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Abstract

Daily living skills, categorized as personal-care activities within the home, community, and school setting, are crucial components in establishing daily routines amongst adolescents (Stabel, 2013). Many of these activities require gross motor and fine motor skills, which are skills that tend to be difficult for individuals with autism spectrum disorder (ASD;Chen et al., 2022). When trying to express their wants and needs surrounding completing day-to-day activities, individuals with ASD may engage in problem behaviors as a way to communicate (Iwata et al., 1982). Nonetheless, implementing choice in treatment has been found to significantly decrease occurrences of problem behavior (Shogren et al., 2004). Thus, the aim of this study was to implement treatment procedures informed by client choice by recording their behaviors within different teaching modalities to assess preferences. During the pre-assessment, a randomized AB design was used to assess the participant's responding to a video model format and in-vivo model format for raking fingers through hair. Probes using high-probability skills were then conducted to reassess the participants responding to the two formats. Although the final part of the study, hairbrushing, was not able to be completed, the results indicated that video modeling was not a successful teaching method for this participant.

In American culture, the transition from adolescence to adulthood is greatly characterized through becoming independent and self-sufficient (Arnett 1998). This transition typically begins with young individuals completing the tasks surrounding getting ready in the morning. These tasks develop into routines that constantly change as one gets older. Today, adolescents engage in a variety of activities in their morning routines, such as bathing, styling hair, shaving, applying perfume and deodorant, applying makeup, and more. Establishing these routines not only helps with familial organization, but has also been linked to greater academic success, skill development, and independence in adolescence (Spagnola & Fiese 2007).

When establishing routines, there are a subset of skills that one must be able to complete - daily living skills. As defined by Stabel, “The term ‘daily living skills’ refers to a wide range of personal self-care activities across home, school, work, and community settings" (2013). These activities can be classified into basic activities of daily living (BADL) and instrumental activities of daily living (IADL). BADLs include feeling, dressing, toileting, continence, personal hygiene, and more. IADLs require a more complex subset of skills as they include navigating transportation, shopping, meal preparation, management of finances, medication management, and more (Edemekong et al., 2023). For adolescents, the ability to independently complete BADLs is the first step in establishing basic morning routines. The inability to do so can result in unsafe life conditions and poor hygiene (Edemekong et. al 2023). With this, it is essential for individuals who struggle to learn these skills to receive the proper support. In some cases, this may include individuals who are diagnosed with a developmental disability.

Developmental disabilities are categorized as a group of conditions that induce lifelong impairment in behavioral, physical, language, and learning areas of development. These diagnoses can include autism spectrum disorder (ASD), attention-deficit/hyperactivity disorder

(ADHD), cerebral palsy (CP), learning disability (LD) and more (Zablotsky et.al, 2019). Individuals with ASD often have difficulty with completing daily routines and the activities that are involved within them, specifically the areas surrounding coordination, fine motor activities, balance, and movement (Chen et. al., 2022). To address these deficits, many individuals who are diagnosed with ASD are encouraged to receive Applied Behavior Analysis (ABA) therapy. ABA therapy is an evidence-based therapeutic approach that is focused on evaluation of one's behaviors and the implementation of programs that promote a more independent lifestyle. Each client's treatment is overseen by a Board-Certified Behavior Analyst (BCBA) - professionals that have received a masters degree in a related area of study, completed supervised experience hours and passed an exam required by the Behavior Analyst Certification Board (BACB) - whose role is to supervise, provide clinical direction, and manage clients and their Behavior Technicians (BTs). BTs are individuals who have completed specialized training and deliver treatment protocols outlined by the BCBA (The Council of Autism Service Providers, 2014).

One area of the Core Principles that all behavior analysts strive to follow is that of treating others with compassion, dignity, and respect. This includes the principle of, "acknowledging that personal choice in service delivery is important by providing clients and stakeholders with needed information to make informed choices about services" (Ethics Code for Behavior Analysts, 2020). Thus, incorporating a client's choices is a necessary part to include within their treatment plans. Opportunities to include choice could be what location they prefer to go during their play times, what items they would like to use for some programs, and even the manner in which they would like to learn a certain skill.

