

2000

A review of empirically based preference assessments' ability to identify reinforcers for individuals with disabilities

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A review of empirically based preference assessments' ability to identify reinforcers for individuals with disabilities

Abstract

Research on empirically based preference assessments has been conducted to determine their effectiveness in identifying reinforcers. This paper reviews the effectiveness of five empirically based preference assessment procedures in identifying reinforcers for individuals with disabilities. The procedures are discussed in relationship to reinforcer-based treatments. The five preference assessment procedures reviewed are: 1) single stimulus, 2) paired choice, 3) multiple stimulus, 4) triad, and 5) verbal. The preference assessments differed in the number of highly reinforcing stimuli they identified, whether or not they provided rank orders of reinforcers, and the amount of time it took to conduct them. All of the preference assessments, except for verbal nomination, were effective in identifying reinforcers for individuals with disabilities.

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**A REVIEW OF EMPIRICALLY BASED PREFERENCE ASSESSMENTS ABILITY
TO IDENTIFY REINFORCERS FOR INDIVIDUALS
WITH DISABILITIES**

An Abstract of a Masters Paper

Submitted

In Partial Fulfillment

of the Requirements for the Degree

Masters of Arts in Education

Jennifer A. Sellers

University of Northern Iowa

July 2000

ABSTRACT

Research on empirically based preference assessments has been conducted to determine their effectiveness in identifying reinforcers. This paper reviews the effectiveness of five empirically based preference assessment procedures in identifying reinforcers for individuals with disabilities. The procedures are discussed in relationship to reinforcer-based treatments. The five preference assessment procedures reviewed are: 1) single stimulus, 2) paired choice, 3) multiple stimulus, 4) triad, and 5) verbal. The preference assessments differed in the number of highly reinforcing stimuli they identified, whether or not they provided rank orders of reinforcers, and the amount of time it took to conduct them. All of the preference assessments, except for verbal nomination, were effective in identifying reinforcers for individuals with disabilities.

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July 2000

This Research Paper by: Jennifer A. Sellers

Entitled: A Review of Empirically Based Preference Assessments Ability
to Identify Reinforcers for Individuals with Disabilities

has been approved as meeting the
research paper requirement for the Degree of

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CHAPTER 1

INTRODUCTION

The purpose of this paper is to review which empirically based preference assessments identify reinforcers for individuals with disabilities. Having preference assessments that are effective in finding reinforcers is important for reinforcer-based treatments. If a treatment is based on an individual earning a reinforcer for emitting a target response, the treatment will not be effective without a reinforcer. Preference assessment can assist in determining not only what items a person prefers, but some preference assessments can rank order preferences from most preferred to least preferred. This information is useful when considering long term reinforcer based treatments. If a person becomes satiated on an item (e.g., does not find the item to be reinforcing due to having it as a reinforcer for too long) or if some preferred items cannot be available all the time (e.g., food) or are only available in certain conditions (e.g., a favorite staff is only available on Thursday) having several possible reinforcers can maintain the reinforcer-based treatment in absence of other reinforcers. Considering the time efficiency of a preference assessment is also important. If two preference assessment obtain the same information on a person's reinforcers and one is more time efficient than another, the more time efficient one would be chosen so that more time can be spent on developing an effective treatment.

The five main types of preference assessment procedures to be discussed are: single stimulus presentation, paired choice presentations (also referred to as paired stimulus presentation), multiple stimulus presentation (with and without replacement), triad presentation, and verbal presentation procedure. The single stimulus presentation

procedure is when the stimuli to be assessed are presented to the participant one at a time and preference to that stimulus is measured. In a paired choice presentation procedure the stimuli being assessed are presented two at a time and preference to the stimuli chosen are measured. Multiple stimulus presentation procedures are conducted by having all of the stimuli being assessed presented to the participant at the same time. After choosing a stimulus the item can either be replaced or not replaced within the array of stimuli being assessed (i.e., multiple stimulus with and without replacement). The triad presentation procedure is conducted similar to the paired choice presentation though instead of two stimuli being presented at a time, three are presented at one time. The verbal presentation procedure is when participants are asked and respond verbally to what their preferences are. Several of the articles reviewed compare these methodologies in their experiments.

The review starts with the single stimulus presentation procedure, followed by the paired choice presentation procedure, the multiple stimulus presentation procedure, the triad presentation procedure, and the verbal presentation procedure. The last two parts of the paper will discuss the implications of the review to reinforcer-based treatments and for future research.

CHAPTER 2

REVIEW OF THE LITERATURE ON PREFERENCE ASSESSMENTS

Single Stimulus Presentation Procedures

Rincover, Newsom, Lovass, & Koegel (1977) conducted an assessment to identify sensory reinforcers. Four children (ages 9-14) with autism and severe disabilities participated in the study. The participants exhibited no to limited verbal expression and engaged in extensive self-stimulatory behaviors. All the participants were living in an institution at the time of the study. Stimuli for the reinforcer assessment were selected based on experimenter observation of the children in their classroom for four days and by consultation with the participants' teachers. Three stimuli were selected for each participant.

In Rincover et al. (1977) the reinforcer assessment was conducted in a small room with the child seated at a table that had a response bar on it. The participant was given 5s access to the stimuli after pressing the response bar a predetermined number of times. One stimulus was presented throughout a session. The number of times the response bar had to be pressed in order for reinforcement to occur was controlled by Davis' programming equipment. At the beginning of each session with a new stimulus, the first press of the bar (through physically prompting the participant) increased the schedule to FR 5. The schedule increased by one after each press of the bar. The second session of each new stimulus started with an FR 5 schedule and no prompts were given to the participant. The therapist left the room during the remaining sessions. Each session lasted 15 min. A minimum of 3 sessions and a maximum of 7 sessions were conducted

per stimulus, and no more than two sessions were conducted per day. Results indicate that the items found to be reinforcing were idiosyncratic across the children.

Pace, Ivancic, Edwards, Iwata, & Page (1985) conducted a single stimulus preference assessment and reinforcer assessment with six individuals with profound retardation (3 males and 6 females) between the ages of 3 and 18 years. The participants were referred to an inpatient hospital for developmentally disabled and chosen for this study based on their absence of appropriate behavior. Two of the participants were nonambulatory, and all participants were inpatient during the study. Sessions were conducted in the activity room, which contained a variety of toys and educational materials. There were 3 to 7 patients and 2 to 3 staff also present in the room at any given time. Stimuli were chosen for assessment based on their general accessibility and ease of presentation. Two experiments were conducted in this study: a preference assessment and a reinforcer assessment.

