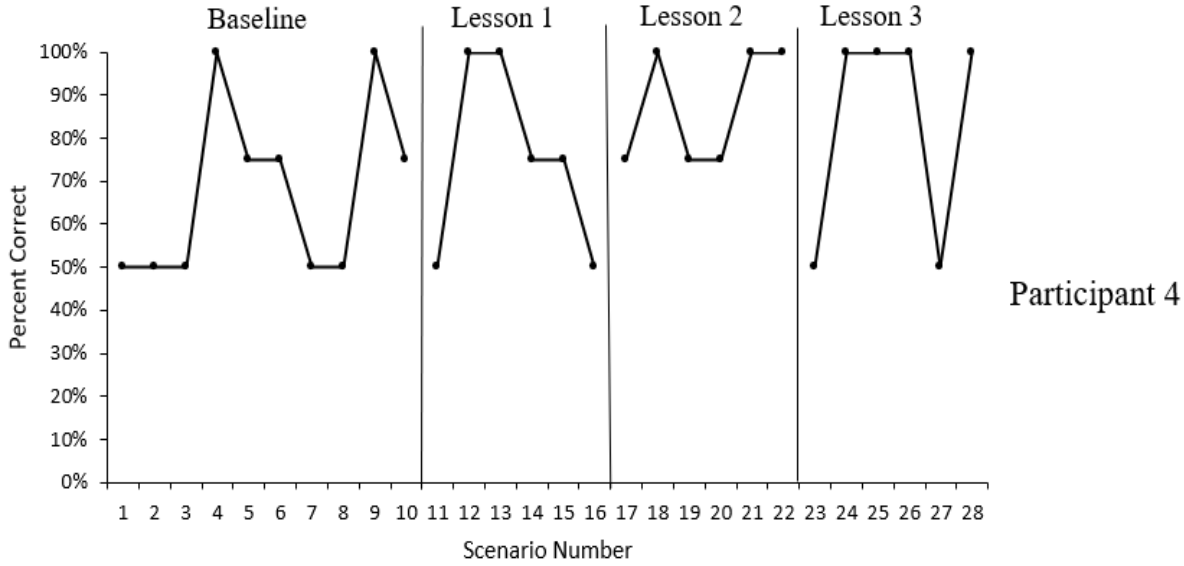


Figure 4

Data From Emotion Scenarios for Participant 4



APPENDIX A

Review of the Literature

Throughout history, humans have used a commonly accepted set of social norms to communicate, connect and relate to one another. Certain behavior that is considered socially appropriate could help people to form relationships that they could benefit from both emotionally and in a business sense (Charlton et al., 2020). The mannerism of daily interactions can contain many complex concepts, such as sarcasm, body language, inferences, etc. that people with autism spectrum disorder (ASD) tend to have difficulty understanding (Argott et al., 2017). Without this understanding, many of their interactions with others may come off as awkward or robotic, which can hinder their ability to form meaningful relationships (Stauch et al. 2018). Without meaningful relationships, these individuals may feel socially isolated or lack connections that could help them to succeed in their education or careers.

It is important to help individuals with ASD gain a better understanding of common social cues, because this could significantly increase their quality of life. This review focuses on ways researchers have used different forms of animation (live and pre-recorded) to teach basic concepts of social-emotional learning (SEL) to children with ASD, following the framework that the earlier these individuals can receive intervention, the more likely they are to successfully acquire these skills (Yan et al., 2018; Golan et al., 2009). Given this population, it is important to use an intervention that can appeal to children, especially those with the specific challenges related to ASD. For these reasons, this review examines the effectiveness of two forms of animated video technology to teach these skills. The use of animated technology is intended to capture children's interest in learning SEL concepts while also providing a structured environment for them to practice these skills without the pressure of interacting with another

person (Stauch et al., 2018). The review specifically analyzes and compares the benefits of using live animation and pre-recorded animation to administer SEL intervention to children with ASD.

Autism Spectrum Disorder (ASD)

ASD is a neurological condition that is characterized by difficulties with social communication and fixated obsessions (Golan et al., 2009). The extent of these characteristics varies across a spectrum of high-functioning or mild impairment in these areas to low-functioning or severe impairment. These characteristics often cause individuals with ASD to struggle as they try to navigate a socially complex world. People with ASD thrive in conditions that are repetitive and predictable because it allows them to better systemize and process the stimuli. It is easier for them to learn when they can hyper-focus on narrow concepts, similar to the way many people with ASD tend to hyper-focus on certain obsessive interests (Baron-Cohen et al., 2009).

Since it is difficult for individuals with ASD to grasp abstract and complex topics, the disability is often characterized the most by having difficulties with social functioning. Socializing is very fluid in nature and has many intricate unsaid rules and nuances that are difficult for people with ASD to catch and interpret. It is often difficult for them to learn these social norms because there are many concepts with a lack of repetition and many exceptions that would cause these concepts to feel inconsistent and difficult to memorize since learning social cues focuses more on following a certain style rather than learning a concrete task (Forbes et al., 2016).

Social-Emotional Learning (SEL)

SEL refers to the process of learning skills to manage emotions and apply knowledge of appropriate social interaction to build and maintain positive relationships with others (Berard et

al., 2017). SEL helps people to engage in effective social behavior, such as starting conversations, maintaining eye contact, and asking questions, with an increasing rate of independence (Charlton et al., 2020). These skills help people to relate to others and form relationships that bring meaningful experiences into their lives.

Some key factors of SEL include facial recognition, emotion recognition, emotional reciprocity, and empathy. These factors require various skillsets to work together to achieve appropriate social interactions. For example, emotion recognition is a cognitive skill requiring someone to refer to their own knowledge of interpreting certain cues to conclude how a person is feeling. Facial recognition also involves using cognitive abilities to draw upon previous knowledge to recognize familiar connections or previous exposure to a certain person. Meanwhile concepts such as emotional reciprocity and empathy require a person to use a more affective or intuitive mindset, since there is not a general concrete answer for how a person should relate to others (Baron-Cohen et al., 2009).

Empathy is one of the most crucial SEL concepts for relating to others using subjective and intuitive senses. Empathy is the ability to recognize and attribute mental states to others and respond with emotions that are appropriate to that person's mental state (Baron-Cohen et al., 2009). This can be displayed through empathetic questions or empathetic listening statements. Empathetic questions are when someone responds to another person with an on-topic question that displays interest in that person's emotional state. An empathetic listening statement is a verbal response to another person that indicates that the responder could understand or identify with that person's feelings or situation (Koegel et al., 2016). Empathy is a crucial skill for building meaningful relationships with others because it displays a sense of understanding that allows people to feel connected to each other, which increases the quality of relationships.

Autism and Social-Emotional Learning

Due to the subjective nature of SEL, individuals with ASD tend to struggle significantly more than an average person to learn those concepts (Brosnan et al., 2015). People with ASD can typically follow goal-oriented actions and objective concepts, but they often struggle to match a certain style while completing the task, which is a core component of social interaction (Forbes et al., 2016). So even if someone with ASD thinks they have a good understanding of certain social skills, the delivery of these skills may come across as awkward and ultimately not achieve the intended effect. This is because people with ASD use explicit, rule-based frameworks to navigate emotional perception, rather than using intuition based on a certain prototype (Brosnan et al., 2015). It is easier for people with ASD to understand basic emotions with consistent patterns and clear indicators, but it is more difficult for them to understand complex or multi-layered emotions (Baron-Cohen et al., 2009).

Although it can be frustrating for people with ASD to try and understand SEL, it is crucial for these individuals to learn these skills for their own well-being. Having a deficit in facial recognition and expression greatly impairs one's ability to connect with others, which could be isolating and result in significant further mental health problems (Russo-Ponsaran et al., 2014). Without sufficient SEL skills, people with ASD often lack meaningful relationships, experience bullying and ridicule from others or struggle to find employment as adults (Arias et al., 2017). It is important to find the most effective methods to help people with ASD to become fluent in SEL skills to ensure a higher quality of life and greater rates of success in all areas. For these methods to be effective, it is important to take systematic learning styles into account while also providing opportunities for these individuals to practice generalizing those skills (Hopkins et al., 2011). Since interventions are generally most effective when implemented from a younger

age (Golan et al., 2009), this review focused on studies that taught SEL skills, such as emotion recognition and empathy to children with ASD.

Teaching SEL to Children With ASD Using Animation

Various forms of animation have become useful tools for teaching SEL skills to children with ASD. Using animated technology is meant to appeal to children because they are typically drawn to the cartoon nature of animation, which should already cause them to be more interested than if a real person was talking to them (Brosnan et al., 2015). Students being more interested in the method of teaching is a significant advantage in many ways. One way being that without a lack of intrinsic motivation, students often limit their desire to generalize the skills they learn, meaning any increase in interest could increase the effectiveness of the intervention (Baron-Cohen et al., 2009). In their study about teaching SEL skills to children with high functioning and low functioning ASD, Hopkins et al. (2011) found that the participants with ASD displayed higher motivation and less disruptive behaviors when engaging in computer-based instruction.

Using virtual methods for teaching SEL skills would especially appeal to children with ASD because they take place in a controlled environment, which would accommodate people with autism's need for structure and repetition and allow them to be more successful (Baron-Cohen et al., 2009). It provides a method of learning that is predictable, consistent, requires fewer social demands and often allows students to work at a pace that is comfortable for them (Rice et al., 2015). This reduced stimulation and reduced social pressure of this type of environment can help children with ASD overcome any social anxiety they may typically experience by giving them a chance to practice SEL skills before easing into using those skills with humans (Kandalaft et al., 2012; Stauch et al. 2018). Within the controlled animated environment, the people implementing the intervention can create multi-sensory interactions and

multi-level interactive functions to engage the learners and can alter the programs as needed to individualize the instruction (Hopkins et al., 2011).

Animated technology can be executed in many forms, such as video modeling, video games, virtual reality, interactive avatars, etc. Each of these methods take a different learning approach while utilizing a controlled virtual environment with an animated appeal. As more studies observe the effects of using animated technology as a teaching tool, it raises the question as to what form of animation would be the most beneficial method of teaching SEL skills to children with ASD. This review focuses on examining previous research studies that examine the effectiveness of using either live animation or pre-recorded animation to teach SEL skills to children with ASD.

Live Animation

For this analysis, live animation was defined as any animated character that was controlled by a human in real-time and could react to a student's words or actions. The biggest appeal that live animation had over pre-recorded animation was the capability to provide instant feedback through interaction and to personalize the curriculum for the individual and be available to clarify any aspects the student may not understand (Charlton et al., 2020). FaceSay is one program that is used to teach SEL skills through live animation. Hopkins et al. (2011) used FaceSay to teach children with both high-functioning and low-functioning ASD to practice facial recognition, emotion recognition, discriminating facial expressions and eye gazing. They found that the children enjoyed the virtual interactions and were able to generalize the skills they practiced. The study also noted that participants with higher IQ scores and lower symptomology benefited more from the intervention than lower functioning participants. Rice et al. (2015) also used FaceSay for their study to have children with ASD practice eye gazing, joint attention,

emotional cognition, and facial recognition skills. They found that FaceSay was a promising, efficient and cost-effective tool to teach these skills to children with high functioning ASD.

Carter et al. (2014) conducted an experiment that compared a human coach, live animation, and pre-recorded animation to teach SEL skills. For their live animation component, one of the researchers voiced a cartoon turtle to teach SEL skills as they measured the participants' verbal and non-verbal responses. The live animation intervention elicited significantly more responses than the pre-recorded animation intervention but did not elicit as many responses as the human coach. However, when Charlton et al. (2020) conducted a social validity survey for parents and participants after learning SEL from a live animation avatar, all but one of the participants reported that they preferred working with the avatar to learning from a human teacher. Every parent that participated in this survey found the live animation avatar to be socially valid and reported that their children all demonstrated improvements in their SEL skills after working with the avatar. Overall, live animation has shown to be a promising, effective and fun way to engage children with ASD with SEL.

Pre-Recorded Animation

For this review, pre-recorded animation was defined as any previously recorded video program that featured an animated character with the purpose of teaching SEL. Pre-recorded animation appeals to teaching children with ASD because it is systematic and predictable in nature. The lack of unpredictable social exchanges may remove pressure or potential anxiety that children with ASD may experience when engaging with a human or live animation character. Pre-recorded animation also appeals to children with ASD's desire for repetition because they could potentially fixate on the video and replay it as many times as they wanted so they could

memorize the content in a manner that is comfortable for them (Baron-Cohen et al., 2009). Children with ASD thrive with this type of structure.

One method that pre-recorded animation may use to teach SEL skills would be to encourage mimicry of the behavior on the screen. However, Forbes et al. (2016) discovered that children with ASD are less likely than their typically developing peers to automatically mimic actions, regardless of how socially engaging the teacher or character was, meaning that the use of mimicry could be feasible for this population if they are less likely to engage with this tactic.

Video modeling is a pre-recorded video that demonstrates how to complete a certain task and is commonly used method for pre-recorded animation interventions. Video modeling has been found to lead to faster acquisition than in-vivo or live modeling, better rates of generalization and reduced anxiety levels during the intervention (Charlton et al., 2020). A benefit to teaching using video modeling is that it allows the learner to view a visual example of the skill they are trying to learn. This allows them to compare their own execution of the skill to the example to try to imitate the model as accurately as they can (Cardon & Wilcox, 2010). The closer the learner can match the skill as it is demonstrated by the model, the more accurately they are able to learn the skill for themselves. The main drawback to video modeling is that it does not provide instant feedback as the learner attempts the skill that is being modeled (Chen et al., 2015).

When Carter et al. (2014) compared teaching SEL using a human teacher, live animation, and pre-recorded animation, they used educational television programs as their form of pre-recorded animation. They found pre-recorded animation elicited the lowest amount of gestural or verbal responses from the participant and that it was a significantly less effective SEL teaching method than a human teacher or live animation. They reported that some participants refused to

watch the pre-recorded animation altogether. Even for the participants that paid attention throughout the intervention, Carter et al. (2014) found that attention alone was not enough to promote effective learning.

