Published in final edited form as:

J Organ Behav Manage. 2018 ; 38(2-3): 258–273. doi:10.1080/01608061.2018.1454871.

Behavior Skills Training with Voice-Over Video Modeling

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Abstract

The present study used behavior skills training (BST) to teach three adult participants to implement a video modeling intervention aimed at teaching social skills to adults with autism spectrum disorder (ASD). During baseline trials, participants were given access to written instructions before role-play with two actors (who simulated a quiet conversation) and one confederate (who played the role of an adult with ASD). During treatment, participants were given a video model with voiceover instruction depicting how to implement the video modeling intervention to teach social skills, repeated roleplay trials, and feedback following their performance. All participant scores (percentage of steps correctly implemented in each session) increased from baseline to treatment, and generalization was demonstrated with an actual consumer diagnosed with ASD. Additionally, after training participants to use a video model to teach one social skill, there was generalization to teaching as many as three additional novel social skills. Participants showed maintenance of skills during a treatment study that involved training adult clients with ASD to engage in the social skills.

Behavior skills training (BST) is a parent and staff training package that includes verbal instructions, modeling, rehearsal, and feedback (Nosik, Williams, Garrido, & Lee, 2013). BST has been used successfully to train clinicians, teachers (Sarokoff & Sturmey, 2004), parents (Lafasakis & Sturmey, 2007) and employees (Alvero, Bucklin, & Austin, 2001; Balcazar, Hopkins, & Suarez, 1985; Sarokoff & Sturmey, 2008). Although the efficacy of BST has been demonstrated repeatedly, it is not without limitations. First, BST relies on the presence of a trainer throughout the training period, which is often not practical or possible. It would be a major advantage to develop an evidence-based training approach based on BST that reduces the reliance on a trainer (Giannakakos, Vladescu, Kisamore, & Reeve, 2016; Macurik, O’Kane, Malanga, & Reid, 2008). Second, while there is extensive literature

evaluating BST to train staff, there are no known studies using BST to teach staff how to implement a social skills intervention, specifically for adults with developmental disabilities.

One promising possibility for developing such a variation of BST is the use of video modeling with voiceover instruction (VMVO) (Giannakakos et al., 2016; Vladescu, Carroll, Paden, & Kodak, 2012). VMVO includes voiceover instruction that describes the behaviors being modeled in the video. This first step of BST with VMVO may not require a trainer. Then, following the video-model, the trainee has the opportunity to practice the exact skill depicted in the training video in a role-play with a trainer. After the role-play, the trainee can be given brief verbal and graphical feedback on steps that need to be improved, as well as steps that were performed correctly. Although some studies have included feedback from a trainer in addition to VMVO (Giannakakos et al., 2016; Lambert, Bloom, Kunnavatana, Collins, & Clay, 2013), other studies have indicated that such feedback may not be necessary (Catania, Almeida, Lui-Constant, & Digennaro-Reed, 2009; Rosales, Gongola, & Homlitas, 2015; Vladescu et al., 2012).

The present study examines the use of BST with VMVO to train participants to implement a social skills training intervention for adults with autism spectrum disorder (ASD). While social skills interventions targeting adults with ASD are reported increasingly, few include the necessary staff training procedures to implement those interventions with fidelity. The development of standardized, efficient training methods like BST-VMVO can help facilitate dissemination of services for adults with ASD to sites that may not have the resources for lengthy on-site training. Therefore, the goal of the present study was to follow the general procedures of Giannakakos et al., (2016) and extend the use of VMVO to training staff to implement a social skills instruction program (video modeling of social skills, VMSS) for adults with ASD, which used video-models of four foundational social skills as its main teaching strategy.