In the first experiment of Pace et al. (1985) the preference assessment consisted of twenty trials per session. Four predetermined items were presented individually, in counterbalanced order, five times each during a session. Approach to the item was measured. If the stimulus was approached within 5s, it was available to the participant for another 5s. If no approach was made within 5s, the participant was prompted to sample the stimulus. Sampling included making sure the participant made eye contact with the stimuli and activated/manipulated it for 5s. This was done to make sure the reason the participant was not approaching items was not only because they were unfamiliar with it. After sampling, the stimulus was re-presented. If the participant

approached the stimulus within 5s, they were given an additional 5s with the stimulus. If no response was made within 5s, the stimulus was removed and the next stimulus was presented. All participants differentially approached the stimuli. In addition, patterns of responding were idiosyncratic, meaning there was no consistent between-participant approach to any of the 16 stimuli.

A reinforcer assessment was conducted in the second experiment of Pace et al. (1985). The stimuli identified as high preferred (approached on at least 80% of trials) and low preferred (approached on 50% or less of the trials) in the preference assessment were evaluated to determine if they functioned as reinforcers. The sessions consisted of 10 trials. The conditions were baseline, preferred and nonpreferred. In the baseline condition the therapist presented a request for the individual to complete a target response every 10s. No consequence was provided for emitting or failing to emit the target response. In the preferred condition, if the target response occurred within 5s of request, the preferred item was provided for 5s. The nonpreferred condition was conducted the same as the preferred condition, though the nonpreferred stimulus was presented contingent on the occurrence of the requested response. These preferred and nonpreferred conditions were arranged in a reversal design and the order of conditions varied across participants.

Pace et al. (1985) conclude that the preference assessment identified reinforcing stimuli for six individuals with mental retardation. When the stimuli identified as preferred in the preference assessment were made contingent on the occurrence of target behavior, the stimuli generally increased the occurrence of the target behavior above baseline and nonpreferred conditions. The advantages to this assessment include: ease in

administration, time efficient (two hours per participant to complete) and economical (could most likely be conducted by any level staff), and it makes use of commonly available stimuli and measurement apparatus. This assessment procedure could also be used to identify stimuli that function as negative reinforcers by including avoidance responses and introducing potentially aversive stimuli.

Pace et al. (1985) provides an example of the single stimulus preference assessment allowing persons with mental retardation to make idiosyncratic choices among stimuli. The single stimulus methodology may result in increased approach to stimuli due to having no other stimuli available to engage with. This methodology provides information on what stimuli would be preferred when no other competing stimuli are available. Though it does not provide information on which stimulus would be chosen when competing stimuli are present. Therefore, it is not known if a participant would choose stimulus A or stimulus B if given a choice. When access to stimuli were made contingent on a response, the single stimulus presentation identified stimuli that were generally reinforcing to the participants (i.e., the participants target responses increased above baseline when the stimuli identified as preferred in the single stimulus assessment were made contingent on their response).

Wacker, Berg, Wiggins, Muldoon, & Cavanaugh (1985) evaluated reinforcer preferences via mercury switches. Five students (ages 13-18) with profound mental retardation and multiple handicaps participated in the study. Sessions were completed within the natural context of the students' classrooms. During the baseline condition, one of the potential reinforcers was placed on the table in front of the participant, though out

of reach. The switch was also placed on the table, though within reach of the participant. The switch was connected to a blank tape. Every 5 min. the participant was verbally, then physically prompted to complete a target response. The physical prompt was always needed. Engaging in the target response resulted in the student activating the switch, though only a blank tape played upon the activation. Therefore, pressing the switch resulted in hearing a blank tape. Frequency and duration of responding were scored, though increase in duration was the main goal. Sessions were 20 min., typically one session was conducted per day.

Training sessions were then conducted in Wacker et al. (1985). These sessions were the same as baseline except the switches were connected to potential reinforcers. Therefore, pressing the switch activated the potential reinforcer. In training 1, two stimuli were assessed, each for five sessions. Stimuli were counterbalanced across sessions. Two different stimuli were assessed in training 2. Reinforcers were quickly and idiosyncratically identified for all participants. It took 200 minutes to identify reinforcers for these participants. The equipment was inexpensive and the participants learned how to use it quickly.

Wacker et al. (1985) conducted a single stimulus preference assessment of reinforcers. This assessment demonstrated the utility of using microswitches as assessment tools for individuals with no to limited functional communication skills and multiple physical handicaps. The switches are large (therefore easy to see and/or find by feeling for) and do not have to be pressed hard in order to activate the related stimulus. The participant pressed and the microswitch to activate their preferred stimulus. Reinforcer preferences for individuals with no to limited functional communication skills

and multiple handicaps were idiosyncratically identified using the single stimulus methodology and microswitches.

Winking, O'Reilly, & Moon (1993) assessed job preferences of individuals without functional communication skills through observations of preference and nonpreference behaviors. Participants included individuals with mental retardation and limited or no functional communication skills. The stimuli used for evaluation were chosen by the participants' parents, family members, case managers and teachers. The care providers completed a survey via a structured interview process. The care providers were asked what familiar activities or stimuli the participant seeks or avoids, their perceptions of the participant's specific tasks completed at their home or residence, and the participant's preferences of other specific tasks. The interview took 30-45 min. to complete. Direct observation of the participant was used to confirm the care providers' perceptions. During the direct observation, the therapist noted the types of behaviors participants engaged in when working on preferred versus nonpreferred activities to develop their operational definitions of participants' preferred and nonpreferred behaviors.

In Winking et al. (1993) the preference assessment the participants were observed completing portions of tasks (broken down through task analysis). These tasks were completed at the work site to make the work situation as realistic as possible. Data on the participants' preference and nonpreference behaviors were collected in alternating 5-min. periods for each session. Due to each participant having little work experience, acquisition data was first collected. After each new task was modeled, a continuous

probe was conducted on the first, middle, and final trial. A prompt hierarchy was implemented to teach the task for the remainder of the sessions. Data were averaged for each session. Six to seven tasks were assessed for 60-90 minutes each. The assessment time ranged from 360 to 630 min. per participant. Results indicate that this work preference assessment found preferences for people with limited to no functional communication skills and no work experience.

Winking et al. (1993) conducted a single stimulus preference assessment with individuals without functional communication skills. Preferences were measured via participants' display of preference and nonpreference behaviors while engaged with a stimulus. Their measure of preference is a unique aspect of the study; typically preference is measured by approach to or engagement with a stimulus. The single stimulus methodology, measuring preference through preference behaviors, identified preferences for individuals with no functional communication skills.