"The Transporters" is a pre-recorded animation program that multiple studies found to be a successful intervention for teaching emotional recognition to children with ASD (Brosnan et al., 2009; Golan et al., 2009; Yan et al., 2018). The program is a series of DVDs that teach recognition skills using animated train characters with human-like faces. Baron-Cohen et al. (2009) found the program was especially effective when participants engaged in small group discussions and role plays after viewing the DVDs and that doing this resulted in high rates of generalization.

While there are certain disadvantages to using pre-recorded animation as an intervention for teaching SEL skills to children with ASD, it could still be considered a generally effective teaching method. Pre-recorded animation is easy to implement and appeals to an audience that learns best through systematic repetition.

Implications

The research above has shown some of the benefits of using pre-recorded animation and live animation for teaching SEL skills to children with ASD. Both have shown to be overall effective forms of intervention that engage the children with the content. There have been a greater number of studies analyzing the use of pre-recorded animation than there have been about live animation. There has only been one study to compare live animation to pre-recorded animation and they found greater success using live animation (Carter et al. 2014). Carter et al. (2014) presumed that live animation could have been a more effective intervention than pre-recorded animation due to interactive nature of live animation being better equipped to sustain

the participant's attention in a way that engages them more with the content, allowing them to learn more from the experience.

Purpose of the Current Study

The goal of this systematic review was to obtain information that would be relevant to the thesis study at the beginning of this document. The original search sought to gather information about live animation and pre-recorded/video modeling animation and to examine the differences between those methods. The study focused on pre-recorded animation methods, specifically we created pre-recorded animated videos of a cartoon avatar teaching SEL skills. These pre-recorded videos also included video modeling components at times where the avatar demonstrated how to express different emotions. Other parts of the videos show the avatar discussing how to interpret or react in different scenarios that require certain SEL skills. Since this study was a replication of a study that used live animation methods, I wanted to research the differences between the two, which is why this review included information about live animation.

Methods

Procedure

To gather articles on this topic, I performed literature searches in the ERIC and PsycInfo databases. I searched the terms "autism," "social emotional learning" and "animation" in the thesaurus for each of these databases to ensure I would include the proper terms for the database or any other terms that would yield relevant results.

In PsycInfo my search phrase was "(DE 'social emotional learning' OR DE 'emotion recognition' OR DE 'empathy' OR DE 'social learning') AND (DE 'autism spectrum disorders' OR DE 'social perception' OR DE 'theory of mind') AND (DE 'audiovisual communications

media' OR DE 'visual stimulation' OR DE 'animation' OR DE 'avatars')". This search yielded nine articles, two of which were used for this synthesis.

In ERIC my search phrase was "(DE 'emotional intelligence' OR DE 'social development' OR DE 'interpersonal relationship' OR DE 'interpersonal competence') AND (DE 'pervasive developmental disorders' OR DE 'autism') AND (DE 'animation' OR DE 'interactive video')". This search yielded four articles, two of which were used in this synthesis. I also used the search phrase "(DE 'Autism' OR DE 'Pervasive Developmental Disorders' OR DE 'Asperger Syndrome') AND (DE 'Social Development' OR DE 'Interpersonal Competence' OR DE 'Social Adjustment' OR DE 'Social Attitudes' OR DE 'Social Experience') AND (DE 'Animation' OR DE 'Cartoons' OR DE 'Computer Simulation' OR DE 'Simulation' OR DE 'Computer Assisted Instruction' OR DE 'Computer Games' OR DE 'Computer Graphics')" in this database which yielded 51 articles, five of which were used in this synthesis.

I accessed the remaining five articles that were used for this synthesis from a file containing articles that were used by the research team I was working with. The research team was conducting a study about using live animation to teach social emotional learning skills to children with autism. The research group had a file containing articles they were using for their literature review; I used five of those articles in this synthesis.

Inclusion Criteria

I reviewed the titles and abstracts of each article to determine if it would qualify to be a part of this synthesis review. After I selected the articles that appeared to meet the criteria that I was looking for to include in this review, I reviewed those articles and laid out the important factors of the articles into an excel document. The excel document included sections regarding the independent and dependent variables, the type of study, participant demographics and a

summary statement of the results. Putting these items into the excel sheet helped to filter out more articles to be used for this review. The following sections were used to evaluate the relevance of the selected articles.

Types of Articles

To be included in this synthesis the article needed to be about an original research study. The study could take place as a group design with experimental and control groups, or it could be a multiple baseline single-case design where participants were compared to their own progress. This eliminated the inclusion of any reviews or response articles to other studies.

Participant Demographics

To be included in this synthesis, the article must have included participants diagnosed with autism spectrum disorder (ASD). This includes high functioning and low functioning ASD. The included articles also had participants that ranged from early childhood to young adulthood (the youngest being four years old, the oldest participant being 31 years old).

Independent Variables

Each of the studies included used some form of static or live animation or direct training from a real person to teach various social emotional learning skills. Various programs and methods were used to measure various social emotional skills from participants, but each of these were meant to measure the strength of these three forms of teaching those types of skills.

Dependent Variables

The studies included in this review used various dependent variables, but each of them was based on the concepts of social emotional learning. Specifically, the dependent variables measured skills such as emotion recognition, empathic communication and expression, or other

relevant social skills. There were also some studies that measured the rate that participants mimicked the social emotional skill that was being taught.

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APPENDIX B

Institutional Review Board Approval Letter

Memorandum

To: Cade Charlton
Department: BYU - EDUC - Counseling, Psychology, & Special Education
From: Sandee Aina, MPA, HRPP Associate Director
Wayne Larsen, MAcc, IRB Administrator
Bob Ridge, Ph.D., IRB Chair
Date: September 24, 2021
IRB#: X2020-374
Title: Project RAARE: Real-time Animated Avatars Realizing Engaged learning

Brigham Young University IRB approved the continuation of the research study referenced in the subject heading. The approval period is through 10/08/2022. All conditions for continued approval during the prior approval period remain in effect. These include, but are not necessarily limited to the following requirements:

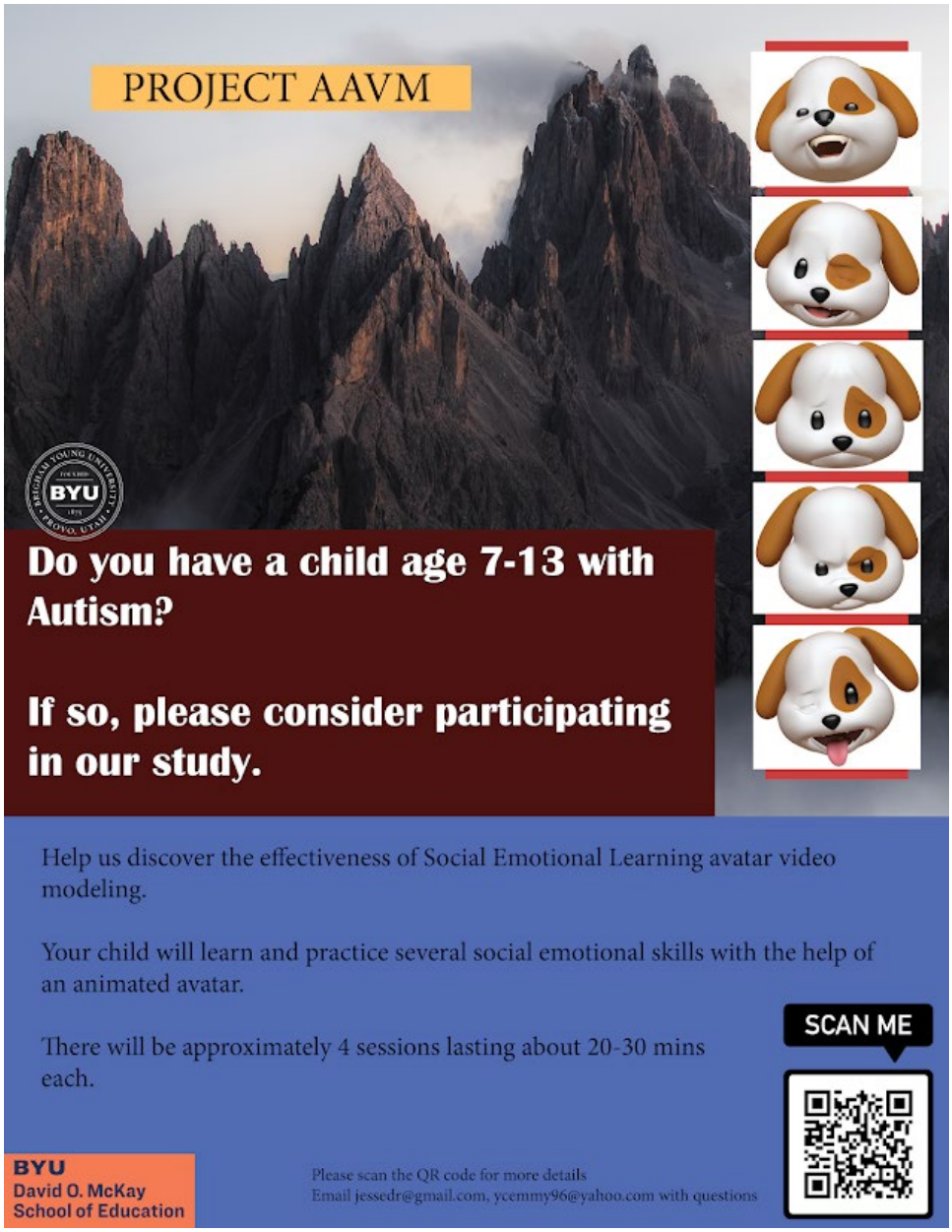
1. A copy of the consent forms is found in the study management folder in iRIS. No other forms should be used. Each research subject must sign the form prior to initiation of any protocol procedures. In addition, each subject must be given a copy of the signed consent form unless the documentation of consent was waived by the IRB.
2. Any modifications to the approved protocol must be submitted, reviewed, and approved by the IRB before modifications are incorporated in the study.
3. In addition, serious adverse events must be reported to the IRB immediately, with a written report by the PI within 24 hours of the PI's becoming aware of the event. Serious adverse events are (1) death of a research participant; or (2) serious injury to a research participant.
4. All other non-serious unanticipated problems should be reported to the IRB within 2 weeks of the first awareness of the problem by the PI. Prompt reporting is important, as unanticipated problems often require some modification of study procedures, protocols, and/or informed consent processes. Such modifications require the review and approval of the IRB.

Instructions to access approved documents, submit modifications, report complaints, and adverse events can be found on the IRB website under iRIS guidance: https://orca.byu.edu/IRB/Articulate/Study_Management/story.html.

A few months before the expiration date, you will receive a prompt from iRIS to renew this protocol. There will be two reminders. Please complete the form in a timely manner to ensure that there is no lapse in the study approval. Please refer to the IRB website for more information.

APPENDIX C

Participant Recruitment Flyer



APPENDIX D

Participant Screening Form

AAVM Participant Screening Form

What is your child's name? *

Your answer

How old is your child? *

Your answer

Can your child read and comprehend full sentences independently? *

- ◯ Yes
- ◯ No
- ◯ Other: _____

Are they able to follow 1-3 step directions? *

- ◯ Yes
- ◯ No
- ◯ Other: _____

How long is your child able to sit and focus/work on tasks before becoming restless to a point that impacts their attitude or performance?

- ◯ Less than 20 minutes
- ◯ 20-30 minutes
- ◯ 30 minutes-1 hour
- ◯ 1 hour+
- ◯ Other: _____

Is your child able to recognize the emotions of others? *

- ◯ Yes
- ◯ No
- ◯ Other: _____

How comfortable is your child with talking to unfamiliar people? *

- ◯ Very comfortable
- ◯ Comfortable
- ◯ Somewhat comfortable
- ◯ Neutral
- ◯ Somewhat uncomfortable
- ◯ Uncomfortable
- ◯ Very uncomfortable

Would your child communicate verbally with unfamiliar people?

- ◯ Yes
- ◯ No
- ◯ Other:

Is your child able to verbally communicate their thoughts or preferences? *

- ◯ Yes
- ◯ No
- ◯ Other: _____

What are your child's favorite things to do?

Your answer

What are your child's least favorite things to do?

Your answer

Is there anything your child is emotionally sensitive to?

Your answer

Can they name all the members of your family?

- ◯ Yes
- ◯ No
- ◯ Other: _____

Does your child express their emotions? If so how do they typically express their emotions?

Your answer

How would they likely respond to viewing a talking animated character?

- ◯ Very positive
- ◯ Positive
- ◯ Somewhat positive
- ◯ Neutral
- ◯ Somewhat negative
- ◯ Negative
- ◯ Very negative

Does your child have any physical limitations that we need to prepare for?

Your answer

Do you have access to any recent testing information? (i.e. recent IEP, adaptive behavior scores, cognitive tests, and Autism score, diagnosis, IQ, achievment) *

- ◯ Yes
- ◯ No
- ◯ Other:

Do you have formal documentation of your child having autism? (this could be a report from psychologist or IEP) *

- ◯ Yes
- ◯ No
- ◯ Other:

What days/times are you most available/unavailable? *

Your answer

APPENDIX E

Parent and Child Consent Forms

Parent Consent Form (presented through Qualtrics)

Introduction

My name is Emmy Davis and I am a Master's student at Brigham Young University. I am conducting a research study about how to teach social and emotional skills to children with pre-recorded animated videos created using Animoji. I am inviting your child to take part in the research because he/she has a developmental disorder and can help us learn more about how kids like your child learn.

Procedures

If you agree to let your child participate in this research study, the following will occur:
1. Your child will meet with a member of our research team at BYU campus. Each lesson should last about 30-40 minutes to engage with a virtual module on a computer. There will be four lessons that researchers will schedule with you. Multiple lessons could take place during one session at BYU campus depending on your preferences.
2. During these meetings your child will learn about social skills and strategies to improve their emotional well-being.
3. Finally, you and your child will then be asked to fill out a survey at the end of the last session to reflect on what they thought about participating in this research project and how effective you felt the intervention was for their learning.