Method

Personnel

Participants.—The participants were two graduate students (Susan and Karen) in an applied behavior analysis program and one undergraduate student (Meg) in psychology, all of whom had some experience in working with individuals with ASD, but none with VMSS. All were being trained to implement VMSS as a component of TUNE In (Training to Understand and Navigate Emotions and Interactions), a treatment study at the University of Pennsylvania aimed at improving social functioning in adults with ASD. TUNE In is comprised of three components: (1) five individual sessions of cognitive coaching (e.g. understanding the relationships among thoughts, feelings, and behavior; identifying automatic thoughts) and mindfulness exercises aimed at reducing social anxiety; (2) eight groups sessions teaching social cognition and using VMSS to teach four fundamental social skills; (3) four group volunteer-work experience sessions to promote the generalization of skills to a community setting. Each of the four fundamental social skills taught in Component 2 of TUNE In was chosen in relation to the accompanying didactic lessons adapted from the Social Cognition and Interaction Training intervention for ASD (SCIT-A;

Turner-Brown, Perry, Dichter, Bodfish, & Penn, 2008), which included lessons on identifying social cues when approaching people and initiating conversation.

Confederate.—The confederate was the first author in the study who read scripted social responses (Appendix B) that were evoked by the actors' discriminative stimuli (Appendix A).

Actors.—The actors were two undergraduate psychology students who were naïve to the purpose of the study. The actors simulated a quiet conversation approximately ten feet away from the confederate and participants during baseline, training, and generalization phases of this study.

Consumer.—The consumer was an adult with ASD who played the same role as the confederate, but without a scripted response during generalization probes of the present study.

Experimenters.—The primary experimenter was a PhD level behavior analyst with more than 10 years' experience working with individuals with ASD (first author). The second experimenter was a bachelor's level clinical research coordinator and lead behavior coach for TUNE In (second author). These two experimenters developed all experimental procedures, collected data, served as the confederate, and provided feedback to participants.

Clients.—The clients were adults with ASD who had enrolled in TUNE In and received the VMSS training program as part of TUNE In. All clients were 18 years or older, met DSM-V criteria for ASD, and had a verbal IQ of 70 or above.

Researchers.—Researchers were graduate students in an applied behavior analysis program at Drexel University who scored session videos for percentage of steps correctly implemented by participants according to the task analysis. This enabled us to determine interobserver agreement (IOA) and conduct maintenance data collection.

Setting and Materials

Sessions were conducted in an office with one large conference table and chairs. The room was approximately 3.0 × 4.5 meters, had one wall of windows and was located on the campus of a large university. Materials for participants included the VMSS task analysis, datasheets, tickets (i.e., reinforcers), and a laptop containing the VMVO for participants and the shorter video models that participants would use when implementing VMSS. The VMVO for participants was a 20-minute instructional video detailing the task analysis via examples. A video camera was used to record all sessions for reliability of data collection.

Dependent Measures

The primary dependent measure (Figure 1) was the percentage of steps correctly implemented by the participants for each session according to the task analysis. The task analysis included specific steps that involved preparation of materials, delivery of discriminative stimuli, error correction, positive reinforcement of correct response, and

scoring of the data sheet. If the confederate or consumer made an error on their first attempt, the participant was expected to present the video model demonstrating the skill performed correctly, and repeat the trial. After a second error, the participant was expected to present the verbal prompt and/or manual prompt (e.g. modeling the correct behavior with the participant) and repeat the trial. After subsequent errors, each type of error correction was alternated until successful acquisition, at which point the participant was supposed to deliver the token reinforcer (i.e. ticket).

One or both of the experimenters scored the percentage of steps that participants correctly implemented during role-play. Each session comprised ten trials of the same skill. Experimenters' data scored correct or incorrect for each step (total of ten) on the task analysis per trial. For a step to be scored overall correct for the session, the participant had to complete that step correctly on every trial (Giannakakos et al., 2016). Data were summarized for the session as the percentage of steps correctly implemented. Maintenance data was measured as the percentage of steps correctly implemented by the participants for each VMSS session with clients with ASD in the TUNE In intervention study. Each VMSS session in TUNE In comprised 20 trials (i.e. five trials per four social skills, described in more detail below). Data were scored and summarized for each session in a similar manner as the primary dependent measure.