There are a variety of modalities that can be used to present a clients' program: in-vivo modeling, video modeling, visual stories, chaining procedures, and more. However, when

analyzing training procedures for practitioners to teach daily living skills, Ruteere et al. (2015) discovered that 78% of teachers for individuals with developmental disabilities surveyed did not have the proper training to teach daily living skills to their students. Regarding hair brushing, there is research about desensitization and tolerance, however, there is limited research surrounding teaching individuals to brush their own hair. The aim of this study was to implement treatment procedures informed by client choice by recording their behaviors within different teaching modalities to assess preferences.

Methods

Participants

The participant in the present study was a 13 year-old adolescent female diagnosed with ASD. She had a history of struggling with tolerating and independently brushing their hair. Previous programs that were implemented were not successful and did not result in them learning how to adequately brush their own hair. Additionally, the participant would sometimes engage in problem behaviors and verbal refusal whenever asked to brush their hair, both at home and in the clinic.With this, challenging behaviors could indicate that they do not prefer the modality in which an activity may be presented. However, implementing choice has been found to limit the occurrence of problem behavior (Shogren et. al. 2004). Weekly, she receives 15 hours of 1-on-1 therapy with a behavior technician and is overseen by a BCBA for 10% of that time.

The participant has limited verbal communication, as she struggles with her articulation and usage of full sentences. She demonstrates reliable ‘yes’ and ‘no’ responses and has no significant physical limitations. She periodically engages in the following problem behaviors: flopping (any instance of dropping on the floor when not appropriate), aggression (any instance of hitting, scratching, pinching, and/or kicking another individual), and crying/screaming (any instance of the client emitting a high-pitched, high volume sound of distress for longer than 3 seconds). The procedures of this current study align with treatment that is currently outlined in this individual's behavior treatment plan, which was approved by parents. However, additional parental consent for this study was obtained.

Setting and Materials

This study took place at an autism center in Southwest Michigan. For each trial, an empty, neutral room with desks and chairs was used. The materials required to complete the

pre-assessment and choice assessment included one tablet, a table top mirror, two tangle teezer hair brushes, stickers, a desk and two chairs, paper data sheets, a clipboard, and a writing utensil.

Procedure

In this case study, a randomized AB design was used. The participant completed 11 pre-assessment trials and 12 probe trials, and is actively completing the choice assessment. The duration of each trial ranged from 5-10 minutes, depending on the participant's performance. Trials were held during the participants' regularly scheduled therapy time. Prior to beginning the pre-assessment, the participant and instructor decorated hair brushes with stickers in the room where the trials were conducted. This allowed the environment to become more reinforcing to the participant. Additionally, an Occupational Therapist was consulted regarding any considerations with the physicality of hairbrushing from an occupational therapy perspective.

Prior to each session, the materials were set up with either the left side of the room obtaining the in-vivo model materials (desk, two chairs, and two tangle teezer hair brushes) or the right side obtaining the video model materials (desk, chair, table top mirror, one tangle teezer hair brush, and one tablet). The order of conditions were randomized. Following the suggestion from the occupational therapist, the pre-assessment consisted of raking fingers through hair. This would allow for the possibility of desensitization and consistency of motion with hair brushing.

When prompting the in-vivo model condition, the participant was directed to sit on the left side of the room and was told "We are going to practice raking our fingers through our hair. Are you ready? Copy me …". Data was collected by a trained observer who was seated to the side. When prompting the video model condition, the participant was directed to sit on the right side of the room and was told "You are going to practice raking your fingers through your hair. Follow the instructions of the video. Are you ready? Copy them…" and the instructor played the

video on the tablet. Data was collected by the instructor, who was seated to the side. Once the participant completed the assessment, their therapy session continued as normal.

Across all teaching modalities, the same task analysis (list of steps) was used and the same data were collected. As depicted in Figure 1, the task analysis was divided into 18 steps, with each step recording problem behavior (flopping, aggression, and screaming and crying), verbal refusal, and step completion. The step completion criteria was divided into yes, attempt, and no; 'yes' signifying all parts of the step were completed, 'attempt' signifying the participant engaging in a step but not completing it, and 'no' signifying the client not beginning the step. Additionally, the date and time, as well as the instructor and any observers present, was marked for each trial. Due to low responding, only 11 trials (five in-vivo modeling and six video modeling) were conducted before the procedure was reassessed.

The next step was to probe the participant's imitation of high-probability skills with an in-vivo model and a video model. The skills (clapping hands and a sequence of touching head-nose) were chosen because the participant demonstrated reliable imitation of these skills in the past. To limit possible confounding variables, these previously mastered skills were used to allow only the teaching modalities to be tested.