Risks

There may be some discomfort caused by being asked some of the questions. Your child may answer only those questions that your child wants to, or your child may stop the entire process at any time. There is also a risk of loss of privacy, which the researcher will reduce by not using any real names or other identifiers. When recording data from the sessions, the name "participant #" will be used instead of your child's real name. Only the researcher will have access to the data. At the end of the study, data will be used to write a report about what was learned. Your child's name will not be on this report.

Confidentiality

The research data will be kept in a secure location and a password protected and encrypted database. Only the researcher will have access to the data. At the conclusion of the study, all identifying information will be removed and the data will be kept in a locked office.

Benefits

There are no direct benefits for your child's participation in this project. There is a possibility that your child may learn some skills that will help them at home or school, but it is not guaranteed.

Compensation

Participants will receive $10 for each lesson they complete in this research study.

Questions about the Research

Please direct any further questions about the study to
Emmy Davis at (***) ****** (text preferred, calls are fine too) or ********@*****.com
Jared Morris at (***) ****** (call only) or **********@***.edu
Jesse Rhodes at (***) ******* (text or call) or *********@***.edu
Questions about your child's rights as a study participant or to submit comment or complaints about the study should be directed to the IRB Administrator, Brigham Young University, A-285 ASB, Provo, UT 84602. Call (***) ******* or send emails to irb@byu.edu.

You have been given a copy of this consent form to keep.

Participation

Participation in this research study is voluntary. You are free to decline to have your child participate in this research study. You may withdraw you child's participation at any point without affecting your child in any way.

Name of Participant: _____

Name of Parent/Guardian: _____

Signature of Parent/Guardian: _____

Date (MM/DD/YYYY): _____

IRB NUMBER: IRB2020-374

IRB APPROVAL DATE: 10/09/2020

IRB EXPIRATION DATE: 10/08/2022

Consent to use Audio and Video Recording of Minor

Thank you for your child's participation in Project AAVM: Animated Avatar Video Modeling conducted by Master's students Emmy Davis and Jesse Rhodes through Brigham Young University

During the Study, researchers will audio and video record your child. Audio and video recordings will only be collected during active data collection and will focus on the interactions between your child and the avatar. Your consent below allows BYU to use these recordings ("Media") for purposes associated with the Study.

Consent

I understand that researchers will take audio and video recordings of my child as part of this Study. I give permission for BYU to use the Media in scientific publications, scientific conferences or meetings, educational presentations, public presentations to non-scientific groups, and other uses related to the Study so long as my child's name is not used. I agree that all Media will become the property of BYU, and I waive my right to inspect, approve, or be compensated for BYU's use of the Media.

By signing below, I certify that I have read this Consent to Use Audio & Video Recording of Minor and agree to its terms.

Name of Participant: _____

Name of Parent/Guardian: _____

Signature of Parent/Guardian: _____

Date (MM/DD/YYYY): _____

IRB NUMBER: IRB2020-374
IRB APPROVAL DATE: 10/09/2020
IRB EXPIRATION DATE: 10/08/2022

Child Assent Form (presented through Qualtrics)

What is this research about?

My name is Emmy Davis, and I want to tell you about a research study I am doing. A research study is a special way to find the answers to questions. We are trying to learn more about how to teach social and emotional skills to children using Animoji. You are being asked to join the study because you have a developmental disorder and can help us learn more about how kids like you learn.

If you decide you want to be in this study, this is what will happen.

1. You will meet with a member of our research team at BYU campus. Each lesson will last about 30-40 minutes. You will have approximately four sessions.
2. During these meetings you will learn about social skills and strategies to improve your emotional well-being.
3. Finally, at the end of the last session you will fill out a survey to reflect on what you thought about participating in this research project. This will take about 5-10 minutes or less

Can anything bad happen to me?

You may not want to answer questions or become tired or bored.

Can anything good happen to me?

You may learn some skills that will help you at home or school, but most likely we will learn things that will help other people like you someday. The purpose of this study is to learn more about how people learn and what kinds of tools we can use to teach social emotional skills.

Do I have other choices?

You can choose not to be in this study.

Will anyone know I am in the study?

We won't tell anyone you were a part of this study. When we are done with the study, we will write a report about what we learned. We won't use your name in the report.

What happens if I get hurt?

We do not expect anyone to get hurt in this study. As always, your parents/legal guardians will be with you throughout the study in case anything happens.

What if I do not want to do this?

You don't have to be in this study. It's up to you. If you say yes now, but change your mind later, that's okay too. All you have to do is tell us.

You will receive $10 for each session you complete in this research study. Before you say yes to being in this study; be sure to ask Emmy Davis to tell you more about anything that you don't understand.

If you want to be in this study, please sign and print your name.

Name: _____

Signature: _____

Date (MM/DD/YYYY): _____

Consent to use Audio and Video Recording

Thank you for your willingness to participate as a research subject for Project AAVM: Animated Avatar Video Modeling conducted by Masters students Emmy Davis and Jesse Rhodes through Brigham Young University.

During the Study, researchers will audio and video record you. Audio and video recordings will only be collected during active data collection and will focus on the interactions between you and the avatar. You will be recorded if you choose to be on screen during these interactions. Your consent below allows BYU to use these recordings for purposes associated with the Study.

Participant Consent

I understand that researchers will take audio and video recordings of me as part of this Study. I give permission for BYU to use the Media in scientific publications, scientific conferences or meetings, educational presentations, public presentations to non-scientific groups, and other uses related to the Study so long as my name is not used. I agree that all Media will become the property of BYU, and I waive my right to inspect, approve, or be compensated for BYU's use of the Media.

By signing below, I certify that I have read this Consent to Use Audio & Video Recording and agree to its terms.

Name: _____

Signature: _____

Date (MM/DD/YYYY): _____

IRB NUMBER: IRB2020-374

IRB APPROVAL DATE: 10/09/2020

IRB EXPIRATION DATE: 10/08/2022

APPENDIX F

Emotion Scenario Questions and Answer Options

Baseline Scenarios

1. Imagine that Sally's little brother broke her favorite toy. It was a helicopter that could fly all around the house. Sally would play with it for hours and fought many wars with the cat. She loved that helicopter. Her little brother put it in his mouth and chewed on it. Now it won't fly. She yelled at him and her face turned red.

-How do you think Sally is feeling in this situation?

a. Embarrassed

b. Sad

c. Excited

d. Angry

- How can you tell that she would be feeling that way? Select two answers

a. She played with the helicopter for hours

b. She fought wars with the cat with her helicopter

c. Her little brother broke their favorite toy and now it doesn't work

d. The helicopter could fly all around the house

e. She yelled at their brother and her face turned red

f. Her little brother put the toy in his mouth

- What would you do to try to help the situation?

a. Yell at her little brother

b. Say "I'm sorry your toy is broken, I know you loved it"

c. Tell her that she could hide her helicopter from her brother better next time

d. Tell her that she can play with a different toy.

2. Imagine that you love to eat ice cream. One time you went to your favorite ice cream shop to get your favorite flavor. You had only had 2 bites when your friend ran into you and knocked your ice cream cone on the ground. You started to yell and he said your face was all red. He said he was sorry and that it was an accident.

- How do you think you would be feeling in this situation?

a. Sad

b. Happy

c. Excited

d. Angry

- How could you tell that you would be feeling that way? Select two answers

a. Because you love to eat ice cream

b. Your ice cream cone was knocked onto the ground

c. Your face was all red

d. You got your favorite flavor

e. Your friend apologized

f. You took two bites of ice cream

- What could you do in this situation?

a. Count backwards from ten

b. Take your friend's ice cream

c. Yell because you're so mad

d. Tell the ice cream shop they have to give you another ice cream

3. Imagine that your friend got 1st place in the science fair! They worked hard on their project. Their dad helped them to make a volcano with real lava and smoke. Your friend's clothes got very dirty when the volcano exploded. They took lots of photos and videos at the science fair. They had a huge smile on their face.

- How do you think your friend would be feeling in this situation?

    a. Disgusted

    b. Scared

    c. Happy

    d. Angry

- How could you tell that they would be feeling that way? Select two answers

    a. They worked really hard on the project

    b. They got first place in the science fair

    c. The volcano had real smoke

    d. Their clothes got dirty

    e. They had a huge smile on their face

    f. They took lots of photos and videos

- What would you do if you were in this situation with your friend?

    a. Say "congratulations on getting first place!"

    b. Say "it looks like your clothes got dirty"

    c. Show them your science project

    d. Ask if you can see the pictures they took

4. Imagine that Bob was walking with his friends to a park when Bob tripped on a rock and fell down. His face turned red and he wouldn't look up. You helped pick Bob up and asked if he was okay. Bob saw that he hurt his knee which made him feel like crying.

- What do you think Bob would be feeling in this situation?

a. Sad (Curved Answer)

b. Angry

c. Embarrassed

d. Excited

- How could you tell that Bob would be feeling that way? Select two answers

a. Bob was with his friends

b. He hurt his knee (Curved Answer)

c. Bob doesn't like the park

d. You helped Bob up

e. Bob's friends saw him trip and fall down

f. Bob's face turned red and he wouldn't look up

- What would you do if you were there in that situation with Bob?

a. Make your face turn red too

b. Tell Bob to be more careful

c. Tell Bob that he should look up at his friends

d. Say "it's okay, everybody falls down sometimes"

5. Imagine that something smells really bad in your friend's kitchen. They went to get lunch and could smell it as soon as they walked in. Your friend wanted to eat their pizza from last night.

They love pizza. They opened the fridge and found a rotten, moldy peach. It smelled so bad they almost threw up.

- How do you think they would be feeling in this situation?

    a. Excited

    b. Disgusted

    c. Sad

    d. Angry

- How can you tell that your friend would be feeling that way? Select two answers

    a. Your friend loves pizza

    b. The moldy peach smelled so bad that your friend almost threw up

    c. They were looking forward to eating leftover pizza from last night

    d. Your friend doesn't like peaches

    e. It’s lunchtime

    f. Something smells really bad in their kitchen

- What would you do in this situation to try to help your friend?

    a. Tell them they could go outside or open a window to get away from the smell

    b. Tell them their stinky kitchen ruined lunchtime

    c. Make a face to show you're grossed out

    d. Leave them alone in their stinky kitchen

6. Imagine that your teacher told your class last week that they are going to the zoo today! While you were on the bus going to the zoo, you were talking quickly with your friends and smiling very big. You looked out the window and frowned when you saw there were gray clouds, but when you saw the zoo coming up you raised your arms and cheered.

- How do you think you would be feeling in this situation?

    a. Happy

    b. Scared

    c. Excited

    d. Bored

- How could you tell that you would be feeling that way? Select two answers

    a. You frowned when you saw the gray clouds

    b. You were talking quickly with your friends

    c. You were riding the bus

    d. Your teacher told the class last week that you would be going to the zoo today

    e. You raised your arms and cheered when you saw the zoo coming up

    f. You were smiling very big

- What would you do in this situation?

    a. Smile and cheer

    b. Ask the teacher about the clouds

    c. Take a nap

    d. Talk to your friends about what you did over the weekend

7. Imagine that at school someone in your class said something mean about your new pants. You tried not to cry because it hurt your feelings. Your friend asked if you were feeling okay because you were frowning a lot. She said your pants were beautiful and it made you feel better.

- How do you think you would be feeling in this situation?

    a. Embarrassed

    b. Sad

c. Angry

d. Happy

- How can you tell that you would be feeling that way? Select two answers

a. Your feelings were hurt and you tried not to cry

b. Your friend asked if you were okay

c. Your friend said that your pants were beautiful

d. Someone in your class was noticing your pants

e. You were frowning a lot

f. You were wearing new pants

- What would you do to help in this situation?

a. Ignore the person who made the mean comment

b. Throw away those pants

c. Yell at the person who made the mean comment

d. Try to hide your pants

8. Imagine that your friend hates high places! They get so nervous thinking they will fall and get hurt. But on the other hand, some people love being in high places. For example, your friend's brother keeps trying to get them to go on rollercoasters. He says they're really fun. But your friend gets nervous and panics just thinking about it.

- What do you think your friend would be feeling in this situation?

a. Scared

b. Embarrassed

c. Angry

d. Happy

- How can you tell that your friend would be feeling that way? Select two answers

    a. Your friend was at an amusement park and didn't know what to do

    b. They felt nervous thinking about falling

    c. They keep trying to go on roller coasters

    d. They panic thinking about roller coasters

    e. Your friend's brother says roller coasters are really fun

    f. A lot of people love being in high places

- What would you do if you were in this situation with your friend?

    a. Tell them to get over it and have fun

    b. Say "it's ok to feel scared"

    c. Ask “why are you so scared?”

    d. Tell them you don't understand why they are scared because rollercoasters are usually safe.

9. Imagine that your neighbor’s dad went to Australia and he was so excited when his dad came home. Their dad brought back this gross brown stuff. He put it on some bread for your neighbor to try to eat. He spit it out because it tasted terrible. And it made your neighbor stick out his tongue because it tasted like salt.

- How do you think your neighbor would be feeling in this situation?

    a. Excited

    b. Angry

    c. Embarrassed

    d. Disgusted

- How could you tell that he would be feeling that way? Select two answers

a. It tasted so terrible so he spit it out

b. His dad went to Australia

c. His dad brought back something from his trip

d. He stuck his tongue out

e. He was excited for his dad to come home

f. Your neighbor doesn't like bread

- What would you do to help in this situation with your neighbor?

a. Ask them about Australia

b. Ask them what kind of bread it was

c. Say "it sounds like that brown stuff was yucky"

d. Tell them that there are things that are a lot more gross than that

10. Imagine that your parents took you to the mall today and you were so excited to go to the toy store and pick out a new toy. When you got inside, your mom saw one of her friends and they started to talk to each other. Unfortunately, the conversation wasn't interesting and you didn't want to listen. So you had to sit next to them doing nothing for an hour while they continued talking.