Summary of single stimulus presentation procedures

The single stimulus preference assessment methodology was successful in determining reinforcers for persons with mental retardation and severe disabilities, as described in Rincover et al. (1977), Pace et al. (1985), Wacker et al. (1985), and Winking et al. (1993). Rincover et al. (1977) assessed preference for reinforcers via single stimulus presentation with children with autism and severe disabilities. The results indicated that these children had idiosyncratic preferences for reinforcers. The results of Pace et al. (1985) also indicated all of the participants assessed via the single stimulus preference assessment were able to make idiosyncratic choices among stimuli. In Pace et

al. (1985) several stimuli were identified as preferred. This may be due to having only one stimulus presented at a time therefore the participant does not have to choose between competing stimuli. Thus, the single stimulus methodology provides information on which stimuli may be preferred when other, more preferred stimuli are not available. The results of Pace et al. (1985) indicate that the single stimulus presentation identifies several reinforcers that generally serve as reinforcers. In Winking et al. (1993) the participants' preferences were evaluated via preference and nonpreference behavior instead of approach or item contact, as the other single stimulus assessments have done. This assessment took more time (360 to 630 min. per participant) in comparison to the Pace et al. (1985) assessment, which took only 120 min. to complete. In the Wacker et al. (1985) single stimulus preference assessment, the effectiveness of microswitches as assessment tools for individuals with poor motor control and poor vision was demonstrated. The participants pressed the switches in order to select a reinforcer. The switches are large and do not have to be pressed hard in order to activate the related stimulus, therefore persons with multiple physical handicaps can successfully operate them. This assessment took 200 min. to complete per participant. Wacker et al. (1985) successfully identified idiosyncratic preferences for reinforcers for all of the participants.

Paired Choice Presentation Procedures

Mithaug and Hanawalt (1978) used a paired choice presentation to identify high preferred, moderate preferred and low preferred vocational tasks. The participants were three adults ages 19-21 years with severe disabilities and limited expressive communication. Six vocational tasks from the prevocational program the participants

were in were assessed. The sessions were conducted in the prevocational classroom for individuals with severe mental retardation. The participants sat at a worktable shared by two other individuals. This study consisted of two phases, the preference assessment phase and the validation phase.

The first phase of Mithaug and Hanawalt (1978) lasted 34 days. Every two days the participants completed choices between fifteen pair combinations (8 the first day and 7 the next day). The paired items were presented in a tray that was set on the table. The item combinations were randomly paired and randomly arranged on the left and right side of the participant. The therapist presented the two tasks simultaneously and directed the participant to pick one. The therapist then moved out of the participants' view while they were choosing. Selection was defined as a participant picking up the task and putting it on the table. Selecting a task resulted in the participant working on the selected task for 7 min. After 7 min. a timer sounded for a 3 min. break before the next choice was presented. The selected task was then continually paired with other randomly chosen tasks until either the sixth trial or when the participant selected a different task. A new pair combination was provided after the sixth trial and if the participant chose a different task during any other time. This allowed the participant to work continuously on their preferred task until all pairs were presented. Results of phase 1 tentatively identified each participant's most preferred (selected 75% of the time or more), moderately preferred (selected between 30% and 70%), and least preferred tasks (selected less than 25%).

Phase 2 of Mithaug and Hanawalt (1978) validated the findings from the paired choice preference assessment by conducting a reversal design paired choice preference

assessment. One highly preferred task, two moderately preferred tasks and one low preferred task (as defined above) were assessed. The assessment was conducted the same as in phase 1, except the combinations assessed in phase 2 always included a moderately preferred task that was paired with either a high preferred or low preferred task. Four conditions were assessed. Condition 1: preferred task paired with moderately preferred task 'A' and nonpreferred task paired with moderately preferred task 'B'. Condition 2: preferred task with moderately preferred task 'B' and nonpreferred task with moderately preferred task 'A'. Conditions 3 & 4 replicated conditions 1 & 2.

Mithaug and Hanawalt (1978) concluded that the majority (9 of the 12) relationships identified in Phase I were also identified in Phase II. Therefore, Phase II validated Phase I findings. This assessment took an extended amount of time to complete (68 days with assessments lasting about 80 min. per day).

Although each subject had many weeks of experience with the six tasks, and probably recognized the objects on the choice tray, we cannot assume they understood that picking up a choice object and placing it on the table meant that they would subsequently work the corresponding task. In effect, the work periods that followed the choices served as reinforcers or punishers (Mithaug and Hanawalt, 1978, p. 160).

Mithaug and Hanawalt (1978) conducted a paired choice preference assessment with adults with limited communication and severe disabilities. The paired choice presentation provided a rank order of preferences for the participants (i.e., preferred, moderately preferred and nonpreferred). Having a rank order allows therapists to provide the second most preferred item to an individual if the most preferred item is unavailable. This study was unique in that the stimulus was engaged with for 7 min. after it was chosen. Typically, a participant is allowed between 5s and 30s access to the stimulus

after it is chosen. This extended engagement period served as either a punisher or reinforcer for the stimulus chosen. The preferences in this study were validated by comparing the rank orders of preferred, moderately preferred, and nonpreferred via a paired choice preference assessment. The paired choice preference assessment was successful in identifying preferences for participants with severe mental retardation and in validating the majority of the preferences by comparing rank orders with each other in a paired choice format.

Dattilo (1986) conducted a computerized preference assessment with individuals with severe handicaps. Three children (ages 6-10 years) enrolled in a public school participated in the study. Two of the participants had no expressive communication and one used a few signs. Three categories of stimuli were assessed: visual, tactile, and auditory. An Apple IIe computer and associated software were used to measure the participants' choices and to provide the participants with their chosen stimulus. The computer was controlled by the participants' activation of microswitches. The program had different files or albums of auditory (songs) and visual (video scenes) stimuli. A powerport was developed to provide access to a vibrating pad upon switch activation. The participant was presented with two microswitches at a time. There were three switches altogether, each with a unique cover and color to indicate what it represented (i.e., visual, auditory, or tactile stimuli). The participant was taught to discriminate between the two switches at the beginning of each condition. Experimental conditions did not begin until discrimination between the switches was achieved. The position the switches were presented on was alternated from left to right side to control for position

preferences.

