AN OVERVIEW OF ELECTRONIC PREFERENCE ASSESSMENTS AND

RECOMMENDATIONS FOR THEIR USE IN TELEHEALTH

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A Project Presented to

The Faculty of Humboldt State University

In Partial Fulfillment of the Requirements for the Degree

Master of Arts in Psychology: Academic Research

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July 2021

Abstract

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Preference assessments are used to systematically determine an individuals preferred

items to be used as potential reinforcers during service delivery. Electronic preference

assessments typically do not use tangible items but instead present electronic

representations of these tangible items, such as electronic pictures or videos, to the client.

The purpose of this overview is to introduce the history and traditional use of electronic

preference assessments and then to provide practical recommendations for using an

electronic preference assessment while providing behavioral services through a telehealth

model. When conducting an electronic preference assessment during a telehealth session

two primary considerations need to be made: the client's prerequisite skills and the

practitioner and the client's access to resources such as an electronic device. An analysis

of the relative benefits and the limitations to a variety of electronic preference assessment

formats, future directions are discussed.

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Introduction

A stimulus preference assessment is a common clinical tool used by behavior analysts to systematically obtain a list of preferred stimuli of a client or patient with autism spectrum disorder (ASD), which can then later be tested for reinforcing efficacy. The current COVID-19 pandemic has caused the cessation or drastic modification of many in-person services. Stimulus preference assessments were originally designed to be conducted in an in-person setting, however, recent research has demonstrated that it is possible to adapt a number of different types of the stimulus preference assessment to an online or electronic format (Snyder et al., 2012; Brodhead et al., 2015; and Morris & Vollmer, 2020). With many behavior analysts and agencies quickly transitioning to an online format, it is important that we consider which adaptations fit best for individual clients. To date and to the authors' knowledge, there has been no summary of the literature on the use of electronic preference assessments in practical application or an evaluation and recommendation of administering electronic preference assessments in an applied setting, although research in this area is growing. The purpose of this paper is to provide a brief overview of the literature available on electronic preference assessments and to provide recommendations to practitioners on the use of electronic preference assessments in telehealth settings. The following brief history of stimulus preference assessments serves the purpose of introducing why preference assessments are used and how they have been adapted over time to meet the need of clients.

A Brief History of Stimulus Preference Assessments

Pace et al. (1985) conducted the first published report on the effectiveness of a formal stimulus preference assessment by presenting 16 different stimuli in a counterbalanced order to six individuals with developmental disabilities. Stimuli were presented one at a time and the participants were able to interact with each stimulus selected. This form of preference assessment would later be known as a single stimulus preference assessment. Using this process, the researchers established a preference hierarchy for the six participants and used that list to test for the reinforcing effect of the stimuli. They found that the delivery of the preferred stimuli, when contingent on a specific action (i.e. making eye contact), resulted in increased rates of the action. Fisher et al. (1992) adapted the stimulus preference assessment created by Pace et al. (1985) to what would later be called a paired stimulus preference assessment. In a paired stimulus preference assessment (PS) two stimuli are presented at a time and the participant is only given access to the stimulus they select. The results of this preliminary testing on paired stimulus preference assessment were more robust than the previous study, indicating that a paired preference assessment could produce a more sensitive hierarchy of preferences (Fisher et al. 1992). Following the research of Fisher et al. (1992), DeLeon and Iwata (1996) compared the three main forms of formal preference assessment's ability to predict those stimuli's potency as a reinforcer. The assessments compared were the multiple stimulus with replacement (MSW) (three or more stimuli are used, and when one stimulus is selected, the other stimuli are removed and replaced and the stimulus that

was selected is added back to the array), the multiple stimulus without replacement

(MSWO) (conducted in a similar fashion to the MSW but once a stimulus is selected it is

not replaced and the remaining stimuli are presented to the participant) and the PS. The

researchers found that MSWO and the PS procedure identified more stimuli that could be

moderately reinforcing; however, the MSW could be more effective in identifying one or

two stimuli that could be highly reinforcing. Nevertheless, all three preference

assessment procedures have demonstrated some level of predicting reinforcing

effectiveness.