- What do you think you would be feeling in this situation?

a. Scared

b. Embarrassed

c. Bored

d. Excited

- How could you tell that you would be feeling that way? Select two answers

a. You went to the mall

b. The toy store didn't have new toys

c. You had to sit doing nothing

d. You don’t like your mom’s friend

e. Their conversation wasn't interesting and you didn't want to listen

f. You don't know what your mom and her friend are talking about

- What's something that you could you do in this situation?

a. Groan loudly so your mom can hear you

b. Fall asleep

c. Tap your mom on the shoulder and ask if you can keep going soon

d. Wander away from your mom

Script 1 Scenarios

11. Imagine that you love summertime. You can run around outside all day and go swimming. You especially love to eat popsicles. Your mom says that you laugh a lot in the summer. You also don’t like it when the winter comes and it gets so cold, but now it's summer again and you don't have to think about being cold anymore.

- How do you think you would be feeling in this situation?

a. Bored

b. Happy

c. Sad

d. Excited (Curved Answer)

- How could you tell that you would be feeling that way? Select two answers

a. You laugh a lot

b. You don’t like winter

c. You went swimming

d. You love summer

e. You ran around outside all day

f. You ate a popsicle

- What would you do in this situation?

a. Sit outside

b. Take a nap

c. Laugh or smile

d. Ask how long summer is going to last

12. Imagine that you went shopping at the new mall with your mom. It was so busy. You went to look at the toy section and forgot to tell your Mom. When you were done you couldn't find her and you started shaking thinking about how she left without you. One of the workers from the store came up and asked if you were okay because your face looked like you were about to cry. You told her you couldn't find your mom and she helped you find her.

- How do you think you would be feeling in this situation?

a. Happy

b. Embarrassed

c. Sad

d. Afraid

- How could you tell that you would be feeling that way? Select two answers

a. You looked at the toy section

b. You were about to cry

c. You were worried you were left alone

d. A worker came up and talked to you

e. The mall was busy

f. Someone helped you find your mom

- What is something that you could do in this situation?

a. Take deep breaths and go with the worker who could help you find your mom

b. Keep looking at the toy section

c. Cry and think about your mom

d. Start yelling until someone finds you

13. Imagine that one time, Tim yelled at Sean because he thought that he had taken his candy. Tim came up and hit Sean in the chest. You knew Sean didn't take it. You couldn't control it and you hit Tim back in his chest. You both got in trouble and had to stay after class. After calming down and talking about it, Tim realized he had forgotten his candy at home that day.

- How do you think you would be feeling in that situation?

a. Angry

b. Sad

c. Embarrassed

d. Disgusted

- How could you tell that you would be feeling that way? Select two answers

a. Tim and Sean are your friends

b. You wanted to stay after class

c. You hit Tim

d. Tim left his candy at home

e. You lost control

f. You calmed down and talked about the problem

- What could you do help in this situation?

a. Tell Sean to hit Tim back so that you don't have to

b. Try to calmly tell Tim that Sean didn't take his candy

c. Yell at Tim to leave Sean alone and try to scare him away

d. Hide your own candy so that no one tries to take it

14. Imagine that your older brother picked you up from school yesterday. He plays hockey and his car smells so gross. You couldn't even breathe in his car and had to plug your nose the whole ride home. He didn't notice the smell and asked why you were being silly. You told him his car was so stinky. He rolled down the windows and you could finally breathe again.

- How do you think you would you be feeling in this situation?

a. Angry

b. Disgusted

c. Embarrassed

d. Bored

- How could you tell that you would be feeling that way? Select two answers

a. Your brother picked you up and you were on your way home from school

b. You plugged your nose and couldn't breathe

c. Your brother told you that you were being silly

d. Your brother rolled down the windows in the car

e. Your brother's car smelled gross

f. You don’t like hockey

- What could you do to try to help this situation?

a. Roll down the windows or nicely ask your brother to roll them down

b. Refuse to get in the car and call your mom to pick you up from school instead

c. Ignore the smell until you get home

d. Tell your brother that you are not being silly. If anything, he is being silly

15. Imagine that while in class the teacher asked everyone to answer a question, you felt confident that you knew the answer so you raised your hand. When you gave the answer, the teacher said that it was wrong and your classmates laughed at you. You felt like you wanted to cry and started to sink down in the chair so they wouldn't look at you.

- How do you think you would be feeling in this situation?

a. Angry

b. Sad (Curved Answer)

c. Bored

d. Embarrassed

- How could you tell that you would be feeling that way? Select two answers

a. You sunk down into your chair so your classmates wouldn't look at you

b. Your classmates laughed at you

c. You felt confident that you knew the answer

d. You were at school

e. You got the answer wrong

f. You answered a question in class

- What is something you could you do in this situation?

a. Yell at the kids who were laughing at you

b. Never ask any questions in class again

c. Tell yourself that it's okay to make a simple mistake

d. Hide in the bathroom

16. Imagine that your sister had a choir concert today. It sounded interesting so you said that you would go. When the concert started, the music wasn't very interesting and you wanted to go outside and play. Your mom said that you had to stay inside and listen. You sat through the whole concert and tried to stay awake. After the concert, you still told her she did a good job.

- How do you think you would be feeling in this situation?

a. Bored

b. Excited

c. Happy

d. Angry

- How could you tell that you would be feeling that way? Select two answers

a. Your mom said you had to stay inside and listen

b. The concert sounded interesting

c. You wanted to play outside

d. You told your sister "good job!"

e. You sat through the whole concert

f. You tried to stay awake

- What is something that you could do in this situation?

a. Walk out of the concert

b. Complain to your mom

c. Take a nap

d. Try to think about something else that's entertaining

Script 2 Scenarios

17. Imagine that you had a friend named Brian. He came over to your house every day. He moved away and you didn't see him anymore. When he told you he was moving, you cried all night. You didn't think you would make a new friend. Then you found your favorite toy and played with it. It made you feel a little better, but you still missed Brian.

- How do you think you would be feeling in this situation?

    a. Bored

    b. Sad

    c. Excited

    d. Angry

- How could you tell that you would be feeling that way? Select two answers

    a. Because Brian is gone

    b. Because you found your favorite toy

    c. You cried all night

    d. You made a new friend

    e. Brian came to your house every day

    f. You like playing with your friends

- What would you do in this situation?

    a. Remember that it's okay to feel sad and share your feelings

    b. Try to forget about Brian

    c. Ask your parents to move your family also

    d. Just play by yourself instead of making new friends

18. Imagine that one time your older sister left a scary movie on the TV. You watched some of it and saw lots of scary things. Your sister got in trouble, which was funny because she never gets in trouble. You couldn't sleep that night and had to sleep in your mom and dad's bed because you thought a ghost was in your room.

- How do you think you would be feeling in this situation?

    a. Afraid

    b. Sad

    c. Excited

    d. Angry

- How could you tell that you would be feeling that way? Select two answers

    a. Your sister got in trouble

    b. It was night time

    c. You saw a scary movie

    d. You slept in your parent's room

    e. Now you ask your mom if you can watch a show

    f. Your sister left the TV on

- What would you do in this situation?

    a. Try to get your sister in more trouble

    b. Don’t look at TVs anymore

    c. Help yourself to calm down or ask for help

    d. Just try to forget about it

19. Imagine that you had to meet with your teacher one time to ask a question about a math problem that was difficult to understand. When you walked into the room, you accidentally

called her “mom”. Your face felt hot and you apologized to her. She laughed and that made you laugh too.

- What do you think that you would be feeling in this situation?

    a. Bored

    b. Happy

    c. Embarrassed

    d. Excited

- How could you tell that you would be feeling that way? Select two answers

    a. You both laughed

    b. You accidentally called you teacher "Mom"

    c. Your face felt hot

    d. You had a difficult math problem

    e. You don’t like math

    f. You had to meet with your teacher

- What would you do in this situation?

    a. Notice that you feel embarrassed and that it’s okay to feel that way

    b. Leave your classroom

    c. Keep calling your teacher “mom”

    d. Apologize to your teacher again

20. Imagine your teacher came back from Asia and showed you pictures from her trip. On her trip she ate cooked bugs. It was so gross that you felt even sick after looking at the pictures, but you were glad you didn't actually get sick. Tim pretended to be sick and it made everyone laugh.

- How do you think you would feel in this situation?

a. Sad

b. Disgusted

c. Excited

d. Angry

- Why do you think that you would be feeling that way? Select two answers

a. Your teacher showed you pictures

b. Seeing cooked bugs be eaten

c. Tim pretending to be sick

d. You felt sick

e. You didn't actually get sick

f. Everyone laughed at Tim

- What would you do in this situation?

a. Wrinkle your nose and say "ew"

b. Ask Tim if he is okay

c. Ask to see other pictures of bugs

d. Ignore your teacher

21. Imagine that you love to play fetch with your puppy. She runs so fast. You smile so big when she brings the ball to you. Sometimes you smile so much it makes your face hurt. Sometimes she slobbers on the ball and it is gross and you have to get a new ball.

-How do you think you would be feeling in this situation?

a. Bored

b. Happy

c. Excited (Curved Answer)

d. Angry

- How could you tell that you would be feeling that way? Select two answers

a. You smile so big and so much

b. You love to play with your dog

c. The slobber on the ball is really gross

d. You have to get a new ball

e. Your face hurts

f. Your dog is so fast

- What would you do in this situation?

a. Stop using the ball

b. Continue smiling and playing

c. Rub your sore face

d. Think of something else to do

22. Imagine that you were waiting for your parents to come home. When your dad came inside, he said he had a surprise. He told you that you were going to Disneyland next week. Naturally, you cheered and started to count down the days until the trip. But then, you frowned when you realized it was still seven days away.

- What do you think you would be feeling in this situation?

a. Happy

b. Embarrassed

c. Sad

d. Excited

- How could you tell that you would be feeling that way? Select two answers

a. You were waiting for your parents to come home

b. Dad said he had a surprise that you were going to Disneyland

c. You cheered and started counting down

d. It was seven days away

e. You frowned

f. You've never been to Disneyland

- What do you think you would you do in this situation?

a. Keep marking the calendar looking forward to the trip

b. Cheer loudly every morning while others are sleeping

c. Ask your parents every day about when you are going

d. Frown until it's the day of the trip

Script 3 Scenarios

23. Imagine that your friend has a dog and their dog died this morning. Your friend's dog was their best friend and they took their dog to the park every Saturday and played fetch for hours. They had many good memories of their dog. Your friend misses him very much and has been crying all day.

- How do you think they would be feeling in this scenario?

a. Disgusted

b. Scared

c. Sad

d. Angry

- How do you know that they would be feeling that way? Select two answers

a. Their dog died this morning

b. They went to the park with their dog every Saturday

c. They played fetch with their dog for hours

d. Your friend has great memories of their dog

e. Your friend misses their dog and has been crying all day

f. Their dog was their best friend

- What would you do if you were in this scenario?

a. Say "there's other dogs out there to play with"

b. Say "I'm sorry to hear about your dog, I know he was important to you"

c. Show them pictures of other dogs to cheer them up

d. Say "try not to think about your dog"

24. Imagine that your friend's favorite TV show is making more episodes. It has been a year since they have come out with a new episode and today is the first day of the new season. Your friend has been telling you about it all day and has been sitting on the couch waiting for the last hour. It was a little boring for a bit, but it's worth it for them to watch the show again.

- What do you think your friend is feeling in this situation?

a. Bored

b. Excited

c. Happy

d. Embarrassed

- How can you tell that they would be feeling that way? Select two answers

a. They have been telling you about the show all day

b. Your friend has a nice couch

c. Waiting was boring for a little bit

d. Their favorite show just came out with a new episode

e. Your friend is watching TV

f. The show hasn't had a new episode in a year

- What would you do if you were in this situation?

a. Say "Wow that's awesome you get to see a new episode!"

b. Say "I don't care about that show"

c. Say "Do you want to watch something else afterwards?"

d. Say “That’s a lot of waiting”

25. Imagine that your friend got stuck in a tree once. They yelled for help, but no one was around. Your friend was shaking up in the tree and didn’t know what to do. It was so high. They finally jumped and landed in the soft grass and your friend was safe.

- How do you think your friend was feeling in this situation?

a. Scared

b. Embarrassed

c. Angry

d. Happy

- How could you tell that they would be feeling that way? Select two answers

a. Your friend was shaking and didn't know what to do

b. They were climbing in a tree

c. They yelled for help but no one was around

d. They jumped and landed on the soft grass

e. Your friend got to the ground safely

f. Your friend couldn't get up the tree

- What would you do in this situation?

    a. Say “That sounds like a fun time!”

    b. Say "You shouldn't have climbed the tree"

    c. Say “That sounds scary, I’m glad you’re safe”

    d. Say "I didn't get stuck when I climbed a tree"

26. Imagine that your friend’s mom brought home pizza for dinner one night. Pizza is your friend's favorite food and it made them smile when their mom walked through the door. Your friend was laughing while eating the pizza with their mom. They were glad there were no mushrooms on the pizza or else they would frown.

- What do you think your friend is feeling in this situation?

    a. Bored

    b. Happy

    c. Excited (Curved Answer)

    d. Disgusted

- How could you tell that they would be feeling that way? Select two answers

    a. They would frown if there were mushrooms

    b. They were laughing while eating pizza with their mom

    c. They smiled when their mom walked through the door with pizza

    d. They were really hungry

    e. They were glad there were no mushrooms

    f. Their mom came home

- What would you say if you were in this scenario?

    a. That's awesome you got to eat your favorite food!

b. No fair, I want pizza!

c. Why don't you like mushrooms?

d. I don’t like pizza

27. Imagine that your friend has been planning all week to play kickball at recess. They were excited because it was their favorite game to play. However, a rainstorm came before recess started, and the teacher said the class had to stay inside, so your friend sat at their desk and drew pictures instead of playing a game. Your friend felt tired the whole time and wasn’t interested in drawing.