In Dattilo (1986) a multiple baseline design was used in conjunction with a multiple treatment design that included three experimental conditions. In condition 1 visual and auditory stimuli were compared, in condition 2 visual and tactile stimuli were compared, and in condition 3 tactile and auditory stimuli were compared. Each condition lasted 3 min. Activation of the switch resulted in 15s access to the corresponding stimulus. Conditions were conducted until switch activation stabilized. Results indicate preferences for persons with severe handicaps can be assessed via a paired choice format and that the individuals displayed idiosyncratic preferences for stimuli. The paired choice format allows preferences to be ranked in a hierarchical order.

Mason, McGee, Dougan-Farmer, Risley (1989) developed a practical strategy for conducting ongoing reinforcer assessments. Three boys, ages 4 and 5 years, with characteristics of autism participated in this study. The boys were receiving early intervention services at a learning center. The participants had some functional communication skills. Though their communication was hampered by aberrant behaviors such as echolalia, loud noise making, and hand biting. An experimenter chose two stimuli from each of the following categories to be assessed: olfactory, gustatory, visual, tactile, thermal, vestibular, auditory, and social. The sessions were conducted in the participants' open, socially integrated classroom. Specifically, the sessions were conducted at a table in a lower corner of the classroom. A comprehensive preference assessment, as described by Pace et al. (1985), was conducted at the beginning and end of the study. One variation of Pace was that the therapist modeled to the child how to

choose and manipulate the stimuli if no choice was made within 5s of the presentation. Preferred stimuli were defined as those approached on 80% or more of the initial trials.

A daily pre-session mini-assessment was conducted in Mason et al. (1989), with stimuli chosen as preferred in the comprehensive assessment. This assessment was conducted in a paired choice format. Two preferred stimuli were simultaneously presented to the participant. Stimuli from the same category were not presented simultaneously. The order and position of the stimuli changed each session. When presented with the pairs the participant was told to "Pick one". There were no time limitations for a choice to occur. The items were presented until the participants selected one, actively rejected or requested a different stimulus. Active rejection or requests for a different stimulus resulted in the next set of paired stimuli being presented. The item that was first touched in each paired presentation was used as a potential reinforcer in the subsequent treatment sessions.

A multiple baseline design was used in the Mason et al. (1989) reinforcer assessment. A baseline was conducted in which teachers selected the stimuli to be used as a potential reinforcer. The treatment sessions consisted of contingent access to preferred stimuli chosen in the pre-session preference assessment. Participants' daily preference changed across a one-month period and the pre-session-paired choice assessment was able to identify those idiosyncratic changes. The pre-session assessment took between 30s and 1 min. to complete for each participant. The teachers took 5 min. to identify a potential reinforcer for each participant. The results found that the daily pre-session preference assessments significantly reduced the level of maladaptive behavior the participants displayed in their subsequent treatment session in comparison to

baseline, in which teachers chose the reinforcers.

Fisher, Piazza, Bowman, Hagopian, Owens, & Slevin (1992) compared the single stimulus preference assessment conducted in Pace et al. (1985) to a paired choice preference assessment. Four children (aged 2-10) with moderate to severe mental retardation participated in the study. Sessions were conducted in individual rooms. Two phases were conducted in this study.

In Phase 1 of Fisher et al. (1992) the same 16 stimuli and single stimulus assessment method used in the Pace et al. (1985) were compared to the paired choice method of stimulus presentation. The single stimulus assessment was conducted for eight sessions. Four stimuli were presented five times each during each session. The stimuli were presented individually and in a counterbalanced order. Participant approach to a stimulus resulted in access to the stimulus for approximately 5s. If a participant did not approach a stimulus after 5s, the therapist prompted the participant to sample the stimulus for 5s. After sampling the item was represented. Approach within 5s resulted in access to the stimulus for 5s. No approach resulted in the next trial.

The same 16 stimuli were presented in the paired choice assessment conducted in Fisher et al. (1992). Every stimulus was paired once with every other stimulus. A total of 120-paired presentations were presented in a randomized order. Approaches to one of the stimuli resulted in access to that stimulus for 5s and removal of the other stimulus. Approaches to both stimuli simultaneously were blocked. No approach resulted in the participant sampling each stimulus for 5s. After sampling, the stimuli were represented for 5s. Approach resulted in access to that stimulus for 5s and removal of the other

stimulus. No approach resulted in the next trial.

Phase 2 of Fisher et al. (1992) began with a baseline condition, in which no consequence was provided for the target response (i.e., in-square or in-chair behavior). After baseline, the participant received training in how to gain access to the stimuli being assessed. Training was conducted via a verbal, model, and physical prompt sequence to complete the target response. The participant was given access to the stimuli for approximately 10s after completing the target response. Training continued until the target response was completed independently on 80% of trials for three consecutive blocks of 10 trials.

Treatment conditions in Fisher et al. (1992) were conducted via a concurrent operant design. Two stimuli were positioned in each of the boxes on the floor or directly next to each of the chairs. The two stimuli approached on at least 80% of trials on both the single stimulus and paired choice assessments were placed with one box or chair, and two stimuli approached on at least 80% of single stimulus preference trials and 60% or fewer paired choice trials were placed with the other box or chair. Access to the stimuli was gained by engaging in independent in-square or in-chair behavior in the corresponding box or chair on which those stimuli were placed. Out of box or chair behavior for 3s resulted in the therapist removing the stimuli and returning it to the appropriate box or chair.

Fisher et al. (1992) concluded that all the stimuli that were identified as highly preferred by the paired choice assessment were also identified as highly preferred on the single stimulus preference assessment and when the two assessments disagreed, the single stimulus preference assessment identified the item as highly preferred and the

paired choice assessment identified the item as low to moderately preferred. The results indicate that the paired choice assessment identified more potent reinforcers than the single stimulus assessment. The single stimulus assessment identified too many stimuli as highly preferred. This may be due to stimuli being presented individually in the single stimulus presentation and therefore not competing with more preferred stimuli. A paired choice assessment would be most useful for identifying potent reinforcers when a concurrent paradigm was used. Whereas the single stimulus assessment would be most useful for identifying several general reinforcers, particularly for individuals who have few known reinforcers or make inconsistent choices.

Fisher et al. (1992) compared paired choice and single stimulus methodologies using the same 16 stimuli. The paired choice methodology provided better concurrent validity amongst stimuli while the single stimulus methodology identified too many stimuli as high preferred. The paired choice format allows for stimuli to be rank ordered into high, middle, and low preferred. Therefore, the paired choice presentation would be better used with an individual with several known preferences. The rank order allows the therapist to identify the most preferred stimuli as a reinforcer for that person. Having a rank order of preference also enables a therapist to provide the individual with the second most preferred item, when the most preferred item is not available. The single stimulus presentation would be better used with a person with few known preferences, allowing the therapist to identify several preferred items to use as potential reinforcers. The paired choice presentation was better at predicting which stimuli would function as more potent reinforcers (i.e., the highly preferred stimuli).