The secondary dependent measure (Figure 2) was the percentage of trials with correct responses by clients in the VMSS component of TUNE In. The participants scored client responses during eight TUNE In intervention sessions. Client responses were scored as correct or incorrect per trial. Each client received 5 trials for each of the 4 skills for a total of 20 trials.

The final dependent measure was total duration of trainer time utilized across treatment sessions. The duration measure began when the treatment session role-play started and ended when the trainer completed providing performance feedback.

Scripted Responses for Actors and Confederate

During baseline and treatment sessions, the experimenters gave the actors written scripts describing verbal, non-verbal, and affective discriminative stimuli to emit during role-play for each of the four different skills being taught. Experimenters probed the confederate/consumer for different skills based on the discriminative stimuli emitted by the actors. Scripts described what the actors were going to say when a trial began, how they were to orient their bodies, and what tone of voice they should use (See Appendix A). During baseline and treatment sessions, the confederate was also given scripted responses that simulated the targeted social response (i.e. Skill 3 - Approach and Greet Response) evoked by the actors' SD. The confederate emitted the scripted social response ten times (i.e., ten trials) per session. These scripted instructions included specific errors made once, twice, or three times per trial in order for participants to demonstrate acquisition of appropriate error correction procedures (Appendix B). During generalization sessions, the consumer did not follow a script, but was instructed to respond naturally.

Targeted Social Response

The target social response was the skill to-be-taught by the participants to the confederate or consumer. The targeted social response was approaching and greeting a pair of people. This response included a motor (approach) and verbal (greeting) component. Therefore, in order to be scored correct, both components had to be present in addition to appropriate eye contact (EC). The motor response (approaching) was defined as walking towards and stopping within two feet in front of or alongside the pair of actors. The verbal response (greeting) was defined as emitting a verbal response such as “Hi, what’s up?” within 2 seconds of approaching the actors. EC must have been directed at one or alternating between the two actors concurrent with making the verbal response. All three components (motor, verbal, and EC) must have been present for the social response to be scored as correct.

Teaching of the Social Response

The goal of the present study was to use VMVO to teach participants to use a video modeling social skills teaching procedure (VMSS) to teach the skill of approaching and greeting others, one of the four skills taught through VMSS in TUNE In. By using VMVO to teach one skill, we anticipated participants would generalize the VMSS procedure and be able to teach all four skills without direct instruction.

VMSS in TUNE In included instruction on four skills (Skill 1 – Approach Only; Skill 2 – Don’t Approach; Skill 3: Approach and Greet; Skill 4: Initiate Small Talk). Each skill’s correct response was characterized by motor and/or verbal components. Clients receiving VMSS in TUNE In were given the opportunity to role-play each skill with actors (i.e. undergraduate research assistants) who presented discriminative stimuli specific to each skill.

Participants in the present study were probed on using the VMSS procedure to teach Skill 3. Participants were also given generalization probes, which included Skills 1, 2, and 4. The correct social response for Skill 1 included a motor response (approach), defined as walking towards and stopping within two feet in front of or one arms-length away but alongside the pair of actors. The correct social response for Skill 2 (don’t approach) was characterized by a motor component (avoiding interaction), defined as turning away from the two actors. Finally, Skill 4’s (make small talk) correct response was defined by motor (orient towards actor), verbal (initiate an appropriate (i.e. non-intrusive, non-offensive) small talk conversation starter), and EC components. For each skill, all components mentioned were required to be present for the social response to be scored as correct.

Design and General Procedure

A series of AB designs replicated across participants was used to teach participants to implement VMSS using BST-VMVO. Across conditions, pairs of actors delivered the discriminative stimuli (SD) in a contrived social situation, which was designed to evoke the target social skill from the confederate or from the consumer (who had a spontaneous, unscripted response to the SD). Following the confederate (during training) or consumer’s (during generalization) response to the SD, each participant had the opportunity to demonstrate her acquisition of the VMSS protocol with the confederate or consumer.