Preference Assessments and ASD

Carr et al. (2000) conducted the first study on the formal use of preference

assessments for individuals with ASD. A MSWO procedure was used to determine

preferences of children with ASD. Following the MSWO, a reinforcer assessment was

conducted and the results corresponded to those of the MSWO (i.e., the more preferred

items were also more reinforcing). Since that time, a number of studies have investigated

procedural variations of preference assessments and their efficacy for people with ASD

and prediction capability of potential reinforcers. Additional research includes: paired

stimulus assessments with access (immediate access to the selected stimuli is given upon

selection) and without access (access to the selected stimuli is delayed or withheld upon

selection) (PS-WA and PS-NO, respectively) (Leaf et al., 2016), MSWO (e.g.

Nuemberger et al., 2012), and comparisons across methods (Verriden et al., 2016). Taken

together, the body of research on the use of traditional preference assessments is robust,

both within the larger population and the population of individuals with ASD. Electronic

preference assessment research is another variation that is perhaps less well known than

traditional preference assessments and warrants further discussion.

Electronic Preference Assessments for Individuals with ASD

To aid with the navigation of the many acronyms that are used to represent the various

types of preference assessments, refer to Table 1.

Table 1

Assessment Types and Their Abbreviations

Assessment Type	Abbreviation
Brief Tangible-Based Multiple Stimulus Without Replacement - With Access	Brief T-MWSO-WA
Brief Video-Based Multiple Stimulus Without Replacement - No Access	Brief V-MSWO-NO
Electronic Picture-Based Multiple Stimulus Without Replacement - With Access	EP-MSWO-WA
GIF-Based Paired Stimulus Preference Assessment	GIF-Based PSPA
Tangible-Based Multiple Stimulus Without Replacement - With Access	T-MWSO-WA
Tangible-Based Paired Stimulus - With Access	T-PS-WA
Video-Based Multiple Stimulus Without Replacement - With Access	V-MSWO-WA
Video-Based Paired Stimulus - No Access	V-PS-NO
Video-Based Paired Stimulus - With Access	V-PS-WA
Video-Based Social Preference Assessment	V-SPA

Throughout the literature, the term, "electronic preference assessment" is used and is defined in several different ways. For the purpose of this paper, the term is operationally defined as any method of presenting an item or items for selection that is done by the representation of that item on the screen of an electronic device (e.g., computer screen, tablet, cellular phone). Representations can include but are not limited to pictures of the item or videos of the item.

Snyder et al. (2012) examined electronic preference assessments using videos to depict potential reinforcers. It was found that when concurrently presented with two separate portable DVD players, each playing a video depicting an unfamiliar child playing with one of the six toys used in the assessment, and asked to make a selection, participants reliably selected stimuli that were later ranked similarly in a traditional PS-WA reinforcer assessment. Following this initial study, Clark et al. (2015) demonstrated that both a video paired stimulus with access (V-PS-WA) and a video paired stimulus without access (V-PS-NO) could produce a preference hierarchy that reliably matched the results of a PS-WA reinforcer assessment. Similar results were demonstrated by comparing two electronic adaptations of an MSWO, one with access to the selected stimuli and one without access to the selected stimuli (V-MSWO-WA and V-MSWO-NO, respectively). The study also demonstrated that a V-MSWO-NO could produce similar results to that of a V-MSWO-WA (Brodhead et al., 2015). The efficacy of electronic preference assessments was further supported when Brodhead et al. (2016)

demonstrated that when using traditional tangible items, such as a toy plane, a ball, or a

book in a tangible-MSWO-WA (T-MSWO-WA), it produced similar results to that of an

electronic picture MSWO-NO (EP-MSWO-NO). Comparing the results of this study with

the three previously mentioned demonstrates that both videos and pictures presented in an

electronic format can be used to reliably predict preference in children with ASD.

Other types of preference assessments have been evaluated in an electronic

format, including a brief-MSWO which follows similar procedures to the MSWO but

with reduced assessment time and clinical response effort by reducing the number of

stimulus presentations from five to three (Carr et al., 2000; Paramore & Higbee, 2005).

Three separate studies have demonstrated success using a brief V-MSWO: across the

comparisons of access to no access (Brodhead & Rispolli, 2016; Brodhead et al., 2017)

and the comparison of tangible with access to video to those with no access (Brodhead,

Kim & Rispoli, 2018). Other adaptations, for example, include a video assessment for

identifying preferred social interactions (Wolfe, Kunnavatana & Shoemaker, 2017;

Huntington & Higbee, 2017) and a GIF-based assessment for social interaction (Morris &

Vollmer, 2020).