- What do you think your friend was feeling in this situation?

a. Bored

b. Excited

c. Happy

d. Embarrassed

- How could you tell that they were feeling that way? Select two answers

a. They've been looking forward to playing kickball all week (Curved Answer)

b. A rainstorm came

c. Kickball is their favorite game

d. They were tired and not interested in drawing

e. The teacher said the class had to stay inside for recess

f. They sat at their desk instead of playing a game

- What would you do in this situation?

a. Talk about how you love kickball too

b. Offer to play a game with them when they're inside

c. Ask what they are drawing

d. Complain about the rainstorm with them

28. Imagine that your friend was in the lunchroom and was walking back to their table when they dropped their lunch. It made a loud noise and the entire lunchroom looked at your friend. Your friend turned their head down and wasn't looking up. A teacher came over to help your friend clean it up and get another lunch.

- What do you think your friend was feeling in this situation?

a. Angry

b. Happy

c. Sad

d. Embarrassed

- How could you tell that they would be feeling that way? Select two answers

a. The teacher helped your friend clean it up

b. The entire lunchroom looked at your friend

c. They dropped their lunch (Curved Answer)

d. They turned their head looking down

e. They got a new lunch

f. The lunchroom is a noisy place

- What would you do if you were in this situation?

a. Laugh at them

b. Say "it's okay, accidents happen sometimes"

c. Ask what was in their lunch

d. Don’t say anything

APPENDIX G

Social Validity Surveys

Parent Survey

Your Thoughts and Feelings on Animated Avatar Video Modeling as an Intervention

How effective do you feel this intervention is for teaching your child emotion recognition? *

- ◯ Very effective
- ◯ Effective
- ◯ Somewhat effective
- ◯ Somewhat ineffective
- ◯ Ineffective
- ◯ Very ineffective

How effective do you feel this intervention is for teaching your child empathetic responses? *

- ◯ Very effective
- ◯ Effective
- ◯ Somewhat effective
- ◯ Somewhat ineffective
- ◯ Ineffective
- ◯ Very ineffective

How effective do you feel this intervention is for teaching your child how to identify clues to why a person would be feeling a certain emotion? *

- ◯ Very effective
- ◯ Effective
- ◯ Somewhat effective
- ◯ Somewhat ineffective
- ◯ Ineffective
- ◯ Very ineffective

Do you think your child enjoyed this intervention? *

- ◯ They really enjoyed it
- ◯ They enjoyed it
- ◯ They somewhat enjoyed it
- ◯ They were indifferent
- ◯ They somewhat did not enjoy it
- ◯ They did not enjoy it
- ◯ They really did not enjoy it

How likely do you think that your child will use the skills they learned from this intervention in their daily life? *

- ◯ Very likely
- ◯ Likely
- ◯ Somewhat likely
- ◯ Not sure
- ◯ Somewhat Unlikely
- ◯ Unlikely
- ◯ Very unlikely

Do you feel like this intervention is an effective tool for teaching children with autism? *

- ◯ Yes
- ◯ No
- ◯ Maybe
- ◯ Other: _____

Did you think that this intervention was user-friendly for children? *

- ◯ Yes
- ◯ No
- ◯ Other: _____

Would you want your child to learn any other skills using this form of intervention? *

- ◯ Yes
- ◯ No
- ◯ Depends
- ◯ Other: _____

What were some strengths you saw from this intervention? *

Your answer

What were some weaknesses that you saw from this intervention? *

Your answer

Is there anything that you would change about this intervention? *

Your answer

Do you have any other feedback about the intervention or about this study? (Things that you liked, ideas for improvement, any other observations, etc.) *

Your answer

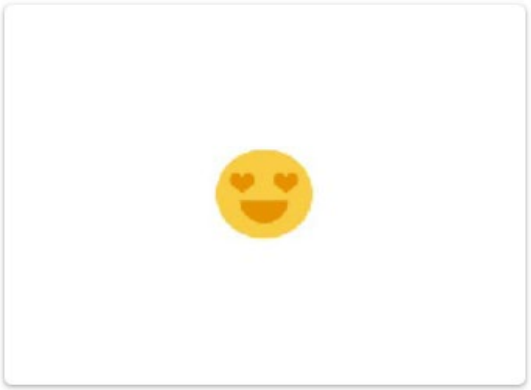
What is your child's name? *

Your answer

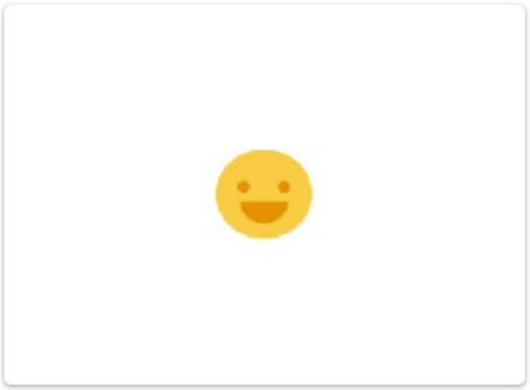
Child's Survey

Your Thoughts and Feelings on Learning with Cartoon Characters

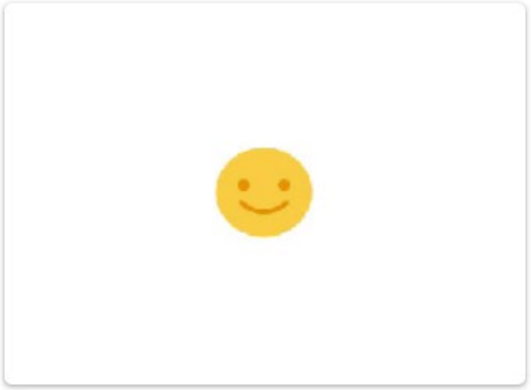
How did you enjoy watching the videos and answering the questions for this study? *



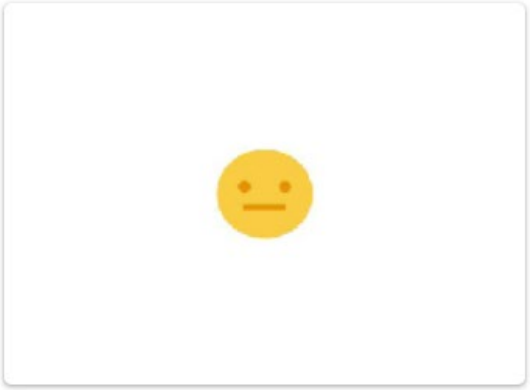
- ◯ I really enjoyed it



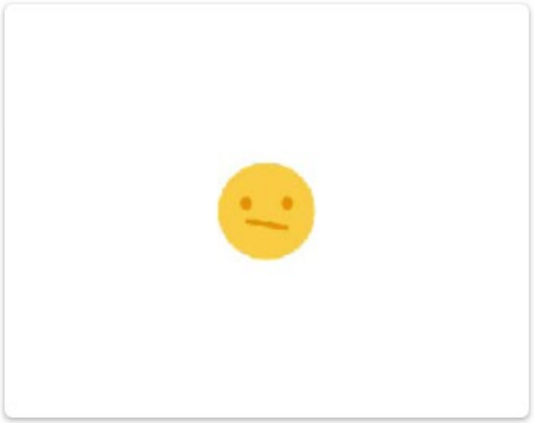
- ◯ I enjoyed it



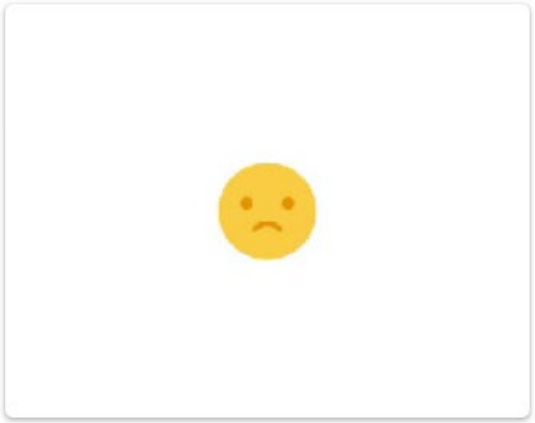
- ◯ I sort of enjoyed it



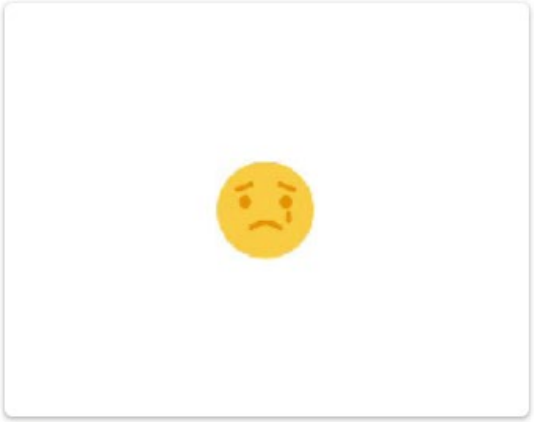
- ◯ I thought it was okay



○ I sort of didn't enjoy it



○ I didn't enjoy it



○ I really didn't enjoy it

How much do you feel that you learned from being a part of this study? *

- ◯ I really feel like I learned something from this study
- ◯ I feel like I learned something from this study
- ◯ I sort of feel like I learned something from this study
- ◯ I sort of don't feel like I learned anything from this study
- ◯ I feel like I didn't learn anything from this study
- ◯ I really feel like I didn't learn anything from this study

How did you like learning the information from a cartoon character? *

- ◯ I really liked learning from the cartoon character
- ◯ I liked learning from the cartoon character
- ◯ I sort of liked learning from the cartoon character
- ◯ I didn't think anything of the cartoon character
- ◯ I sort of didn't like learning from the cartoon character
- ◯ I didn't like learning from the cartoon character
- ◯ I really didn't like learning from the cartoon character

Would you have preferred to learn the same things from the cartoon character or from a regular, non-cartoon person? *

- ◯ Cartoon character
- ◯ Non-cartoon person

Would you like to learn about other things through similar videos with cartoon characters? *

- ◯ I would really like that
- ◯ I would like that
- ◯ I would sort of like that
- ◯ I wouldn't care either way
- ◯ I would sort of not like that
- ◯ I would not like that
- ◯ I would really not like that

What did you like about learning from the cartoon character videos? *

Your answer

What did you not like about learning from the cartoon character videos? *

Your answer

Is there anything that you would change about the videos? *

Your answer

Do you have anything you want to say about the videos or the study? *

Your answer

What is your name? *

Your answer

APPENDIX H

Lesson Scripts

Lesson 1: Self-Awareness

2 min **Review/Introduction**	***Hi there!*** ***My name is Emmy and today, we will learn to better identify our feelings.*** **Feelings are also called emotions.** ***We will talk about different types of feelings and decide if they're comfortable or uncomfortable.*****"** Then we will learn how to show our feelings in meaningful and appropriate ways. Insert first emotion scenario here?
5 min **Name/Define Skills**	***"An emotion is a feeling that is meant to tell you something about your situation."*** What are some of the feelings you have felt so far today or sometime this week? (Participant Answers out loud or thinks about the question) Like we mentioned, feelings, or emotions, can be comfortable or uncomfortable. **"*Being comfortable with a feeling means that we feel good and enjoy that feeling. Being uncomfortable with a feeling means that the feeling makes us feel* hurt *or upset*"** For example, do you think happy is comfortable or uncomfortable? (Participant answers out loud) I think it's comfortable too! I feel good about it and I want to keep feeling that way. How do you know when you are feeling uncomfortable? (Participant answers, Rhetorical out loud?) When I'm feeling uncomfortable, I also can feel hurt or upset. Uncomfortable feelings help me change and do better, but

	sometimes they make it hard to work or play with other people. Sad could be an example of an uncomfortable feeling. Now let's talk about showing our feelings. We are going to learn and practice how to show emotions. ***It is okay to have any feeling***, but there are appropriate and inappropriate ways to show feelings. Appropriate ways to show your feelings are respectful and don't hurt anyone. Inappropriate ways can hurt yourself or others. For example, an appropriate way to express anger would be to show it in your face and calmly tell your teacher the problem. But if you yelled and pushed over your desk, that would be an inappropriate because it could hurt you or someone else. We're going to talk about the three steps to showing your feelings. These steps are on your purple sheet. 1. First, ask yourself, "WHAT am I feeling right now?" … Is it comfortable or uncomfortable? 2. Second, WHY am I feeling this way?... You can ask yourself, "Why do I feel this?" 3. Third, HOW can I show others how I feel? You can do this best when you choose an appropriate way to express your emotions. You can remember these steps as what, why, and how! Can you list those steps out loud for me? (Participant Answers out loud) Yes! What, why, and how! Now, I will give you 3 ways to show what, why, and how. These three ways are also on the bottom of your purple sheet. 1. Use your FACE. You can use your eyes, mouth, and eyebrows to show feelings in your face. I open my eyes wide, raise my eyebrows, and open my mouth when I feel afraid (*afraid face*). Can you make an afraid face? (Participant Answers)

	2. Use your WORDS. Telling someone when an emotion is very uncomfortable will help you stay calm. With words, you can also get help. I talk to my mom when I feel furious, or very angry. Do you ever think to do this? (Participant Answers) 3. Use your BODY. You can use your hands and shoulders to show feelings in your body. I sometimes put my hands out like this (*wide arms*) when I feel excited. Can you practice using your body to look excited too? (Participant Answers) Remember, you use WHAT WHY and HOW to communicate your feelings by using your face [points to face], words [points to lips], and body [waves both hands]. Can you tell me again what you can use to Show your emotion? (Participant Answers) That's right! You can use your face, words, and body! Insert emotion scenario here
2 min **Non-Examples**	Ok! Now I'm going to demonstrate some situations and I want you to tell me what I'm doing wrong. My sister stole my markers this morning and didn't ask me, so I screamed at her to give them back and when she wouldn't, I stomped away crying. What did I do wrong in this situation? a. Wanted my markers back **b. Screamed at her** c. Crying d. Didn't hide my markers well enough from her Yes, this is inappropriate! What is a better way I can respond using WHAT WHY and HOW? a. Take something of hers without asking b. Take the markers back when she isn't looking

	c. Ask her nicely if I could have my markers back and tell her it made you feel upset when she took them d. Don't talk to her and throw a fit by yourself in your room Great! Now, I'm painting my friend a picture and as I reach for more paint, I spill water all over my artwork and it's ruined. I cry very loud and throw my painting because of my frustration. What did I do wrong in this situation? **a. Threw my painting** b. Painting a picture for my friend c. Spilling water on my artwork d. Crying Yes, this is inappropriate! What is a better way I can respond using WHAT WHY and HOW? **a. Tell someone that I'm feeling upset, take a break or get paper to draw a new picture** b. Give your friend the ruined picture anywhere c. Push everything else off the table d. Keep all your emotions inside and don't let anyone know that you're upset Insert emotion scenario here
5 min **Modeling Situation**	Alright, now I'm going to look at an example situation and then model it for you. Once I finish, we will talk about how I used WHAT WHY and HOW to show an emotion. Here's the situation: You are at the city fair, and your mom buys you some ice-cream for a treat. Okay. First, WHAT I am feeling? • I am feeling very happy right now. Second, WHY am I feeling happy? • I think my happy feeling is very comfortable and I am feeling this way because I am getting ice cream! Third, HOW can I respond? • I will show my emotion with my face and my words [Avatar spreads arms wide] 'I just love ice cream! Thank you, Mom!'