Baseline.—At the beginning of each session, the experimenter provided the participant with a written description of the intervention (i.e., task analysis, datasheet). The experimenter said, “These are the materials you will need to run the session. Please take ten minutes to review these materials. I cannot answer any questions at this time. Please let me know when you are finished reading”. Once the participant finished reading, the experimenter said, “Now we will practice teaching social skills using a video model. I will not be able to help you at this time but try your best. There will be some actors: one person in a red shirt who you will be teaching, and two other actors who will be standing in the background having a conversation”. The experimenter provided the participant with the task analysis and datasheet as well as a laptop computer (which contained the video models they were to use to teach the targeted social response to the confederate and consumer) and token reinforcers (i.e., tickets). No feedback was delivered after participant’s responses at baseline, and the VMVO was not delivered in baseline.

Generalization Probes.—The generalization probes assessed whether training on a single social skill (i.e., approach and greet) would produce correct responding (i.e., correct teaching) to three other novel social skills for which the participant had not received training. Generalization probes were conducted during baseline and following treatment, once the participant had reached the mastery criterion (i.e., 90% or more correct for two consecutive sessions). Generalization probes were conducted identically to baseline, meaning all materials except the VMVO were provided and no feedback was delivered. Finally, generalization sessions were conducted with a consumer with ASD, rather than with a typically developing confederate.

Treatment.—Treatment was identical to baseline with a few exceptions. First, when the written materials were presented for review, they were accompanied by the VMVO. The experimenter said, “Please watch this video. You may take notes if you prefer. I cannot answer your questions at this time. Please let me know when you are finished”. At the conclusion of the video, the experimenter asked the participant to practice the intervention as described in baseline. The participant did not have access to the VMVO during role-play. Second, following role-play, the participant was immediately provided performance feedback using positive feedback scripts (e.g., “You did a great job opening the video at the beginning of the session”) and corrective feedback scripts (e.g., “You did not deliver a token when the participant made a correct response; next time deliver a token as soon as the participant responds correctly”). Subsequent treatment sessions began with another role-play opportunity and ended with performance feedback. The participant did not view the VMVO again. Treatment sessions continued with role-play opportunities and performance feedback as needed until the participant had achieved 90% or more steps correct for two consecutive sessions.

Maintenance.—Maintenance of the participant’s accuracy implementing VMSS with clients with ASD and without feedback was assessed during TUNE In. The VMSS portion of this separate pilot intervention study began six days after participants in the current study completed training and ran for eight consecutive weekly sessions, for 90 minutes each.

Interobserver Agreement and Procedural Integrity

To calculate IOA on the primary dependent measure, two independent observers (i.e., the researchers) scored the correctness of participants' responses during 33% of all trials across both baseline and treatment conditions. IOA data collection was divided so that an equal number of sessions from each participant were scored. IOA was calculated by dividing the total number of agreements by the sum of the total agreements plus disagreements, which was then multiplied by 100. Inter observer agreement data indicated a mean of 90.1% agreement (range = 77% – 99%) across 36% of sessions. Procedural integrity was scored for 59% of sessions from a checklist of sequential tasks the researcher should complete in each session. The mean procedural integrity score was 98.4% adherence to the checklist.

Results

Scores for all participants increased following the implementation of VMVO. The scores in the baseline role-play sessions for Susan were 0%, 20%, 0% correct respectively. After the introduction of the VMVO, Susan's scores during the role-play increased to 92% correct in the final session of treatment. Susan reached the mastery criterion after three treatment sessions. In the baseline generalization probes, Susan scored 0% correct for each of the three probes. In the generalization probes following treatment, this score increased to 92%, 100%, and 83% correct respectively, thereby demonstrating generalization across skills.