Taken together, the literature base suggests that preference assessments can be

readily adapted to an electronic format that produces results comparable to traditional

preference assessments. However, simply knowing that there are multiple methods to

electronically assess the preferences of an individual with ASD does not, in and of itself,

serve as a clear guide for the behavior analyst in choosing one electronic preference

assessment over another, and other practical considerations surrounding these assessments. It is important for a practicing behavior analyst to know which procedures might be appropriate for a particular client. Special considerations in procedural variations in electronic preference assessment is warranted and may serve to assist practitioners in making a more informed decision for their clients' needs.

Recommendations for Practitioners

The Council of Autism Service Providers (CASP) published a paper in March of 2020 that included detailed information and recommendations for providing telehealth services for practitioners. Telehealth services are any services provided through an electronic device while not physically present with the client. There are four main models of telehealth service delivery: partial telehealth, telehealth direct services and clinical direction, caregiver-implemented services, and caregiver consultations (Council of Autism Service Providers, 2020). For the purpose of this paper, the focus will remain on the partial telehealth model and the telehealth direct services and clinical direction model, as in both the caregiver-implemented services model and the caregiver consultations model, the practitioner does not provide any form of direct services to the client. While the CASP paper provides broad recommendations, it does not specifically discuss conducting preference assessments through telehealth. The following sections will provide information and recommendations for conducting electronic preference assessments through telehealth by examining the appropriateness of the two models and how the client's individual characteristics, their caregiver's ability to participate in a session, and the technological requirements might impact the assessment.

Client Prerequisite Skills

When conducting an electronic preference assessment, the first question the practitioner must answer is if their client is capable of participating in an electronic

preference assessment. The prerequisite skills for participating in telehealth sessions are likely the same as the skills necessary for participation in an electronic preference assessment, and include basic joint attention, discrimination, echoic and motor imitation skills, the ability to follow 1-step directions, participation with little caregiver support, the ability to sit without prompts for 8 to 10 minutes, and low rates of challenging behavior or a caregiver that can effectively manage any challenging behaviors that may arise (Council of Autism Service Providers, 2020). In addition to these prerequisite skills, the client must also be able to effectively respond to static images, GIFs, or videos that are used to represent an object or activity in the real world.

An effective way to test for this skill was identified by Brodhead et al. (2017), in which they used a simple test to ascertain the children's ability to identify that an electronic picture represents something in vivo. The children were presented with a picture of an object. Then, the researcher asked the child to lead them to that object in the room. All children in the study demonstrated the ability to locate the object that corresponded with the image and were able to successfully complete the preference assessment later. An adaptation of this could be done in a virtual setting: a practitioner could use examples of objects that the client has already shown the ability to identify, through previous testing, such as matching-to-sample tasks completed in the past or a demonstrated ability to identify an object from a pictorial representation and then match that picture to a physical object.

As an example, a practitioner would determine what objects to digitally create or find pre-made static images, GIFS, or videos that represent these objects. Next, the practitioner would show the client an electronic representation of the object in the telehealth session that is known to be present in their physical environment. Then the practitioner would prompt the client to look at the electronic representation, and ask them to find that object in their physical environment. Success in this test would provide some evidence that the client can appropriately respond to electronic representations of an object. It may also be possible to indirectly assess for this prerequisite skill without testing by reviewing the child's other behavior goals, programs, or daily living activities, such as: if the child follows a visual schedule or if the child has demonstrated the ability to follow an activity depicted on a card.

If the practitioner wishes to use a multiple-stimulus electronic preference assessment, the client should be able to demonstrate one other prerequisite skill, the ability to scan an array of items. This could be determined through previous work of the client or by simply running a test by presenting the same number of items that will be used in the electronic preference assessment and testing if the child can identify a single specific stimulus within the array.

Once the practitioner has determined whether an electronic preference assessment is appropriate for the client, the next step is to determine how the assessment will be integrated in to ongoing telehealth services.

Partial Telehealth Model

The partial telehealth model utilizes both in-person and telehealth sessions. With this model being the only model to include in-person sessions, it is the preferred method for service delivery when a fully in-person service model is not possible (Council of Autism Service Providers, 2020). In this model it would be ideal for the practitioner to conduct in-person preference assessments due to the well-established body of research. However, if this is not possible, an electronic preference assessment could be appropriate.