Prior to the choice assessment being conducted, the study was put on hold due to external limitations, to be addressed later.

Results

Figure 2 depicts the percent of steps the participant engaged in problem behavior. Figure 3 depicts the percent of steps the participant engaged in verbal refusal. Figures 4 and 5 depict the percent of steps the participant did not attempt nor complete ('no' was circled) and the percent of steps the participant attempted ('attempt' was circled), respectively. Figure 6 depicts the

percent of trials the participant correctly completed for the video model format and in-vivo model format of clapping hands and touching head-nose.

During the video model sessions, the participant completed 100% of the sessions without problem behavior and verbal refusal. On average across all six video model sessions, she scored 0% on 'yes' step completion, 4.7% on 'attempt' step compilation, and 95.3% on 'no' step completion.

During the in-vivo model sessions, the participant completed 100% of the sessions without problem behavior and, on average, 98.8% of the sessions without verbal refusal. On average across all five in-vivo model sessions, she scored 1.2% on 'yes' step completion, 12.2% on 'attempt' step completion, and 86.6% on 'no' step completion.

Following the completion of the pre-assessment, the participant completed high-p probes. For the video model format, she scored on average 25% 'yes' step completion for clapping hands and 0% 'yes' step completion for touching head/nose. Regarding the in-vivo model format, they scored on average 100% 'yes' step completion for clapping hands and 75% 'yes' step completion for touching head/nose.

Discussion

It is imperative that researchers continue analyzing ways that practitioners can teach daily living skills and to find ways to implement client choice in treatment, especially when constructing client treatment plans. Not only does including choice allow individuals to 'voice' their opinions regarding their care, it also leads to clinically significant reductions in problem behavior occurrences (Shogren et al., 2004). As seen in Figures 2 and 3, little to no problem behavior and verbal refusal occurred when implementing the pre-assessment. These findings are vastly different to previous implementations of hair brushing programs, where the participant

regularly engaged in problem behaviors. This reduction could also be in part due to the pre-assessment being focused on raking fingers through hair, rather than hair brushing.

Nonetheless, creating a way for the participant of this study to demonstrate preference led to the discovery of valuable information that is important for their overall treatment at the autism center. As depicted in Figure 6, even when presented with skills that they had previously mastered and maintained, the participant did not respond to the instruction when presented through a video modeling format. This information allows the participants BCBA to reassess and apply new procedures that better fit the participants needs.

Although all portions of the study were not completed and the participant did not learn how to independently brush their own hair, these findings provided parents with valuable information. The participant's parents had considered purchasing video modeling based resources to teach appropriate sexual health routines. This discovery allowed them to be redirected to other resources that are less video based, ultimately saving them time and money.

There were a handful of limitations that led to the study not being completed, with the biggest one being time. The participant was sick and periodically out of the autism center for about a month and a half. This, and changes in scheduling, resulted in the researchers having limited opportunities to conduct trials. Procedurally, a few limitations presented themselves throughout the completion of the study. For one, limited modalities were tested, meaning, it is unknown on how the participant would have responded to other teaching modalities. Furthermore, generalization of location and models was not implemented. With this, future researchers should be sure to allocate adequate time to completing all steps and should examine generalization of the skill across models, additional modalities, and settings.