	Can you tell me WHAT I am feeling in this situation? Yes! I'm feeling Happy! WHY was I feeling that way? Yeah! Because my mom got me ice cream and I love ice cream! And HOW did I show my emotion? Yes! I showed my emotion with my face and words! Great Job! Insert emotion scenario here? Now, I am going to give you examples and I need you to figure out WHAT emotion is being felt, WHY that emotion is being felt, and HOW to respond. Ready?
5 min **Guided Practice Continued**	Here's our first example: ***You are the goalkeeper [goalie] for your soccer team. During the last 2 minutes of the game a ball slips by you, and your team lost***. <u>Can you identify WHAT emotion you would feel?</u> **a. Sad** b. Disgusted c. Happy d. Bored <u>Is that a comfortable or uncomfortable emotion?</u> a. Comfortable **b. Uncomfortable** I would also feel [sad], and maybe frustrated. I agree, sad is uncomfortable for me. Now, can you find out WHY you would be feeling sad? a. You don't like soccer **b. Your team lost the game** c. The game is over d. You were the goalkeeper for this game I would feel sad that my team lost. HOW c<u>an you show that emotion in an **appropriate** way?</u>

	a. Stomp away from your team and throw a fit b. Yell at the coach or the other team saying the game wasn't fair c. Start blaming people for reasons why you lost the game **d. Tell your teammates that you're sad you lost the game** That's a great way to show your emotion. Can you show me with your face how you would show your sadness for losing the game? (Participant Answers) That's a great way to show how you feel! Here's our next example: After a quiz, ***your teacher says "Great job! You got 100% right!"*** What are the 3 steps to show how you feel? a. Where, When and What b. Stop, Drop and Roll **c. What, Why and How** d. Go, Fight and When Yes! What, why, and how! What emotion would you feel ***when your teacher says "Great job! You got 100% right"?*** a. Embarrassed b. Angry c. Bored **d. Excited** I would also feel excited, and even a little proud too. Is that a comfortable or uncomfortable emotion for you? **a. Comfortable** b. Uncomfortable I agree! It is also a comfortable emotion for me. Can you find WHY you are feeling excited? a. Your teacher talked to you **b. You got 100% on your quiz and your teacher told you "Good job!"** c. You had to take a quiz

	d. You're done with your quiz Good observation! I would also feel excited because my teacher is said such a nice thing. Now HOW would you show this feeling? Try thinking of the different ways to show emotion that we talked about earlier. **a. Smile and say "Thank you! That makes me so excited"** b. Take the paper then look away c. Jump on the table and say “YES!” d. Tell your classmates "Haha, I did better than you on the quiz!" Yes, you can show excitement by telling your teacher how excited you are! We also learned about showing how we feel with our face. What face would you make to show your excitement? You can show that you’re excited by lifting your eyebrows and having an open smile, like this. (Demonstrate) Insert emotion scenario here You are mastering showing your emotions! For our last activity we will give you 2 examples for you to work through independently. We will say a scenario, and I want you to respond with WHAT WHY and HOW. Ready?
5 min **Independent Practice**	Scenario 1: ***You can’t think of anything to do.*** Can you identify WHAT emotion you feel, WHY you would feel that way, and HOW you would respond? a. Sad because I can’t think of anything to do. I could cry about it **b. Bored, because I can't think of anything to do. I could ask my mom if she knows of any activities I could do** c. Excited because I want to do something. I can ask my mom if she knows of any activities I could do d. Bored because I can't think of anything to do. I could push a table over so I can feel entertained Awesome! I would also feel bored when I don’t have anything to do! I would also show I’m bored in my facial expression like this: (make a bored face). If I’m home, I might also ask my mom

	if she has any ideas of something fun to do. Okay, ready for scenario 2? Scenario 2: ***While at school you find out that one of your classmates has been saying things that are untrue about you.*** How would you respond using WHAT, WHY and HOW? a. Happy because your classmate is talking about you. You can go up and talk to them. b. Sad because your classmate is telling people things about you that aren't true. You can yell and cry so people pay attention to you instead of your classmate. **c. Angry because your classmate is telling people things about you that aren't true. You could tell them to stop saying those things.** d. Angry because your classmate is telling people things about you that aren't true. You could yell at them or hit them to make them stop. Yes, I would also feel angry with my classmates! I would feel angry and frustrated because their words are untrue. When I am angry, I also pull my eyebrows down, scrunch my nose, and frown—like this! It would also be great to talk to your teacher. You can tell your teacher, your parents, or another trusted adult if you need some more help. Insert emotion scenario here
2 min **Review/Close**	Great job today! What did you learn about your emotions today? (Participant Answers out loud) That's great! How can you tell if an emotion is comfortable or uncomfortable? (Participant Answers) Yes! What are the steps to showing your emotions? (Participant Answers) What are the 3 ways of showing your emotions? (Participant Answers)

	Wow! We learned a lot about emotions today. We learned that emotions can be comfortable or uncomfortable to feel. It's alright to feel all kinds of emotions, but it's important to show them in safe, appropriate ways. When we show our emotions in an appropriate way it helps us tell others how we feel. I'm so happy we got to work together; you did great!

Lesson 2: Understanding Emotions in Others

Lesson Plan: Understanding Emotions in Others	
Name and Describe the Skill **(8 min)**	Hello again! I am excited to talk with you today! Do you remember how we talked about expressing our own emotions last time? Great! Well, now we're going to learn some important skills about understanding *other* people's emotions. We will use the blue sheet in your packet today. ...Do you remember what emotions are? *(Participant Answers out loud or thinks about the question)* Emotions are another way to say feelings. There are many different feelings such as happy and sad. Can you think of any others? *(Participant Answers out loud or thinks about the question)* That's great. Other people feel emotions just like you do. When we feel certain emotions, our faces and bodies change to give other people clues as to how we are feeling. This lets other people know our feelings even without saying words! It is important to know what different emotions look like so we can understand what others are feeling. Are you ready to learn to recognize how others are feeling? *(Participant Answers out loud or thinks about the question)* Fantastic, here come the steps to recognize how someone might be feeling. These steps are also on your blue paper. 1. First, look for **clues**. Clues can help you know how a person are feeling. Some clues are facial expressions, body language, and tone of voice. 2. Second, look for **cues**. Cues are things around the person that can help you understand what's happening. 3. Third, make a **guess**; of how the person is feeling based on the cues and clues. 4. Last, **Ask**. After making a guess you can ask them if they are feeling that way. Now can you tell me the order of the steps? a. Clues, Guess, Ask, Cues b. Cues, Ask, Clues, Clues c. Clues, Guess, Cues, Ask **d. Clues, Cues, Guess, Ask** Great! First look for Clues, then cues, then make a guess and ask! Insert emotion scenario

Model the Skill **(3-4 examples, 3 min)**	To recognize emotions in others we think about how someone else might be feeling. We can't always ask someone how they are feeling; so we first we look for the clues and cues that give us hints. Then we make a guess. When appropriate, asking is the best way to check our guess, because people can act or feel differently than we think. Do you remember the first step from your blue paper? *(Participant answers or thinks about the question)* ...Look for clues. Remember, this means to look for hints on a person's face, body, or voice. OK. The first emotion I want to talk about is "bothered". Bothered is when someone is feeling irritated or annoyed and maybe upset. They could be bothered by another person, by noises, or something else. Think of a time when something bothered you. **(Make "Bothered" face)** (Eyebrows up, a sigh or huff, mild anger, pursed lips, maybe crossed arms) This is what my face looks like when I am bothered. Can you describe what clues you see on my face that help you know I am bothered? *(Participant answers or thinks about the question)* That's great! When people feel bothered, they may look away from you, their eyebrows could go up, and sometimes people sigh or huff. Their arms might be folded or held tightly. Those are all **clues** that someone is feeling bothered. What does it look like I am feeling right now? (Make bothered face again) **a. Bothered** b. Sad c. Scared Insert emotion scenario here Now that you know what bothered can look like, let's try learning another emotion together. Let's talk about "sad". This emotion can feel heavy and gloomy, and it can be the reason we cry sometimes.

	Try thinking about when someone you know felt sad. Maybe they lost something they loved, or something bad happened to them. **(Make "Sad" Face)** (eyebrows come down and pulled together, the corners of mouth turn down, and their eyes close a little bit or look downward) What does it look like I am feeling right now? Yes! I am feeling sad. Can you tell me how you know I'm sad? Select all that apply **a. Eyebrows are down and together** b. Nose is wrinkled **c. Corners of mouth are turned down** **d. Eyes closed or downward** e. Eyes wide open That's right! Usually, when people feel sad, they show clues like their eyebrows come down, the corners of their mouth turn down, and their eyes might close a little bit. Sometimes people even cry when they feel sad. Insert emotion scenario here Good job! Sometimes things happen that make us **afraid.** This emotion is called "scared". When someone feels scared, they can feel nervous or worried, and jumpy. Their heart beats faster than normal and they might have sweaty hands. Try thinking about a time when you were scared. Maybe it was when you were lost or when something startled you. **(Make "Scared" Face)** (Eyebrows are high and drawn together, mouth opened and curved down at corners, eyes are wide open, quiver sound optional) This is what I look like when I'm scared. Can you describe what my face looks like? *(Participant answers or thinks about the question)* ...Usually, when people feel scared, they show clues on their face. Their eyebrows move up really high, sometimes their mouth opens up wide, and their eyes may be wide open. Let's try and remember what we learned together… What emotion am I feeling right now? a. Bothered b. Sad

	c. Scared Do you remember the second step? **a. Cues** b. Ask c. Clues d. Guess We look for cues which are hints in the environment. The environment around someone might make them feel a certain way. Also, events (or stuff that happens) in an environment can cause feelings. It can be easier to understand how events make others feel when we think about how **we** would feel if it happened to **us**. Let's talk about some examples. Another important emotion is embarrassed. This emotion can feel uncomfortable and make you want to hide. You might feel like everyone is looking at you or thinking bad about you or even laughing at you. There are many different events that can cause someone to feel embarrassed. Embarrassment often comes from an unwanted type of attention, such as when you make a mistake in front of the class, or when you trip and fall in front of people. Alright, let's practice using cues. I'm going to tell you a scenario (a very short story) with some cues, and you'll tell me how that scenario might make someone feel. We may not have talked about some of the emotions listed. If that's the case just me your best guess. Also there may be more than one right answer. • Your **friend** reached out to hug you and you turned away. (Embarrassed, Sad…) • You cleaned the dishes without your **mom** even asking you to. (Proud, Happy, excited…) • Your **brother's** goldfish died. (Sad, mad…) • You told your **friend** that they have something stuck in their teeth and it's been there since breakfast! (Embarrassed, disgust, thankful…) • Your **friend** just found out they get to go to Disneyland! (Excited, happy…)

	• Someone at school just stole your **friend's** favorite (toy, treat, pencil, etc.) (Sad, Mad…) Great job! You are getting really good at recognizing cues and guessing how someone would feel! Since we don't yet know for sure, once you guess, you can ask them if they are feeling that way. That's how you can check if your guess was right. That's the last step! To ask! Insert emotion scenario here
Guided Practice **(3-4 examples, 3** **min)**	Now let's see if we can guess how I'm feeling using our steps (Look for clues, look for cues, make a guess, ask) I just got my favorite ice cream from my mom. Do you remember the first step? *(Participant answers or thinks about the question)* **(Make "Happy" Face)** (Smile: mouth open or closed, raise in eyebrows, eyes close slightly, cheeks raised) Right! Let's look for **clues**. What clues do you see on my face? *(Participant answers)* Do you remember the second step? *(Participant answers)* What are some **cues** about the situation that could make him/her feel a certain way? *(Participant answers)* Looks like we're ready for the third step! Do remember what it is? *(Participant answers)* You are ready to make a guess. Based on the clues and cues you noticed; how would you guess I'm feeling? *(Participant answers)* Now if you want, we can ask to be sure.

	(Participant asks) Yes, I am happy/excited! Insert emotion scenario here Let's try another! I'm really busy trying to finish his/her homework and his/her little brother keeps asking her over and over to help him get a snack. Can you use all of the steps we learned to figure out how he/she is feeling? If you need a reminder look at your blue sheet to help you remember the steps *(Participant answers).* Insert emotion scenario here
Wrap-Up **(2 min)**	Recognizing emotions can be tricky or hard sometimes, but with practice like we had today, it can get a lot easier and feel more natural! Today we practiced recognizing emotions by looking at the person for clues, and looking around them and their situation for cues. We also made guesses to how others are feeling and practiced asking as well. You did an awesome job. Will you try practicing this skill at home with your mom and dad or at school or with your friends the next time you see them? *(Participant answers or thinks about the question)* Awesome! Well, Thanks for hanging out with me today. I'll see you next time and we'll learn even more cool things together!