Benefits of Partial Telehealth Model

If a practitioner is utilizing a partial telehealth model, there are benefits that are available to them that are not available in the other three models. In this model the practitioner could introduce items in-person prior to conducting the assessment electronically to provide more familiarity with the stimuli to the client. Meeting with the client's caregiver in person and doing direct training on how to assist with the electronic preference assessment may be possible, such as modeling to the caregiver how to provide or remove stimuli during the assessment. Lastly, it may be possible to provide the caregiver with the stimuli that are to be used in the assessment so that the client can have access to the stimuli after selecting them from a virtual stimulus array, providing a hybrid electronic and in-person preference assessment.

Telehealth Direct Services

In this model, all direct services, caregiver trainings and meetings, clinical supervision of the practitioner, and staff training, are done through telehealth, and is appropriate if the client has the prerequisites listed previously (Council of Autism Service Providers, 2020). In this model, the resource limitations of both the client and/or the client's family, as well as the resource limitations of the practitioner have the biggest role in determining what method of electronic preference assessment should be selected.

Resource Considerations

The choice of solutions is not only dependent on individual client and family needs but other variables as well. Refer to Table 2 for a checklist of each preference assessment type and whether it would be appropriate given a range of variables. In the following section the potential choices will be discussed in greater detail.

Table 2

Assessment Type	No Access to Stimuli	Attending Skill Deficit	Access to Computer/Laptop	Access to Smartphone Only
Brief T-MWSO-WA	-	+	+	-
Brief V-MSWO-NO	+	+	+	-
EP-MSWO-WA	-	+	+	-
GIF-Based PSPA	-	+	+	-
T-MWSO-WA	-	+	+	-
T-PS-WA	-	+	+	+
V-MSWO-WA	+	+	+	-
V-PS-WA	+	-	+	+
V-PS-NO	-	+	+	+

A "+" denotes that the preference assessment is recommended to use under those conditions, a "-"indicates that it is not recommended under the specific conditions.
No Access to Stimuli: Child has no access to physical stimuli during assessment.
Attending Skill Deficit: Child has not demonstrated ability to attend to a video for 15 or more seconds.
Access to Computer/Laptop: Client has a laptop or tablet.
Access to Smartphone Only: Client access services via a smartphone.

Technological advancements within the last decade have made the barrier of cost

of electronic preference assessments shrink as most practitioners have access to a

portable device (e.g., tablet). Previous research has used iPads with the program Keynote,

a free program for iPad that allows for the arrangement of video clips on the screen (e.g.,

Brodhead et al., 2015; Hunington & Higbee, 2017). These may or not be available to the

individual practitioner or the client. Alternatively, portable DVD players have been

shown to be effective as devices to display pictures or videos that represent stimuli used

in the preference assessment as well, although they lack the touch screen capability of an

iPad (Synder, Higbee & Dayton, 2012; Clark, Donaldson & Kahng , 2015). A laptop

playing a DVD or recorded video clip, either from a flash drive or online video hosting

website, of the selected stimuli is functionally equivalent to a portable DVD player and is

also likely accessible to practitioners. It is assumed that if a client is continuing services

through an online meeting platform such as Zoom, or other HIPAA approved online

meeting platforms, that the electronic device they are using is capable of producing both

video and sound. In this case, the client will have access to either an iPad, a similar tablet

device, or a laptop which would allow the client to participate in an electronic preference

assessment with little to no cost to the client or practitioner. However, if a client is

instead using a smartphone to access services, there has yet to be any published literature

evaluating the effectiveness of displaying pictures of videos used in the preference

assessment through a smartphone. While it still may be possible to conduct an electronic

preference assessment through a smartphone it should be done with caution and careful

consideration. One such consideration is that smartphones traditionally have smaller

screens than that of a tablet or laptop and may make it more difficult to clearly view the

stimuli. Assessments that use a larger array of items, such as an MSWO, would not be

recommended. A PS, however, might be more acceptable on a smartphone. If the client is

using a smartphone to access telehealth services, it may be possible for a practitioner to

loan a laptop or other device to the family and conduct the assessment to circumvent the

visual issues and lack of research surrounding the use of a smartphone.