Derby, Wacker, Andelman, Berg, Drew, Asmus, Prouty, & Laffey (1995)

conducted a paired choice preference assessment that used two measures to select stimuli: approach to stimuli and latency to first aberrant response. Two children (ages 3 and 7 years) with profound mental retardation and aberrant behaviors participated in the study. Four stimuli were assessed using a modified paired choice procedure described by Fisher et al. (1992). At least 15-paired presentations of each stimulus were assessed. The participant was allowed access to the chosen stimulus until either an aberrant response occurred or 5 min. had passed. Treatments were developed using preferences identified through both approach to the stimulus and latency to aberrant behavior.

Derby et al. (1995) concluded that both approach to stimulus response and latency to aberrant behavior response were effective in identifying preferences and potential reinforcers for these two children. The stimulus that was approached most often also had the shortest latency to aberrant behavior. Typically, preference is measured by approach or engagement with a stimulus. The paired choice methodology successfully identified preferences for individuals with aberrant behaviors by measuring both approach to a stimulus and latency to aberrant behavior.

Piazza, Fisher, Hagopian, Bowman, Toole (1996) used a preference assessment to predict reinforcer effectiveness. Four males (ages 7 –19) participated in the study. All had been admitted to a specialized inpatient unit for the assessment and treatment of severe destructive behavior. The participants were individuals with severe to profound mental retardation and limited expressive communication skills (i.e., used a few signs/gestures to communicate). Stimuli for the assessment were chosen by

administering a structured interview called Reinforcer Assessment for Individuals with Severe Disabilities (RAISD), developed and described by Fisher, Piazza, Bowman, and Armani (1996), to the participants care providers. The RAISD asks care providers questions about the participant's preferences within general domains: visual, auditory, olfactory, edible, tactile, and social. Care providers are also asked in what specific conditions they thought different preferences would be reinforcing to the participants.

The preference assessment in Piazza et al. (1996) was conducted identical to that described in Fisher et al. (1992). Each stimulus was paired with every other stimulus in the assessment. The number of trials or pairs presented to the participants ranged from 66 to 120. Three categories of preferences were identified: high, middle, and low. There were three stimuli assigned to each category. The high preference stimuli were the three highest ranked stimuli. The middle preference stimuli were the three stimuli ranked closest to the median, and the low-preference stimuli were the three stimuli chosen the least.

The reinforcer assessment conducted in Piazza et al. (1996) compared the reinforcing effectiveness of the high, middle, and low ranking stimuli identified in the preference assessment. Three identical target responses were available concurrently to access different stimuli. For example, three different chairs were simultaneously available for the participant to sit in. Sitting on one chair accessed a high preferred stimuli, sitting in another chair accessed a low preferred stimuli. One chair was always a control chair; sitting in the control chair did not access any reinforcer. Training sessions were conducted until the participants emitted the target behaviors independently for 80% of three consecutive blocks of 10 trials. Three phases of the reinforcer assessment were

conducted. One phase compared high and middle stimuli, a second compared high and low stimuli, and a third compared middle and low stimuli. The sessions lasted 10 min.

A mini-preference assessment was conducted in Piazza et al. (1996) prior to each session. Each stimulus in the category (i.e., high, middle, low) was paired with every other stimulus. The stimulus selected most frequently in each category was used in the following session. The stimuli were then randomly assigned to one of the three chairs or squares. Access to the related stimulus was contingent on in-chair or in-square behavior. If the participant left the chair or square the stimulus was taken away.

Piazza et al. (1996) concluded that stimuli ranked as high preference in the preference assessment produced higher rates of the target response for participants than the middle or low ranked preferences, when the stimuli were made contingent on responding. The stimuli ranked as high preference functioned as more effective reinforcers than the stimuli ranked as middle or low preferences in the preference assessment. For two of the participants the middle preferences also functioned as reinforcers (though not as effective as the high preference stimuli), though for two other participants neither the middle nor low preference stimuli functioned as reinforcers, only the high preference stimuli functioned as reinforcers. This suggests that the paired choice preference assessment is able to predict the relative reinforcing efficacy for high, middle, and low preference stimuli.

Piazza et al. (1996) conducted daily paired choice assessments of reinforcers. The three highest, median, and lowest preferred stimuli identified from a preference assessment conducted identical to Fisher et al. (1992), were assessed for reinforcer effectiveness. A mini paired choice preference assessment was conducted prior to each

session. The mini assessment was conducted identical to Fisher et al. (1992) and assessed the three high, median, and low ranked stimuli. The stimuli selected the most from each rank were used as potential reinforcers in the following session. The participant had one stimulus from each rank order simultaneously available to access based on a target response. The stimuli ranked as high preferred served as more effective reinforcers than either the median or low ranked stimuli. The comprehensive paired choice assessment in combination with the mini pre-session-paired choice assessment were able to predict the reinforcing value of the high, median, and low preference stimuli.

Roscoe, Iwata, & Kahng (1999) compared reinforcers identified from preference assessments conducted according to Fisher et al. (1992) and Pace et al. (1985). Eight individuals (ages 25-63) with mental retardation participated in the study. All lived at a state residential facility for persons with developmental disabilities. Participants ranged from having no expressive communication to well developed functional communication skills, though most had limited functional communication skills. Edible stimuli were chosen based on informal reports of the participants' preferences. The same 10 stimuli were assessed in both assessment methodologies. Sessions were conducted four to five days a week, two to four times per day.

The single stimulus assessment conducted in Roscoe et al. (1999) was conducted according to Pace et al. (1985), and was always conducted first. Followed by the paired choice assessment conducted according to Fisher et al. (1992). Participants were allowed to eat all of the stimuli prior to the assessments to ensure familiarity with them. Sessions were conducted about one hour after meals and the participants were not

allowed access to the stimuli outside of the sessions. Preference was measured by approach to the stimuli. The single stimulus presentation resulted in high approaches (100%) to all stimuli for 6 of the 8 participants. The paired choice assessment resulted in all participants approaching one stimulus 75% of the time or more and approaching another stimulus 25% of the time or less, thus identifying more differential preferences than the single stimulus assessment.