Lesson 3: Relationship Skills

Lesson Plan: **Relationship Skills**	
2 min **Review/Introduction**	Well, hey there, it's me Emmy and I'm excited to work with you again! **Today, we will learn about a skill called empathy. We will learn how to notice other people's feelings, to better understand the feelings of others, and to see a situation from another perspective.** What are some of the feelings you have felt so far today/this week because of others? (Participant answers, rhetorical out loud) Why did you feel that way? (Participant answers out loud) Everyone has feelings, and using empathy can help us relate to others through connections and understanding! Why do you think that's important? Select all the answers that sound right (all of them) a. Social connections can be fun and are important b. Understanding others helps us understand ourselves c. Empathy helps us help others who are having a hard time d. Showing empathy can be important for long term relationships Insert Emotion Scenario Questions Here
5 Minutes **Name/Define Skills**	In your past lessons, we learned how to identify emotions using cues and clues, and how to respond using our face, body and words. Remember that "**Clues and cues are signals or signs you can see that tell you something about another person. If we can find clues, we might be able to guess how someone is feeling."** Can you give me an example of a clue? **a. A frown on your friend's face** b. A car going down the street and turning c. A phone ringing at the grocery store d. Happy birthday balloons on your neighbor's mailbox

	Today, we are going to use those prior skills to understand how to show empathy. Do you know what the word empathy means? (Participant answers out loud) **"Empathy is understanding another person's feelings or emotions and trying to help"** I am going to walk you through your green sheet with different steps that will help you understand how to help others, okay? Step 1: **Identify** what they are feeling Step 2: **Why** might they be feeling this way? Step 3: Decide if their feeling is **comfortable** or **uncomfortable** Step 4: **Respond**! • If comfortable... give praise • If uncomfortable... try to help, or find someone who can help While looking at the green sheet, can you repeat these steps back to me? (Participant Answers) Insert Emotion Scenario Questions Here Now I'm going to model some situations! Ready?
5 min **Modeling Emotions**	#1: Imagine your friend is saying "I have a headache" and rubbing and holding their forehead. Step 1: I can **Identify** what they are feeling • They are probably feeling sad. Step 2**: Why** might they be feeling this way? • Because a headache hurts and can make you feel dizzy. Step 3: I'll decide is it comfortable or uncomfortable? • I think having a headache is an uncomfortable feeling Step 4: How would I respond? • I would tell them I'm sorry they have a headache and ask them if they need any help. Can you tell me what steps I used? (Participant Answers) Great! Here is the last modeled example: Imagine your friend comes to school and says "Look what I got! It's my favorite book!" and shows you their book. Step 1: Identify what they are feeling

	• I think your friend is feeling happy and excited. Step 2: Why might they be feeling this way? • I think they are happy because they got their favorite book! Step 3: Is it comfortable or uncomfortable? • Happy is very comfortable Step 4: How would I respond? • I would say "Awesome! Can you show me?" Can you tell me the steps I used? You can look at your green sheet for help (Participant Answers) Insert Emotion Scenario Questions Here
5 Minutes **Guided Practice**	Okay! First Scenario: My marker is not working! (Shake marker, face of frustration/anger) Step 1: Can you identify what emotion I might be feeling? **a. Frustrated** b. Scared c. Excited d. Embarrassed Yeah! I would be frustrated! Why do you think I would be feeling frustrated? a. I don't like the color of this marker b. I like shaking markers **c. I can't color when my marker isn't working** d. I'm tired Yeah! I'm frustrated because I want to color, but my marker is not working! Is being frustrated comfortable or uncomfortable? a. Comfortable **b. Uncomfortable** Correct! Being frustrated would definitely be an uncomfortable feeling. If I were your friend, how would you respond? a. Do you need any help? b. Do you want to use my marker? c. I'm sorry! **d. Any of the above** Ok, here is the last example: I'm watching a scary movie and I keep hiding behind my blanket and covering my eyes.

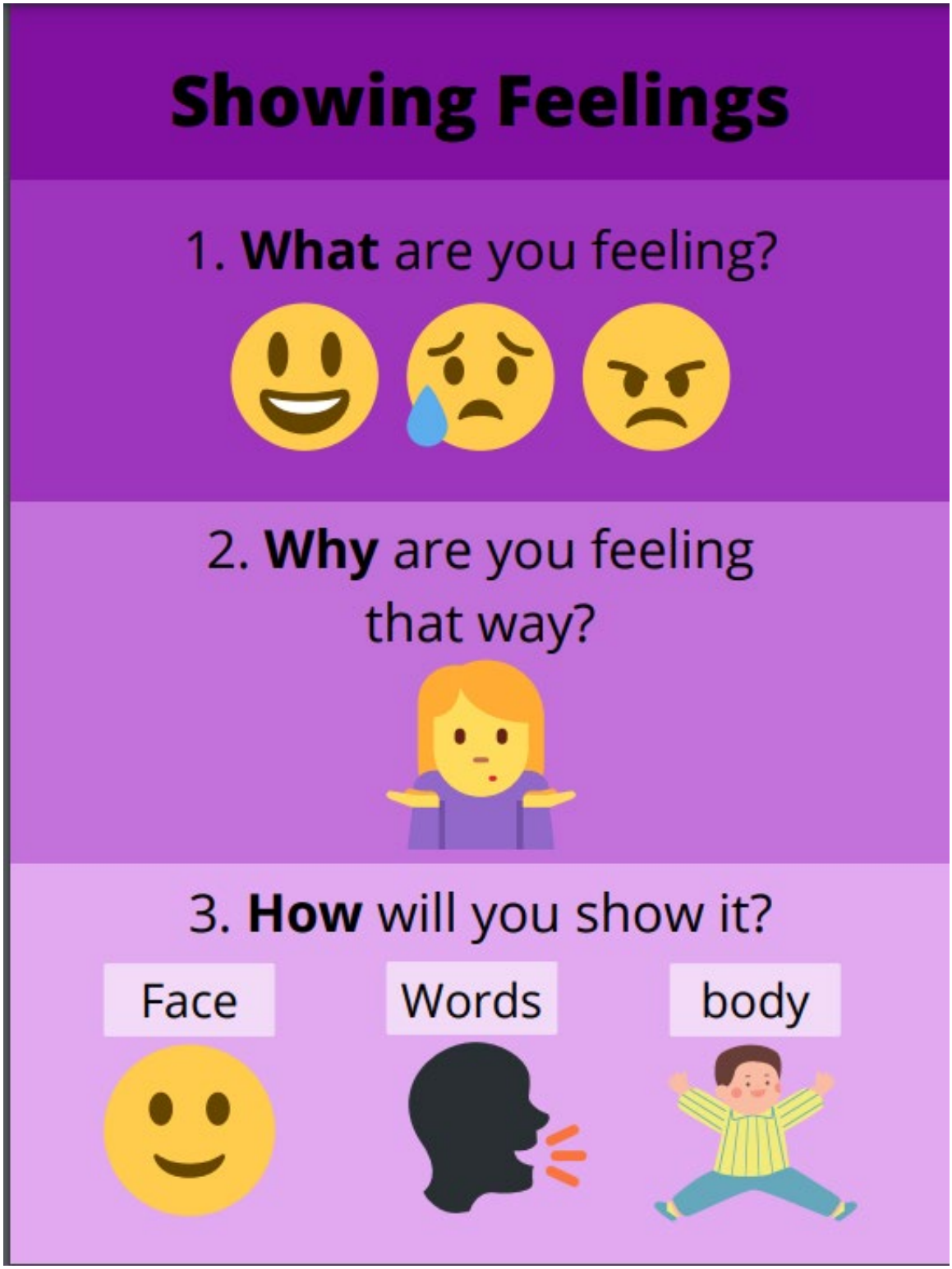
	Step 1: Can you identify what emotion I might be feeling? a. Happy b. Bored **c. Scared** d. Disgust Yeah! I would be scared! Why do you think I would be feeling scared? **a. I hid behind the blanket because I was scared to see the movie** b. I'm scared of blankets c. I like watching movies d. I don't like watching movies Yeah! I'm scared because I don't like the movie and I keep jumping! Is being scared comfortable or uncomfortable? a. Comfortable **b. Uncomfortable** Correct! Being scared would definitely be an uncomfortable feeling. If I were your friend, how would you respond? a. Do you need help? b. Are you ok? c. I'm sorry, being scared is not fun! d. Any of the above Insert Emotion Scenario Questions Here Ok, now that we have practiced together, I am going to give you some examples and I want you to try and respond using the steps we have practiced, ok?
5 Minutes **Independent** **Practice**	Scenario 1: Your friend comes to school and tells you that they get to go to a waterpark this weekend, and they love the waterpark! Can you use your green sheet with the 3 steps to respond? What is your friend probably feeling? a. Sad b. Bored c. Scared **d. Excited** Why are they feeling this way? a. They are home from school b. Because they are friends with you **c. They are going to the waterpark**

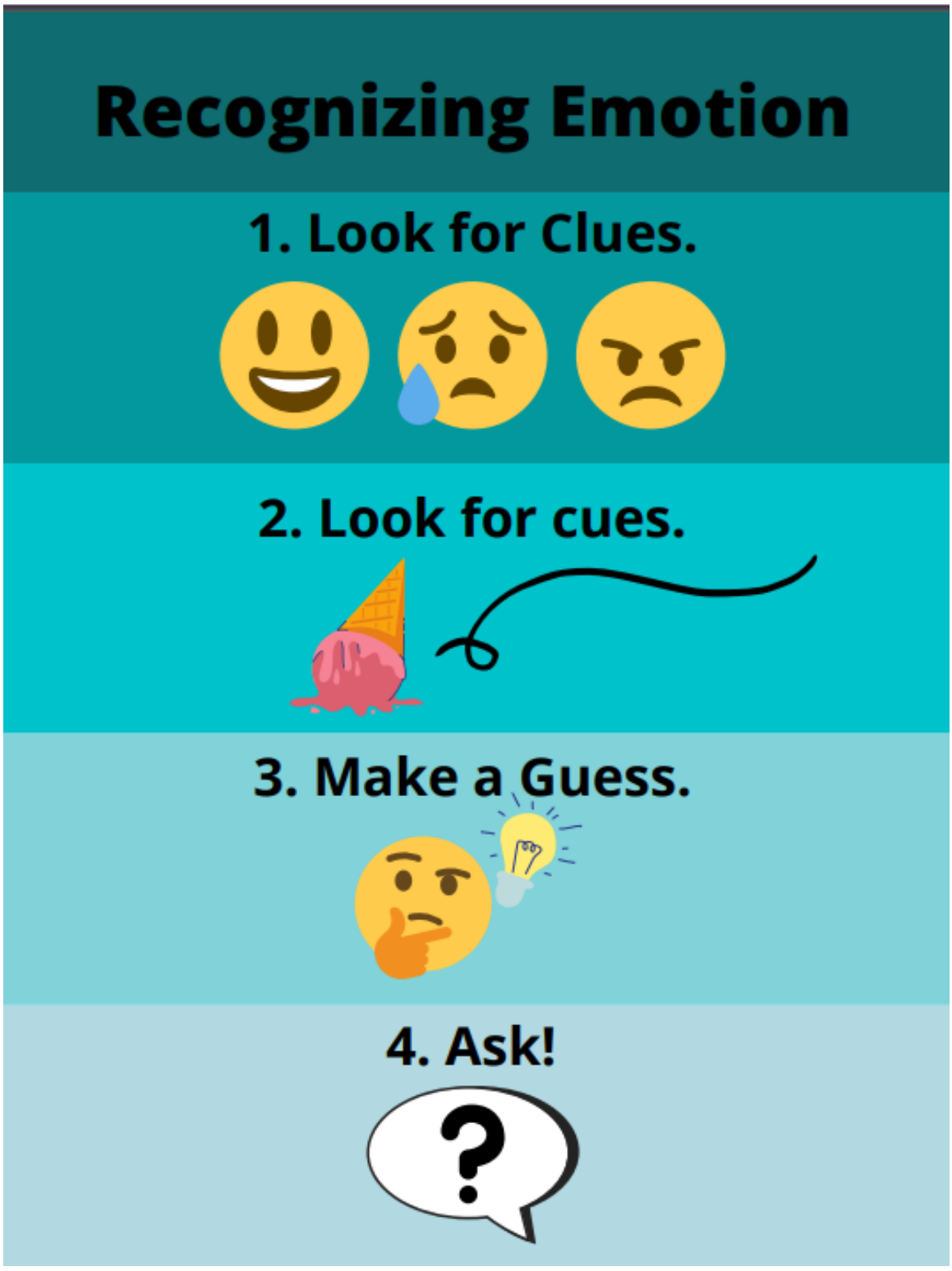
	d. It's the weekend Is the feeling comfortable or uncomfortable? **a. Comfortable** b. Uncomfortable What could you do (praise or try to help)? a. Ask them if they are feeling ok **b. Tell them that that's awesome** Scenario 2: Your friend sees you in the hall and told you that they did really well on their math test! Can you use your green sheet with the 3 steps to respond? What is your friend probably feeling? **a. Happy** b. Excited c. Scared d. Disgusted Why are they feeling this way? a. They saw you in the hall **b. They did well on their math test** c. They love going to school d. They just saw something funny Is the feeling comfortable or uncomfortable? **a. Comfortable** b. Uncomfortable What could you do (praise or try to help)? **a. Tell them "Great job!"** b. Ask if they can help you with your homework Scenario 3: Your friend lost their favorite soccer ball during recess. Can you use your green sheet with the 3 steps to respond? What is your friend probably feeling? a. Disgusted **b. Sad** c. Embarrassed d. Bothered Why are they feeling this way? a. Recess is over b. They didn't win the game

	c. It's too hot to play soccer **d. They lost their soccer ball** Is the feeling comfortable or uncomfortable? a. Comfortable **b. Uncomfortable** What could you do (praise or try to help)? **a. Ask them if you can help look for it** b. Tell them they can still play soccer with a different ball Insert Emotion Scenario Questions Here
2 Minutes **Review/Close**	What does empathy mean to you now? (Participant answers out loud) Great thoughts! Why is it important to know how to respond to other's feelings? (Participant answers out loud) Exactly! We need to be empathetic towards others. We should support them when they are happy or excited and comfort them and ask what's wrong when they are sad, scared, or frustrated. Insert Emotion Scenario Question Here Awesome! Today, we learned about empathy and understanding others. We discussed how to recognize others' emotions and how to understand them. When you are not sure how someone is feeling, use cues to figure it out! The more you can empathize with others, the stronger your relationships can be! Great job today!