Maintenance sessions were measured following the VMVO plus feedback training, when participants implemented the VMSS to adults diagnosed with ASD (i.e. ASD clients Kenny, Miles, Bill) who were enrolled in TUNE In. Susan, who worked with Kenny, maintained accuracy of implementing VMSS at an average of 70%, ranging from 54% to 85% correct responding (Figure 1, top panel).

The data for Meg were very similar to the data for Susan. Meg's baseline scores were 17%, 17%, and 25% correct, respectively. These data increased to 100% correct in the final treatment session. Meg required three treatment sessions to achieve the mastery criterion. During the baseline generalization probes, Meg's scores were 15%, 18%, and 9% correct, respectively. After treatment, the generalization probe score increased to 73% correct. Meg received only one treatment generalization probe due to time constraints on the participant. During maintenance probes, Meg worked with Bill and maintained an average accuracy of 79%, with scores ranging from 67% to 100% across sessions (Figure 1, middle panel).

Karen's data demonstrate a second replication of the effectiveness of the training protocol. Karen's baseline scores were 17%, 25%, and 25% correct, respectively. After the introduction of the video model, Karen's scores increased to 100% correct in the final treatment session. Karen reached the mastery criterion in only two treatment sessions. Baseline generalization probe scores were 8%, 0%, and 8% correct respectively. After treatment, the generalization probe scores increased to 92%, 70%, and 100% correct respectively. During TUNE In, Karen worked with Miles and demonstrated an average accuracy of 78%. Across maintenance sessions, her performance ranged from 54% to 100% (Figure 1, bottom panel). Scores of Susan, Meg, and Karen were somewhat lower during the TUNE In intervention (relative to the end of VMVO) perhaps because of some attrition of

skills over time (TUNE In was conducted one week after VMVO) or due to some differences in the treatment setting.

Figure 2 illustrates client performance during the eight VMSS sessions of TUNE In conducted by the participants. Data presented describe session data for approach only (Skill 1) trials. All clients with ASD scored 0% correct in their approach only response at baseline. Kenny's score increased to 100% correct for the last three consecutive sessions of treatment once Susan implemented the VMSS (Figure 2, top panel). Bill's score increased to 100% correct for the last four consecutive sessions of treatment once Meg implemented the VMSS procedure (Figure 2, middle panel). Finally, Miles's score increased to 100% correct for the last two consecutive sessions of treatment once Karen implemented the VMSS (Figure 2, bottom panel).

The total duration of trainer time in the three treatment sessions was 40 minutes, 32 minutes, and 35 minutes for Susan, Meg, and Karen, respectively.

Discussion

All participants acquired a video modeling social skills (VMSS) teaching repertoire after viewing a video model with voice over instruction (VMVO) once, followed by verbal feedback of specific participant errors in subsequent rehearsals. Overall, one exposure to the training video, followed by verbal feedback, was sufficient to establish a generalized repertoire of instructional behavior within two or three sessions for all participants. The intervention produced generalization in three ways. First, participants' teaching repertoires generalized in this package, allowing the participant to provide video modeling instruction on additional, novel skills that had not been targeted in the present training. Additionally, after training was conducted in a contrived context (i.e., using scripts with the actors and confederate), responding generalized to a consumer with ASD who had spontaneous (unscripted) responses. Finally, the participants in the present study went on, without additional practice, to use the social skills training package to teach adult clients with ASD to engage in four social skills as part of a larger treatment study (TUNE In). Therefore, substantial generalization was achieved in a relatively short training period.

While all skills were maintained, the degree of maintenance during TUNE In (relative to the end of VMVO) was variable across participants and skills. This could perhaps be due to the range in skill complexity (e.g. maintenance scores were highest for Skill 1, a relatively 'simpler' skill as compared to Skills 3 or 4), some attrition of skills over time, or to potential differences in the treatment setting. To our knowledge, no other behavior skills training study of implementing video modeling of social skills for adults with ASD has reported similar maintenance data.