A reinforcer assessment was conducted in Roscoe et al. (1999) to assess two stimuli: a stimulus that was identified as high preference (stimulus approached the most in both assessments) and a low preference stimulus (stimulus in which the two assessments showed the largest discrepancy on approaches). The target response was pressing a microswitch for all participants except one. The exception wrote the letter E, due to high rates of switch pressing when no reinforcement was available. Two reinforcer assessments were conducted: a concurrent-schedule and a single reinforcement schedule. The concurrent schedule was conducted prior to the single reinforcement schedule. Before the assessments began a training session occurred to ensure the participants understood the relationship between pressing a switch or writing an E on one side and accessing the stimulus on the corresponding side. A concurrent schedule baseline was then conducted. Two switches/pads were simultaneously available. Pressing the switch or writing an E did not result in reinforcement. In the concurrent schedule reinforcement condition, the high preference stimulus was placed behind one of the switches/pads and a low preference stimulus was placed behind the other. Responding on the switch/pad with the high preference stimulus behind it resulted in access to the high preference stimulus, responding on the switch/pad with the low

preference stimulus behind it resulted in access to the low preference stimulus.

A single schedule baseline was conducted in Roscoe et al. (1999) in which the switch/pad that had been associated with the low preference stimulus in the previous condition was placed in front of the participant. Responding resulted in no consequence. In the single schedule reinforcement the switch/pad associated with the low preference stimulus had the low preference stimulus placed behind it. Responding resulted in access to the low preference stimulus. Sessions lasted 10 min. In the concurrent schedule reinforcement condition, participants chose the high preference stimulus almost exclusively to the low preference stimulus, and at higher rates than the concurrent schedule baseline condition. In the single schedule reinforcement all but one participant chose the low preference item at similar levels as they chose the high preference stimulus in the concurrent schedule reinforcement, and at higher levels than the single schedule baseline condition.

Roscoe et al. (1999) conclude that the assessment method used can result in distinct differences in preferences identified and reinforcers used in treatments. The paired choice method allows identification of the most preferred stimuli and ranking of stimuli, though it may leave out potential reinforcers. The single stimulus method does not rank order preferences and may identify a preference that would not serve as a reinforcer. Even though the paired choice method gave more differentiated results of preferences for the participants than the single stimulus method, the single stimulus method still resulted in responding at similar rates to the stimuli the paired choice method ranked as high preferred.

Summary of paired choice presentation procedures

Mithaug and Hanawalt (1978) conducted a preference assessment via paired choice presentation. The paired choice methodology provided a rank order of preferences for the participants (i.e., preferred, moderately preferred and nonpreferred stimuli). The rank order provides information regarding which stimuli a person prefers over another. Therefore, if one stimulus is not available, a therapist would be able to provide the next most preferred stimulus to the individual. The preferences in this study were validated by comparing the rank orders of preferred, moderately preferred, and nonpreferred via a paired choice methodology. The paired choice methodology preference assessment was successful in identifying and validating preferences for participants with severe mental retardation. This study was unique in the amount of time a participant engaged with the stimulus after it was chosen. The participants engaged with the chosen stimulus for 7 min. in comparison to engagement time of 5s-30s in the single stimulus presentations and several of the other presentation styles. Dattilo (1986) conducted a paired choice preference assessment with severely handicapped individuals. Stimuli were selected via microswitches connected to a computer. The individual pressed the microswitch associated with the stimulus they preferred and then gained access to the stimulus via the computer. Using the microswitch for selecting stimuli allows a person with multiple handicaps (particularly physical handicaps) to independently make choices. This study indicates that the preferences of persons with severe handicaps can be assessed via paired choice presentation.

Mason et al. (1989) conducted daily-paired choice preference assessments on the stimuli assessed as preferred (approached 80% of the time or more) in a comprehensive

assessment conducted according to Pace et al. (1985). Instead of assessing all of the stimuli as in Mithaug and Hanawalt (1978) and Dattilo (1986), they continued to present paired presentations of stimuli until the participant chose a stimulus. The first stimulus chosen was identified as the days preferred stimulus. The paired choice presentation was successful in identifying the participants' daily changes in preferences. The daily assessment took less time to conduct than a comprehensive assessment, in which all of the stimuli were presented. Fisher et al. (1992) compared paired choice presentation and the single stimulus presentation conducted in Pace et al. (1985) using the same 16 stimuli. Both presentation methods identified the same stimuli as high preferred. Though the single stimulus method identified more stimuli as high preferred than the paired choice method. The paired choice method provided information on which stimuli are the most reinforcing when they are presented concurrently and was better at predicting which stimuli would serve as more potent reinforcers. The single stimulus presentation predicted too many stimuli to be high preferred. The paired choice presentation would then be preferred for individuals with several known preferences and the single stimulus would be the preferred methodology for individuals with few known preferences. Therefore, allowing the individual with few known preferences to identify several possible high preferred stimuli and the person with several known stimuli to have their preferences rank order, so only a couple of the highest preferred stimuli are identified.

Derby et al. (1995) conducted a paired choice preference assessment with two children that display aberrant behavior. Approach to a stimulus resulted in access to the stimulus for 5 min. or until an aberrant behavior was emitted, at which time the stimulus was removed. Typically a choice is defined as approach or engaging with the item.

Therefore, this type of assessment may be most useful with persons who display aberrant behavior. Latency to aberrant behavior was an effective measure of preference. The paired choice presentation was successful in identifying preferences for two children that displayed aberrant behaviors. Piazza et al. (1996) conducted paired choice assessment to evaluate if it could predict the relative reinforcing efficacy of high, middle, and low preference stimuli. The initial comprehensive preference assessment was conducted identical to Fisher et al. (1992). As in Mason et al. (1989), a mini preference assessment was conducted before each reinforcer assessment. Though in this study, each stimulus from each category (3 stimuli per high, middle, and low category) were paired with every other stimulus. The paired choice presentation was successful in predicting the relative reinforcing efficacy for high, middle, and low preference stimuli. Roscoe et al. (1999) compared the reinforcers identified from Pace et al. (1985) and Fisher et al. (1992) preference assessments. Each method resulted in distinctly different preferences identified and reinforcers used in treatments. As found in Fisher et al. (1992) the paired choice method allowed for the identification of the most preferred item and the rank ordering of stimuli and the single stimulus method identified too many highly preferred stimuli. Despite the paired choice method providing rank ordering of the stimuli, the stimuli identified in both the paired choice and single stimulus presentations were reinforcers. The stimuli identified in each methodology resulted in similar rates of responding when used as reinforcers. Therefore, it may not matter which method is used, if the main goal is to identify effective reinforcers for individuals.