APPENDIX I

Handouts for Lessons




Recognizing Emotion
1. Look for Clues.
2. Look for cues.
3. Make a Guess.
4. Ask!
?

Relationship Skills

Identify what they are feeling.

Why might they be feeling this way?

Is this a *Comfortable* or *Uncomfortable* feeling?

Comfortable

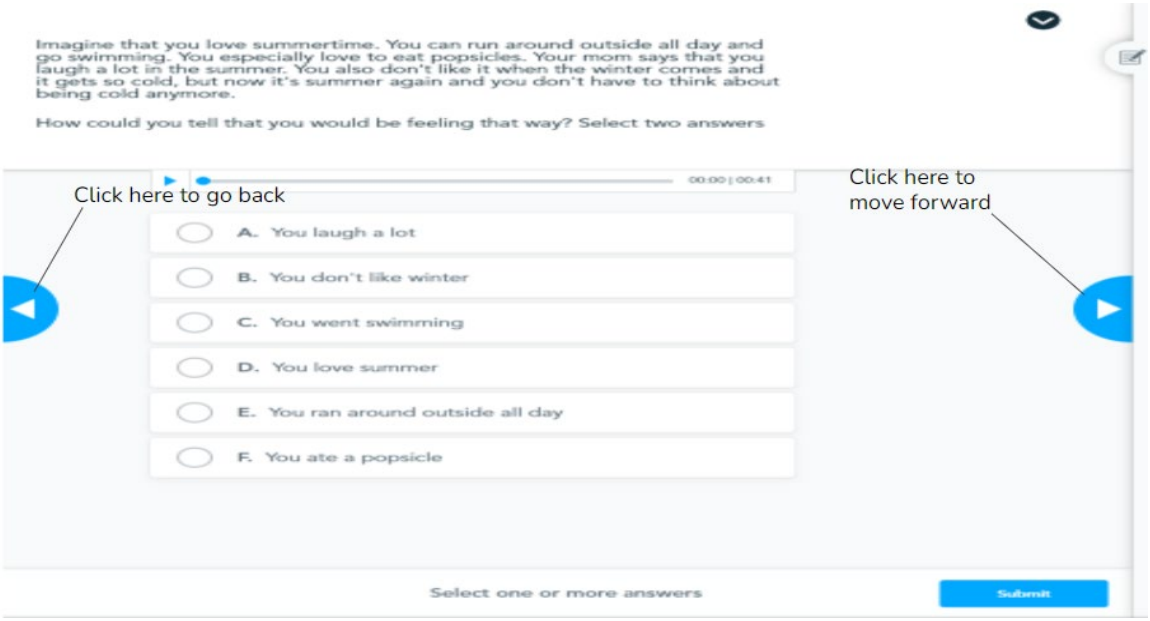
Give praise.

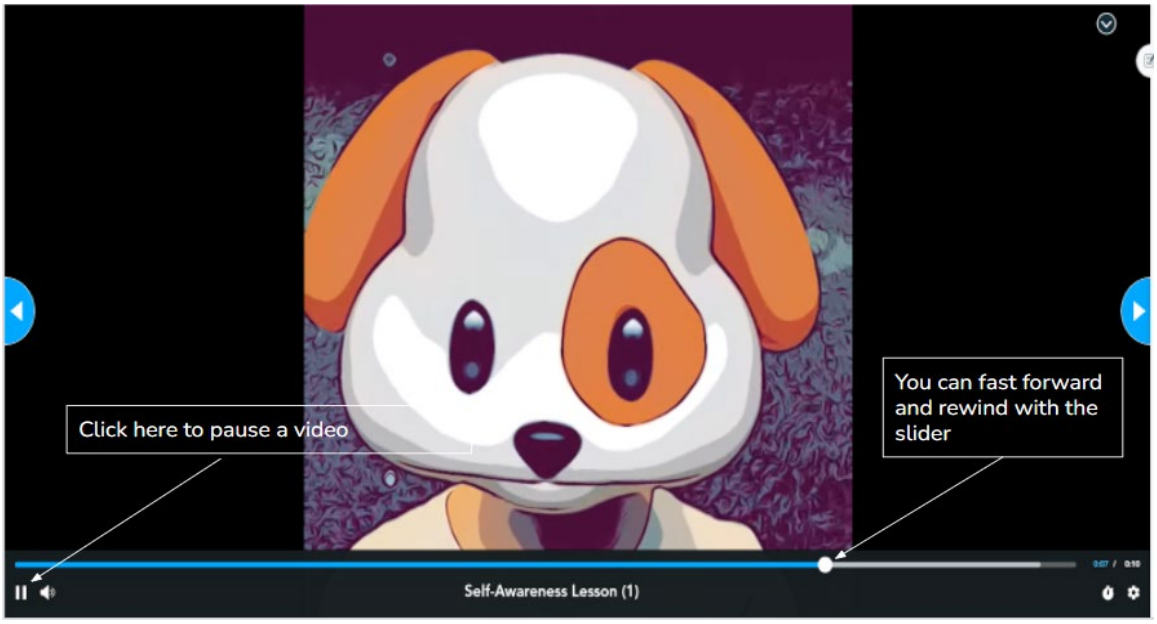
Uncomfortable

Try to help.

APPENDIX J

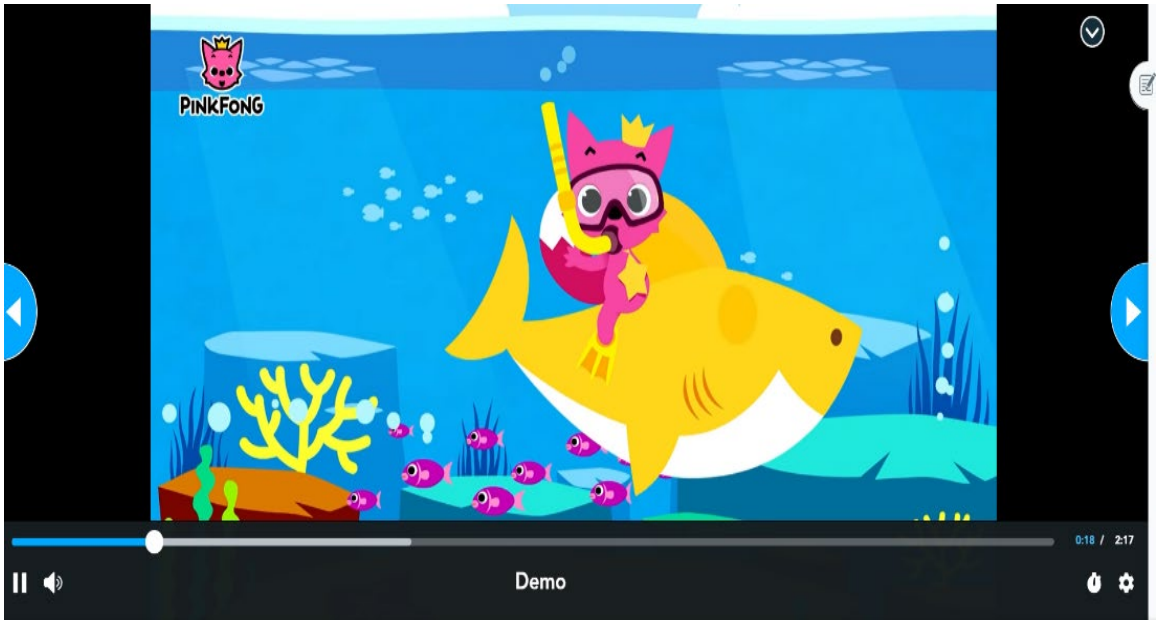
Examples From Nearpod Tutorial PowerPoint and Demo Module

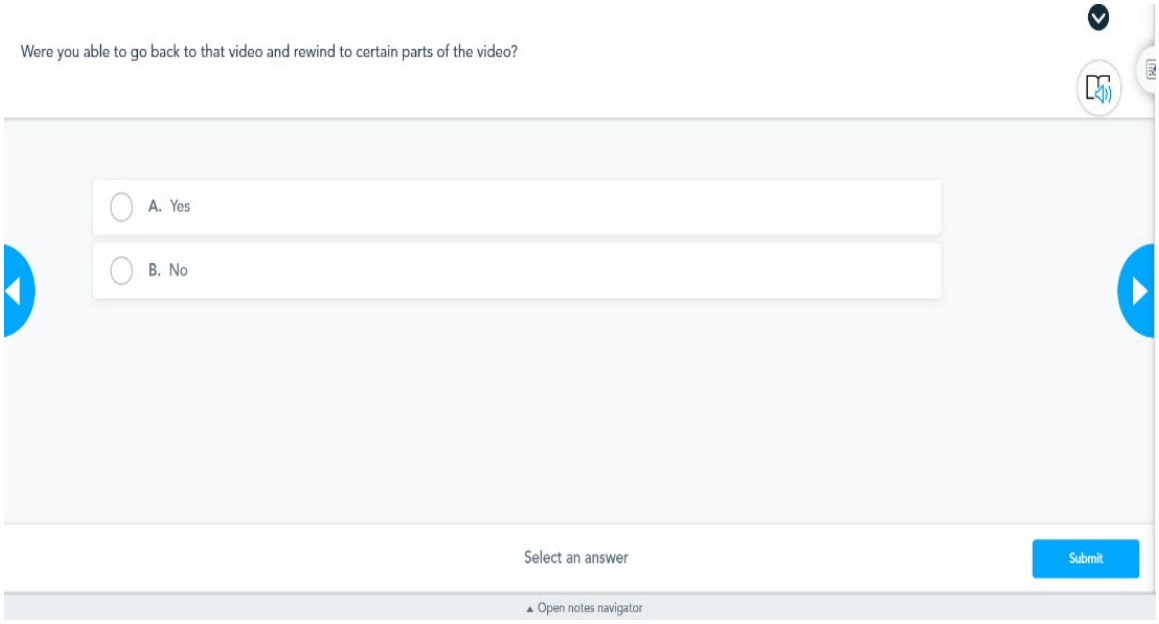


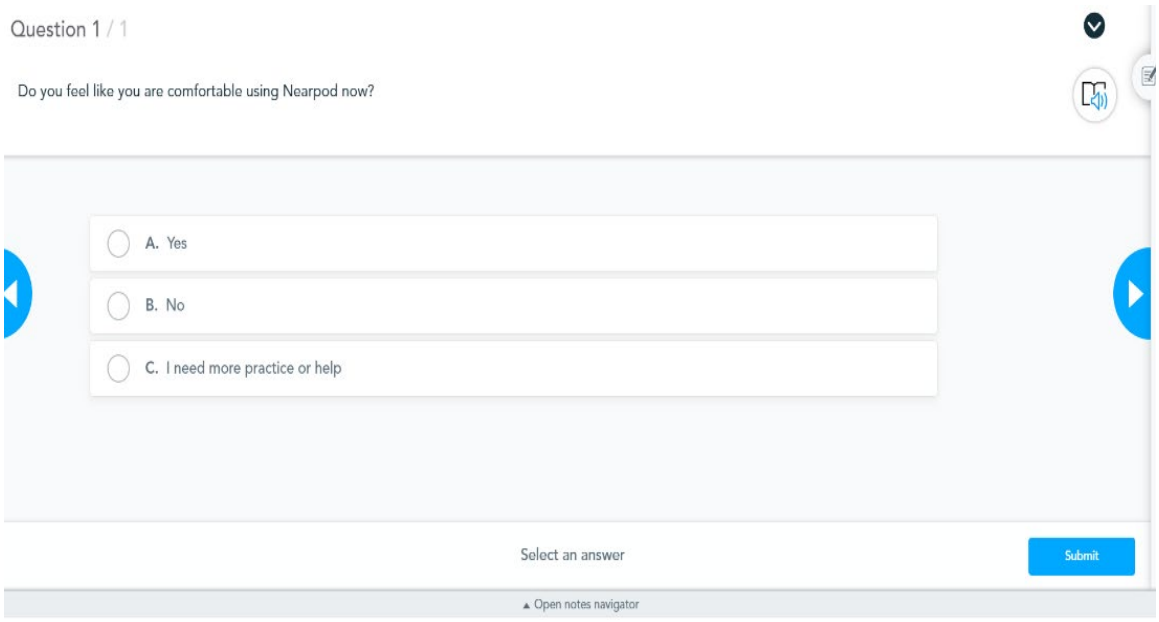


Let's Practice!

To try out using Nearpod, you can click on this link (https://app.nearpod.com/?pin=plct2) and have the researcher who is helping you enter this code to get to a page that you can practice with so you can feel like you know how to use it


PINKFONG
0:18 / 2:17
Demo


Were you able to go back to that video and rewind to certain parts of the video?
A. Yes
B. No
Select an answer
Submit
▲ Open notes navigator


Question 1 / 1
Do you feel like you are comfortable using Nearpod now?
A. Yes
B. No
C. I need more practice or help
Select an answer
Submit
▲ Open notes navigator

APPENDIX K

Treatment Fidelity Checklist

1. Researcher comes to lab 30 minutes before appointment and set up laptop and cameras. They will also open Nearpod and input the access code and leave the tab open on the screen where the participant will input their name. Then they will set up the Zoom link and check that it is recording and sharing the part of the screen that shows the Nearpod module. Be sure to go to “advanced” under screen sharing and select “share portion of screen”. Once sharing your screen, select more options and select “hide floating meeting controls”
2. When the participant arrives, the researcher will greet them and their parents and lead them into the lab and show them to their seats.
3. For a participant’s first session, the researcher will have the PowerPoint ready that shows the participants how to navigate Nearpod and direct participants to look through that PowerPoint before running the intervention.
4. At least one researcher will sit in the room with the participant as they engage with the intervention. The researcher won’t give the participants any hints about the questions but will be available to help the participant if they run into any problems while engaging with the intervention. If another researcher is present, they can watch the participant engage in the intervention on the Zoom call from the observation room.