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Figure 1

Steps	Problem Behavior			Verbal Refusal		Step Completion:		
	Flopping	Aggression	Crying/Screaming					
1. With dominant (right) hand, open your fingers and bring them to the middle right section of the hair				Yes	No	Yes	Attempt	No
2. Drag fingers to the bottom of the strands				Yes	No	Yes	Attempt	No
3. Repeat steps 1 and 2 until hair is smooth				Yes	No	Yes	Attempt	No
4. With dominant (right) hand, open your fingers and bring them to the middle back section of the hair				Yes	No	Yes	Attempt	No
5. Drag fingers to the bottom of the strands				Yes	No	Yes	Attempt	No
6. Repeat steps 4 and 5 until hair is smooth				Yes	No	Yes	Attempt	No
7. With dominant (right) hand, open your fingers and bring them to the middle left section of the hair				Yes	No	Yes	Attempt	No
8. Drag fingers to the bottom of the strands				Yes	No	Yes	Attempt	No
9. Repeat steps 7 and 8 until hair is smooth				Yes	No	Yes	Attempt	No
10. With dominant (right) hand, open your fingers and bring them to the top right side of the head				Yes	No	Yes	Attempt	No
11. Drag fingers to the bottom of the strands				Yes	No	Yes	Attempt	No
12. Repeat steps 10 and 11 until hair is smooth				Yes	No	Yes	Attempt	No
13. With dominant (right) hand, open your fingers and bring them to the top back side of the head				Yes	No	Yes	Attempt	No
14. Drag fingers to the bottom of the strands				Yes	No	Yes	Attempt	No
15. Repeat steps 13 and 14 until hair is smooth				Yes	No	Yes	Attempt	No
16. With dominant (right) hand, open your fingers and bring them to the top left side of the head				Yes	No	Yes	Attempt	No
17. Drag fingers to the bottom of the strands				Yes	No	Yes	Attempt	No
18. Repeat steps 16 and 17 until hair is smooth				Yes	No	Yes	Attempt	No
Totals:				Yes:	No:	Yes:	Attempt:	No:

Figure 2

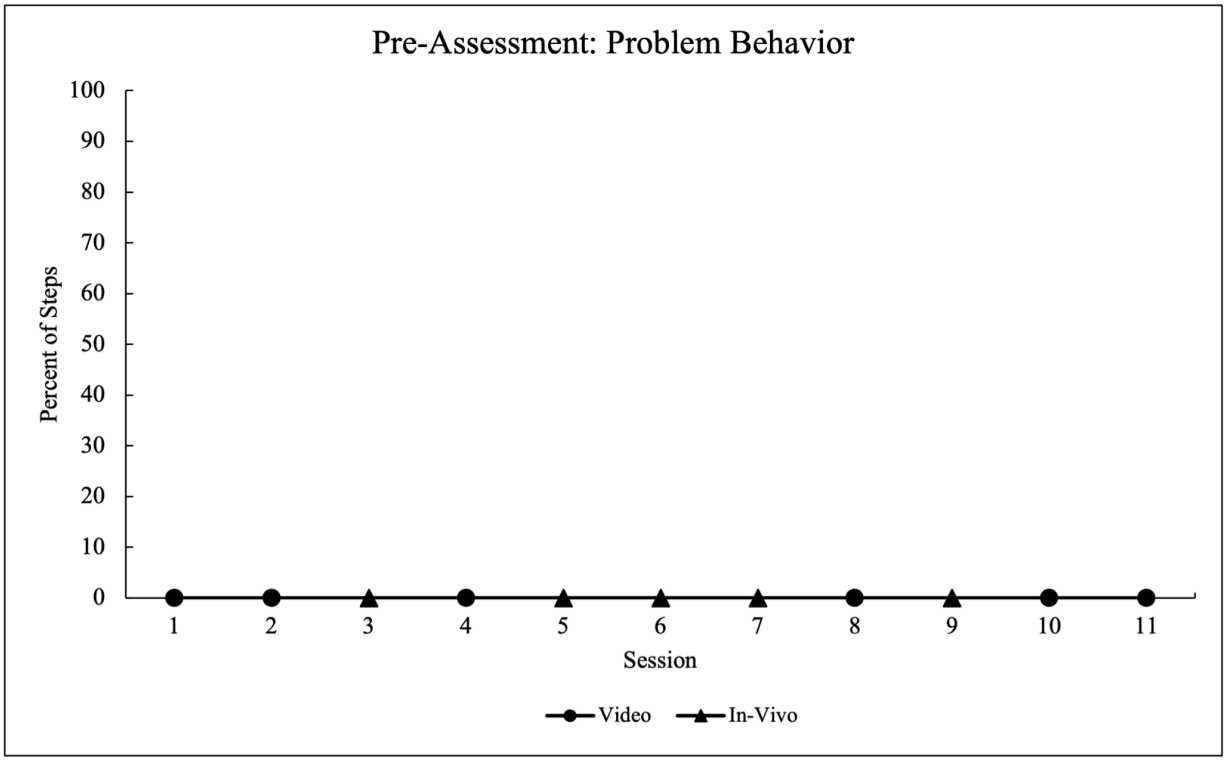


Figure 3

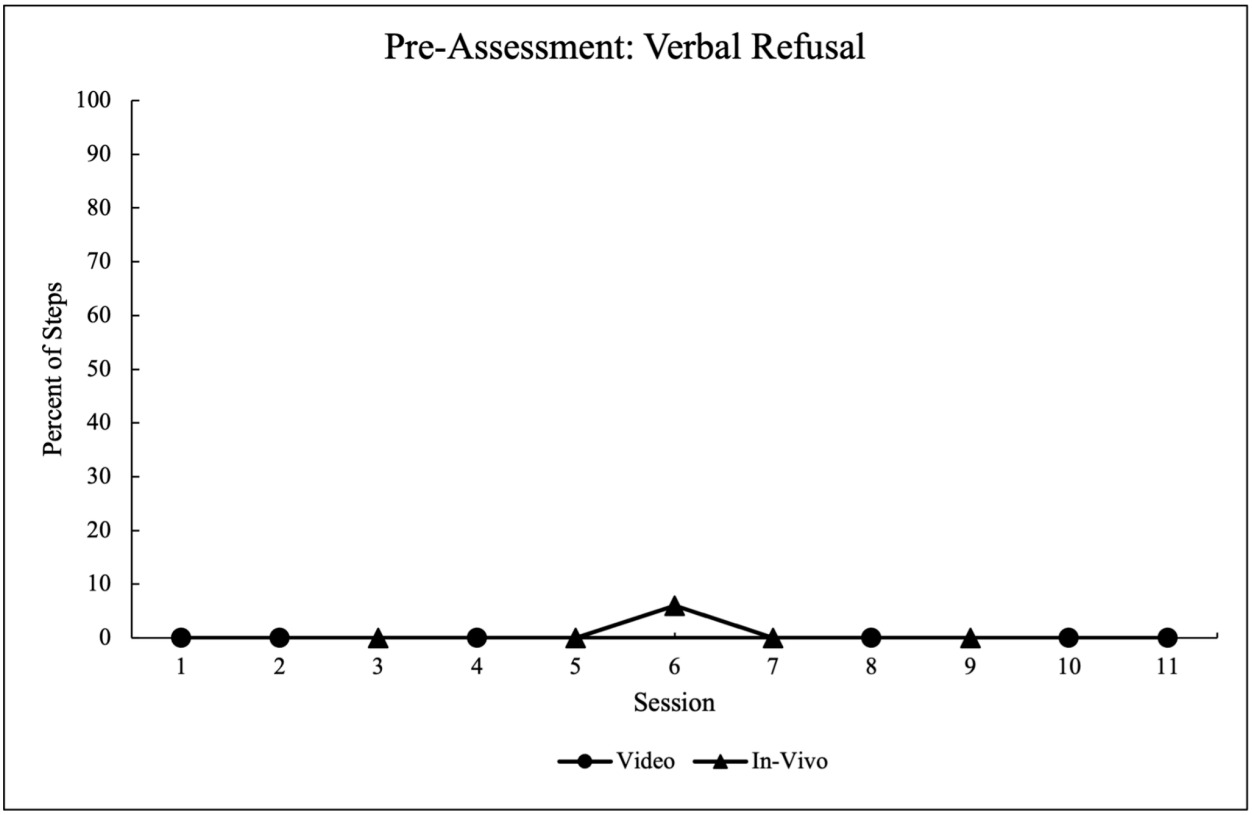


Figure 4