Multiple Stimulus Presentation Procedures

Favell and Cannon (1976) evaluated the entertainment materials of eleven females (ages 11-26 years) with severe mental retardation via observations during free play conditions. All participants had limited expressive communication and were residing in an institution. Twenty stimuli were evaluated for their ability to occupy the participants constructively. Sixteen stimuli were chosen from staff recommendations and four were chosen for comparative purposes. All participants were observed together in an open area with the stimuli. Staff were present, though did not interact with participants unless the participant initiated the interaction. Sessions lasted 20 min. and were conducted about three times a week. The preference assessment lasted approximately 10 weeks. Appropriate engagement of the stimuli was scored every five minutes.

Appropriate engagement was scored if a subject was manipulating, visually attending to, or listening to an item, unless the behavior was clearly stereotypic, dangerous, destructive, or otherwise inappropriate behavior (p. 358).

In the first twenty sessions participants had free access to all twenty stimuli. Ten more sessions were then conducted in which ten of the most preferred items and ten of the least preferred stimuli were available in a quasi-random order. The results indicate that these individuals with severe mental retardation have strong preferences amongst stimuli.

When more preferred items were available the participants were only idle about 25 percent of the time, versus about 65 percent of the time when less preferred items were available.

Windsor, Piche', & Locke (1994) compared paired and group presentation

methods of preference assessments. Eight adults (ages 17-29) with severe to profound disabilities participated in the study. The participants communicated through idiosyncratic sign, gestures, and facial expressions. Three staff that knew the participant selected stimuli by developing a list of six foods (as a group) they thought the participant liked. Food and drink were used as reinforcers due to them being the primary reinforcers used in the participants activities. Since food and drink were being assessed, the assessments were not conducted right after a meal or snack. There were five sessions of each presentation style administered.

The group presentation in Windsor et al. (1994), from now on referred to as multiple stimulus presentation, was conducted by having each participant assessed individually in a separate room. Participants sat at a table with all of the stimuli simultaneously presented over a series of 10 trials. The stimuli were placed in a line on the table in front of where the participant was sitting. The stimuli were placed in random order in each trial, with each stimuli appearing in each position at least once but no more than twice per session. Prior to each trial, the therapist identified each piece of food/drink. The participant was then asked, "Which one do you want?" (Windsor et al., 1994, p.444). Selection was scored when the participant attempted to grasp the item and consume it. No response was scored when no choice was made within 20s of the presentation of stimuli. The paired choice presentation was conducted the same as the multiple stimulus presentation except two items were simultaneously presented to the participant in a series of 30 randomly ordered trials. Right and left side preferences were controlled for by alternating which side stimuli were presented on.

Both preference assessments conducted in Windsor et al. (1996) resulted in

idiosyncratic preferences amongst the participants. The rankings of the preferences were similar between the two presentations. Five of the eight participants' preferences were significantly correlated between the two presentations. This suggests that the two presentation methods assess similar information. Both methods allowed for preferences to be identified and rank ordered. Though the paired choice presentation provided more consistent responses of preferences across sessions than the multiple stimulus presentation. There were 10 trials in each session for the multiple stimulus presentation and 30 trials per session for the paired choice presentation. It took 3 to 10 min. to conduct the multiple stimulus assessment and 10 to 22 min. to conduct the paired choice presentation.

Windsor et al. (1994) compared multiple stimulus presentation and paired choice presentation methodologies. It took longer to conduct paired choice assessment, though it produced more consistent rankings of preference than multiple stimulus presentation. Still, both assessments produced similar results in ranking amongst the assessments. If a therapist has a choice between two assessments that provide similar results and one takes less time, that one may be more appealing. Keeping in mind that 10-22 min. is not that long, especially in comparison to several hours or days that some assessments may take. Though a shorter assessment would prove more time-efficient, regardless of how much time, for more frequent (e.g., daily) assessments.

DeLeon and Iwata (1996) evaluated multiple stimulus presentation formats for assessing reinforcer preferences. There were 7 adults (ages 25-45 yrs) with profound developmental disabilities that participated in this study. Participants ranged from

having limited to no expressive communication skills. The participants lived in a state residential facility for people with developmental disabilities and were chosen for participation due to having a number of behavioral deficits and the potential benefit from the identification of additional reinforcers. Seven stimuli were assessed. The experimenter selected most of the stimuli arbitrarily, though a few additional items were selected based on casual observation of preferences and caregiver opinion of preferred and nonpreferred items. Three multiple stimulus presentations were evaluated: multiple stimulus without replacement (MSWO), multiple stimulus (MS), and paired choice (PC). Five consecutive sessions of each procedure were conducted, for a total of 15 sessions. The order of procedures varied across participants. The participants were given a sample of each of the edible items and 30s access to each of the leisure items before the first session. Choosing an item within 30s resulted in 30s access to that item. Selection was defined as physically touching the stimuli. If more than one item was selected, the item touched first was scored as the selected stimuli. The no-choice response differed across methodologies.

The MSWO procedure conducted in DeLeon and Iwata (1996) began each session with all the stimuli sequenced randomly in a straight line on the table, with the participant seated in front of the stimuli. The participant was then instructed to select one item. The chosen item was made available to the participant for 30s. Then the stimulus was either removed (leisure item) or was not replaced (food item) before the second trial was conducted. This continued until all items were selected or until no selection was made within 30s. If no choice was made within 30s the session ended and all remaining items were recorded as 'not selected'. The MS sessions were conducted identical to that

described in MSWO procedure, with one exception. The item selected was returned to the array (leisure items) or was replaced (edible stimuli). Therefore, the same number and type of stimuli were present throughout the assessment. Only two items were presented at a time in the PC procedure. The session continued until each item was paired with every other item (21 total trials per session). No stimulus was presented twice in a row. Stimuli were also positioned randomly on the left or right side of the participant. No choice within 30s resulted in the next pair of stimuli being presented, which is different than both of the multiple stimulus methods.

DeLeon and Iwata (1996) concluded that “overall, the three assessment formats produced similar results in identifying the most preferred stimuli. Though the MSWO and PS [PC] procedures generally produced more consistent rankings across administrations” (p.525). DeLeon and Iwata (1996) also predicted more items could serve as potential reinforcers than the MS procedure. The MS procedure may not predict as many items as potential reinforcers since the top preferred items are always available to select from. Therefore, the MS procedure may only predict that the top preferred items would serve as potential reinforcers. Both multiple stimulus procedures took less time to administer than the PC assessment. Though this could have been due to the MS sessions being terminated when no selection was made within 30s (occurred on 51.4% of sessions). The average completion time for each procedure was MS 16.5 min., MSWO 21.8 min., and PC 53.3 min. The MSWO procedure may have taken longer than the MS procedure because of the time it took the participant to look at and choose an item from the sequence. In the MS procedure the items were replaced so the participant could keep choosing their most preferred items right away and did not have to choose between less

preferred competing stimuli. Administering a methodology that identifies similar preferences as another methodology, but takes less time to administer, allows a therapist to spend more time developing an effective intervention.