The primary benefit to electronic preference assessments is that it is not always

necessary to have the physical stimuli available during the assessment (e.g., Clark,

Donaldson & Kahng, 2015 and Wolfe, Kunnavatana & Shoemaker, 2017). The absence

of physical stimuli could remove the cost of purchasing unnecessary tangible items by

only requiring the purchase of preferred items that are identified through the preference

assessment. However, access to the preferred stimuli would be eventually necessary

when testing for reinforcement efficacy, wherein the preferred stimuli are delivered as

consequences for behavior. To accommodate a preference assessment with access, the

practitioner could provide the caregiver(s) or staff the items required during the

preference assessment. The practitioner could then train caregivers to provide the stimuli

as a consequence contingent on the child's selection. Previous research indicates that

parents and caregivers are able to learn how to implement programs and interventions

without in-vivo training (Spiegel, Kisamore, Vladescu, & Karsten, 2016), however,

training the caregiver does require more time than simply doing a preference assessment without access and providing the physical stimuli at a later time.

One solution to the challenge of providing tangible stimuli as consequences in a telehealth environment is to instead test for preference of specific videos, such as a short cartoon or clip (Curiel & Poling, 2019), though several considerations from Table 2 are warranted. For example, one such variable to consider is video length. If a child is unable to attend to a longer video clip (e.g., 30 seconds), then an electronic picture preference assessment or a video-based electronic preference assessment with shorter video clip lengths could be utilized. Choosing a different form of electronic preference assessment that uses shorter clips such as a V-PS-WA (e.g., Curiel & Poling, 2019) which uses 5-sec clips may be necessary for those with the inability to attend to a 30-second clip.

Clinical Vignette

To illustrate the use of this paper as a guide for selecting the best electronic preference assessment for an individual client, consider the following clinical vignette: Haley is a verbal ten-year-old girl with ASD. She has recently been showing a lack of interest in items that were previously reinforcing to her while participating in telehealth sessions and is often refusing to join telehealth sessions. She accesses her telehealth services through a tablet. She is receiving telehealth services only, with no in-person direct services, and struggles with attending to a video clip for more than 10 seconds. Her caregivers have an inconsistent presence during her telehealth sessions, in which they are

sometimes present and able to assist with the telehealth session and at other times they are absent.

In this example, the practitioner would first want to decide what type of preference assessment to conduct. The practitioner knows that Haley has difficulty attending to and scanning when more than three items are placed in front of her. Therefore, a PS is chosen and by checking Table 1, the practitioner can see that using V-PS-NO only requires 5 seconds of exposure to the video clip. Due to the unreliable involvement from caregivers within session, the practitioner makes a video using their smartphone of each stimuli, and then creates a slide show which shows a sequencing of each of the trials for the client to watch and make selections. The practitioner can then upload the slide show to their laptop and share their screen with the client during a telehealth session and ask the client to make verbal selections during each trial.

The data collected during this preference assessment would be used to purchase the highest preferred stimuli. The practitioner can then give that item to the caregiver to allow Haley access contingent on engaging with her telehealth sessions. The practitioner can test the reinforcing properties of those stimuli through Haley's future engagement in telehealth sessions.

Summary and Future Directions

In this paper, we have given the basic tools for the practitioner to evaluate and help determine which electronic preference assessment might work best for their clients. Electronic preference assessments appear to compliment a variety of telehealth models. As with in-person ABA service delivery, care should be taken to tailor procedures to the client's current skill sets. It is important to remember that creative thinking and flexibility still remain a vital part of adapting services to telehealth models. Determining the client's capabilities, their access to technology, caregiver involvement and what you as an individual practitioner are capable of producing are all part of the decision-making process. The resources provided in this paper are a starting point, and further research is needed to better understand which electronic preference assessments work best under various telehealth conditions.

Another area in particular that would benefit from further research is to determine the most effective way to train caregivers and parents to implement preference assessments. We can draw conclusions based on prior research on caregiver implemented services, but research on procedures to specifically train parents to conduct preference assessments is still limited, though research continues to show that parents can be trained to perform other procedures such as functional analysis (Gerow, Radhakrishnan, Davis, Zambrano, Avery, Cosottile, & Exline, 2020). It is likely that conducting behavior services through the telehealth model will become more frequently utilized for service delivery as we continue to progress through the digital age, and perhaps out of necessity

and increased exposure to telehealth technology from the COVID-19 pandemic.

Systematically testing how each type of electronic preference assessment performs, when

conducted in a variety of telehealth models, will be essential to guide the evidence-based

practice of preference assessments in virtual settings.

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