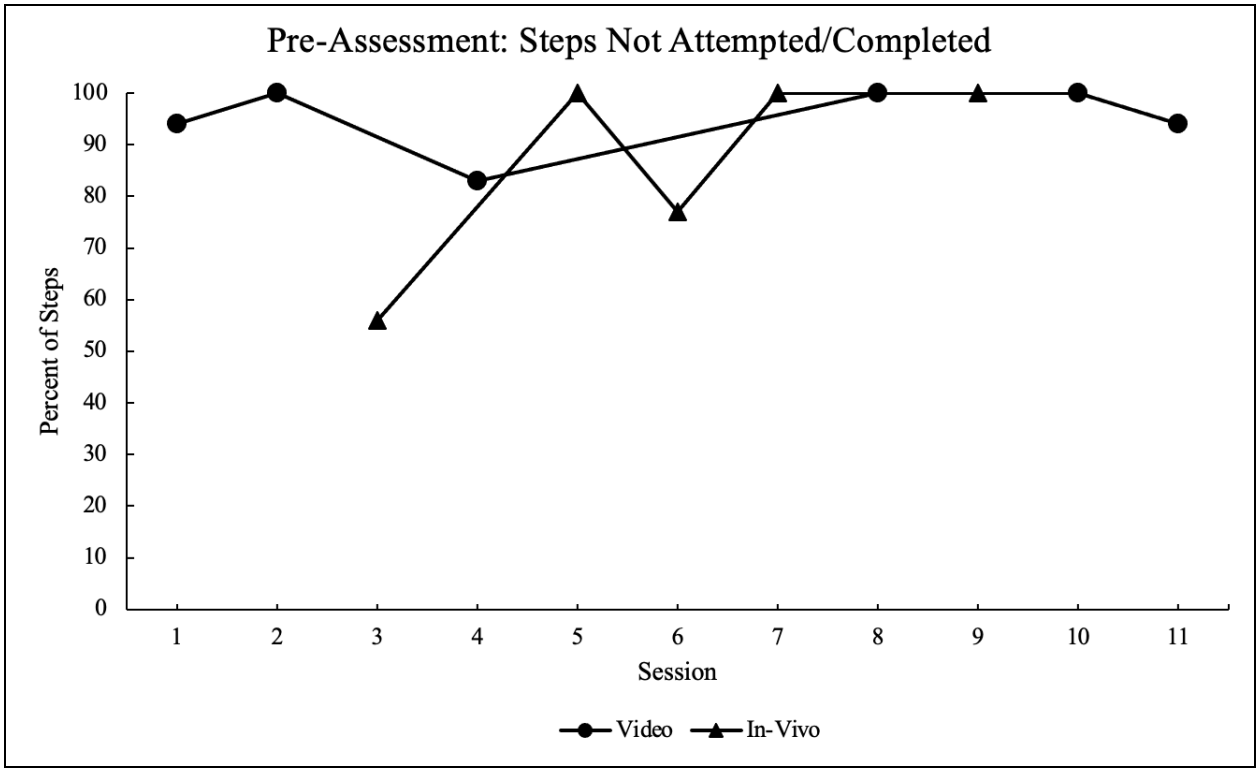


Figure 5

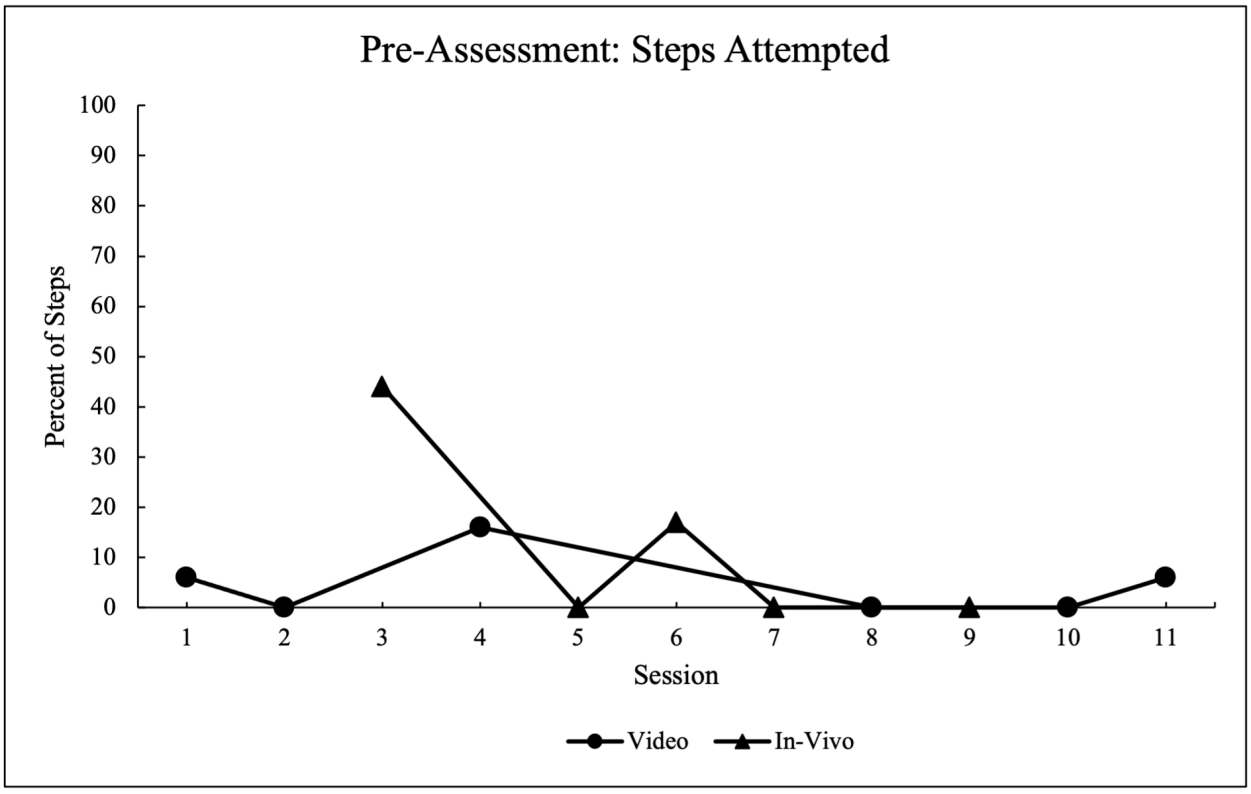
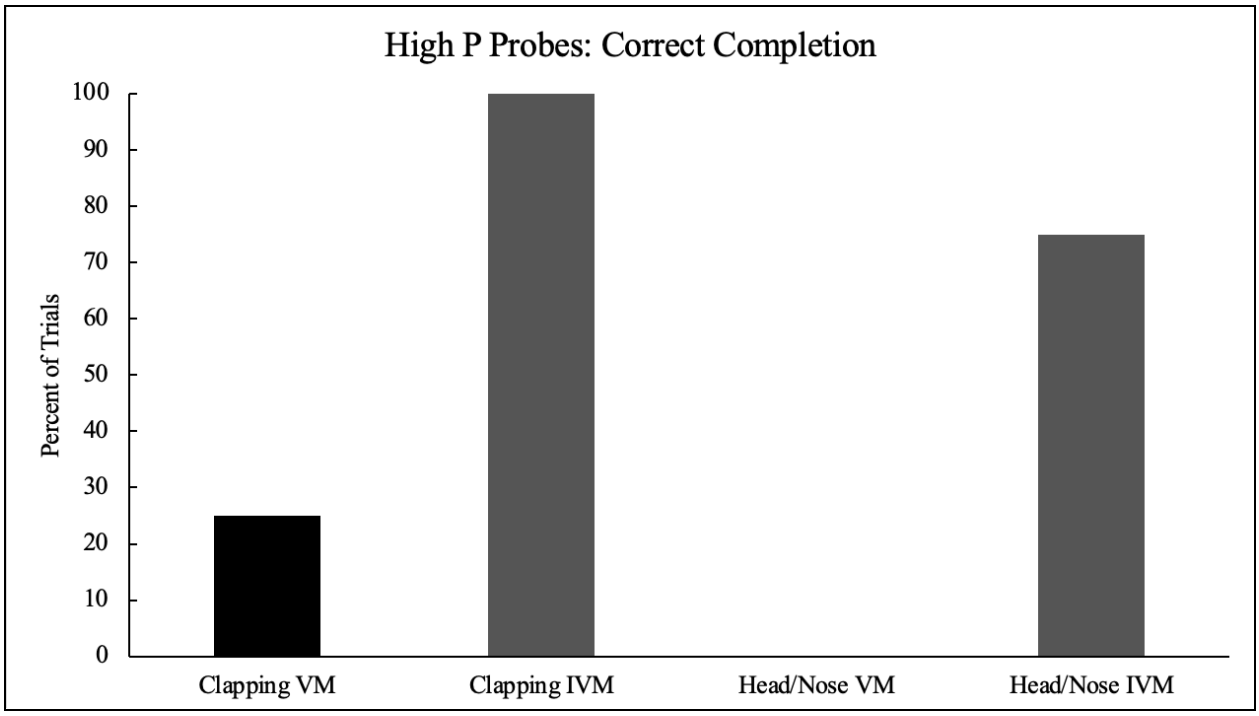


Figure 6


High P Probes: Correct Completion
Percent of Trials
100
90
80
70
60
50
40
30
20
10
0
Clapping VM
Clapping IVM
Head/Nose VM
Head/Nose IVM