The present study replicates the efficacy of VMVO and generalization outcomes found by other researchers (Vladescu et al. 2012; Giannakakos et al. 2016). Additionally, it extends the approach of behavior skills training with VMVO to training staff to implement social skills instruction. This study further establishes the efficiency of VMVO in two ways. First, the video model was viewed on a computer, which allows the training to be transportable,

unlike in vivo training that may be bound to a classroom or clinic setting. Transportability allows a greater number of potential trainees to access the intervention.

Second, participants needed to view the video only once in order to obtain the target skill (i.e. training a specific social skill) and generalize it to training additional social skills. After viewing the video, subsequent errors in the rehearsal were corrected with verbal feedback of the participant's performance immediately following rehearsal. Therefore, the video intervention served as an antecedent-based strategy. It should be noted that the present study used VMVO, role-play and feedback in a package, therefore it is not possible to isolate these components to determine whether a single component was the mechanism for behavior change. While other studies have reported acquisition of other types of skills without feedback during rehearsal (Catania et al. 2009; Vladescu et al. 2012; Rosales et al. 2015), it is unclear whether VMVO alone would be sufficient to teach more complex, difficult strategies such as video modeling of social skills for adults. Our rationale for including feedback in this initial study was to try to minimize numbers of errors and numbers of sessions needed for role-play and acquisition, thus reducing the need for extended trainer participation over prolonged periods of time. For example, our participants achieved the mastery criterion in 2–3 sessions whereas in previous studies where feedback was omitted or used on an as-needed basis, the number of sessions to criterion was a range of 5–6, 3–6, and 3–5 (Catania et al., 2009; Rosales et al., 2015; Vladescu et al., 2012, respectively). Despite the likely usefulness of feedback in this initial study, future studies would benefit from testing a similar approach without feedback, to maximize efficiency. This is especially important when training staff to implement the VMSS protocol in a variety of more naturalistic environments where trainer time would be more difficult to access.

One limitation of this VMVO approach is the resources needed to develop the training video. However, this time is small compared to the training time that would be needed to produce this same staff repertoire through direct, in vivo instruction. Future research might investigate how to maximize the efficiency of VMVO through use in a group format while maintaining mastery level performance in the role-play and across novel training opportunities. Additionally, generalizability of data is limited due to the contrived nature of both participant training and client training (i.e., in an office with confederates/actors). Future studies would benefit from using this approach in more naturalistic interactions such as social behavior between friends, family members, routine staff, etc. Finally, we used a strong mastery criterion of 90% in our study, however a criterion of 100% might have been associated with even higher levels of maintenance and generalization.

We anticipate that the use of this efficient VMVO approach for training social skills trainers will be in increasing demand, given the rapidly growing numbers of individuals with ASD reaching adulthood, the vast majority of whom will need social skills instruction. Moreover, social skills training needs are not limited to adults with ASD, but also extend to adults with a variety of other diagnoses, as well as typically developing adults who might need social skills training for a variety of purposes.

Acknowledgements

This work was supported by NIMH grant R34MH104407, Services to Enhance Social Functioning in Adults with Autism Spectrum Disorder (Brodin, PI). We also thank all the families who participated in this study, without whom this research could not have been conducted. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

Appendix A:: Description of Actor Responses and Targeted Social Response by Confederate, Consumer, and Clients - Discriminative Stimuli (SD)

Skill Name	Personnel	Non-Verbal	Verbal	Affective
Approach (#1)	Actor(s) SD	Two actors casually orient themselves toward one another, slightly angled so as to invite social engagement by a third party.	Various scripts of friendly conversation (Ex. "How is your day going?")	Variations of approachable facial expressions (e.g., neutral, smiling, nodding, laughing, excited)
	Confederate, Consumer, or Client Target Response	Approaches actors within 8 seconds of the SD at a typical walking speed. Orients towards and makes eye contact with at least one of the group members after approaching.	None	n/a
Don't Approach (#2)	Actor(s) SD	Two actors demonstrate body language that implies a closed, private conversation (i.e. oriented closely and directly towards one another).	Various scripts of private conversation (e.g., whispering, arguing, distressed)	Variations of unapproachable facial expressions (e.g., serious, angry, upset, concerned, frustrated)
	Confederate, Consumer, or Client Target Response	Recognizes this is not an opportunity to approach and consciously turns away, choosing not to approach the group.	None	n/a
Approach & Greet (#3)	Actor(s) SD	Two actors casually orient themselves toward one another, slightly angled so as to invite social engagement by a third party. When the individual practicing the skills approaches, the actors are to look up at the individual to invite conversation.	Various scripts of friendly conversation (Ex. "How is your day going?")	Variations of approachable facial expressions (e.g., neutral, smiling, nodding, laughing, excited)
	Confederate, Consumer, or Client Target Response	Approaches actors within 8 seconds of the SD at a typical walking speed. Within 5 seconds of approaching the group, orients towards and makes eye contact with at least one of the group and greets the group.	"Hey guys, what's up?"	Neutral or smiling facial expression
Make Small Talk (#4)	Actor(s) SD	One actor casually engaged in activity next to the consumer (e.g. reading a magazine, writing notes, waiting in line, etc.).	None	Neutral facial expression
	Confederate, Consumer, or Client Target Response	Within 8 seconds of the start of the trial, orients towards the actor, makes eye contact at least once during response.	Any verbal initiation, as long as it's not overtly intrusive or uncomfortable and is contextual to approaching someone. (Ex. "How was your weekend?"; "Can you	Neutral or smiling facial expression

Skill Name	Personnel	Non-Verbal	Verbal	Affective
			believe this weather we're having?"; "Do you know any good restaurants around here?"; "Hi, I really like your glasses." etc.	

Appendix B:: Confederate Responses

Trial	Confederate Response to Skill 3	Description
1	Correct motor and verbal responses, and appropriate eye contact	Walk over to the actors, make eye contact and say "hey, what's up"
2	No response	Stand still, do nothing
3	Incorrect motor and incorrect verbal responses (i.e. interruption)	Stand still, turn to trainer, say "I don't think this is realistic"
4	Correct motor and verbal responses, and incorrect eye contact (repeat twice)	Approach the actors, but look at your feet while saying "hey what's up"
5	Incorrect motor and correct verbal responses (repeat twice)	Stand still, and say "hey, what's up"
6	Incorrect motor and incorrect verbal responses (i.e. rocking)	Walk up to actors quickly and stop inappropriately close and rock, while saying "I'm going to move out of my parent's house"
7	No response	Stand still, do nothing
8	Correct motor and incorrect verbal responses (repeat three times)	Walk to actors, stop and repeat "let's get started" over and over
9	Correct motor response and no verbal response	Walk over appropriately to participants but say nothing
10	Incorrect motor response and no verbal response	Walk inappropriately close to actors but say nothing

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Figure 1.

The percentage of correct responses per session demonstrated by participants. Filled diamonds represent participants' behavior to teach a neurotypical confederate to approach and greet another person (Skill 3). Open circles (Skill 1 - approach only), open squares (Skill 2 - don't approach), open triangles (Skill 4 - make small talk) are generalization skills tested with each participant and a consumer with ASD. The maintenance data represent Susan, Meg, and Karen's behavior when implementing the same VMSS social skills intervention with clients (i.e., adults with ASD) during a separate intervention study (TUNE In) to

improve social functioning in adults with ASD. Maintenance data collection began 6 days after the conclusion of the study and was repeated across 6, 9, and 6 weeks for Susan, Meg, and Karen, respectively.

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Figure 2.

The percentage of correct responses demonstrated by clients (i.e. adults with ASD) participating in the VMSS component of the intervention study TUNE In) per session. Filled circles represent the percentage of correct responses to 5 probes of Skill 1 (i.e. approach only). Karen's client Miles was absent in week 5 and data was not collected.