In DeLeon and Iwata (1996) the reinforcing value of four stimuli that were never selected in the MS procedure, but had been selected some of the time in the MSWO and PC methods, were assessed. Four participants, who had selected an item during the MSWO and PC procedures that was not selected in the MS procedures, participated in the reinforcer assessment. One difference in the reinforcer assessment from the preference assessments was a microswitch panel was mounted on a small movable cart for one participant. The sessions lasted 10 min. A baseline condition was conducted. Two of the four participants had previous training on their target response. The other two required training to complete their target response. After stable rates of responding were observed in baseline, a fixed-ratio (FR) 1 schedule of reinforcement began. Contingent upon each response, the experimenter delivered the relevant item.

For 3 of the 4 participants in DeLeon and Iwata (1996) the results indicated stimuli that were never selected during the MS procedure but had been selected on some proportion of the trials during the MSWO and PC procedures produced increased responding when delivered on a contingent basis. This suggests that stimuli that are not identified as reinforcers in the MS procedure can function effectively as reinforcers. The MSWO and PC procedures identified more stimuli as at least minimal reinforcers whereas the MS procedure identified one or two potent reinforcers. A therapist may want to use the MSWO and PC procedures to identify reinforcers for a person with few known reinforcers and use the MS procedure to identify potent reinforcers for persons who have

several known reinforcers.

DeLeon and Iwata (1996) evaluated multiple stimulus presentation formats for assessing reinforcer preferences. The multiple stimulus procedure was completed in the least amount of time (16.5 min.) and identified the most potent reinforcers for the participants. The multiple stimulus without replacement and the paired choice procedure took more time (21.8 min. and 53.3 min. respectively) and identified at least minimally reinforcing stimuli for participants. Therefore, if the goal of the preference assessment is to identify only the most potent reinforcers the multiple stimulus procedure would be the most effective. However if the goal of the assessment is to identify several stimuli that are at least minimally reinforcing, the multiple stimulus without replacement or the paired choice procedure would be the most effective, with the multiple stimulus without replacement the least time consuming of the two.

Roane, Vollmer, Ringdahl, & Marcus (1998) extended the research on multiple stimulus presentation by developing a brief (5-min) assessment in which individuals have free access to an array of stimuli. Twenty individuals with severe developmental disabilities and aberrant behaviors participated in this study. All communicated through gestures or vocalizations. Participants ranged from pre-school to adults. Sessions were conducted in the participants' school or day setting. For the assessments, care providers of each participant selected ten potentially reinforcing stimuli. Attempts were made to include stimuli from general categories (i.e., food, drink, leisure and play, tactile, auditory and social attention). During assessments, food and drinks were replaced after consumption. Two experiments were conducted. Reinforcers were assessed in

experiment 1 and stimulus preference assessments were compared in experiment 2.

In Roane et al. (1998), ten participants (ages 3 to 37), with levels of mental retardation ranging from moderate to profound participated in experiment 1. A five-minute free operant (FO) preference assessment was conducted daily to determine the participants most preferred stimuli. The most preferred stimuli was determined by the stimuli that was interacted with on the highest number of intervals in the FO assessment. The FO preference assessment was conducted by having the stimuli arranged in a circle on a table. Participants were shown where each stimulus was on the table and either sampled the items or the therapist modeled appropriate use of the items. The therapist then left the assessment area and allowed the participants free access to the stimuli. The participants could interact with all or none of the stimuli. The stimuli were not taken away during the assessment. Interaction with the stimuli was measured by the participant touching the item with their hand.

Roane et al. (1998) conducted reinforcer assessment A so that the stimuli chosen as preferred in each daily FO assessment were evaluated for reinforcer efficacy in a concurrent-operants paradigm, as described in Fisher et al. (1992). Six individuals participated in this assessment. There were two squares concurrently available to the participants. In square behavior resulted in access to the corresponding item in the square entered. Participants could change squares at anytime. Training was provided to participants to ensure their understanding of gaining access to the item in the square they entered. One square had the days preferred stimulus (identified via daily FO) and the other was a control square and had no stimulus in it. Therefore, in-square behavior in the control square did not result in access to a stimulus. Whereas in-square behavior in the

preferred stimulus square resulted in access to the days preferred item as long as the participant stayed in that square. Sessions lasted 10 min., though after 5 min. the participant was taken back to the middle point and the squares were switched to control for position preference, before they were allowed access back to the squares. One session was conducted for each participant.

A second reinforcer assessment (B) was then conducted in Roane et al. (1998). Four individuals participated in this assessment. The item found to be most preferred during the daily FO was compared to a nonpreferred item (never or rarely selected) via a concurrent operant paradigm. Two work stations (with identical work tasks) were associated with either the high-preferred item or the nonpreferred item identified in the daily FO assessment. The only difference in work stations was the stimuli (either preferred or nonpreferred) associated with the response. The participant could choose either work station. Completion of the task either independently or after modeling resulted in access to the corresponding stimuli for 15s. Access to the item was allowed after the first physical prompt, so as to make the relation between task completion and the corresponding stimuli known. Sessions were 10 min.

Roane et al. (1998) concluded that the FO preference assessment identified one or more preferred stimuli for all of the participants. When access to preferred items was made contingent on a response, the target response was increased in comparison to no stimuli and nonpreferred stimuli. This suggests the brief FO assessment can identify items that serve as effective reinforcers. The FO assessment was also able to identify daily changes in individuals' preferences.

Roane et al. (1998) conducted a second experiment to compare the FO assessment

with the paired choice (PC) assessment. Seventeen individuals (ages 3 to 31) with moderate to profound mental retardation participated in this experiment; seven had also participated in experiment 1. The same stimuli were used in both preference assessments for each participant. Two assessments were conducted with each participant. The PC was conducted similar to Fisher et al. (1992). The stimuli were presented to the participant in pairs. Choosing an item resulted in 20s of access to the item. If no choice was made in 5s, the participant was verbally prompted to choose. No choice after another 5s resulted in removal of the items. If an item was not chosen within the first five presentations or was chosen on two or fewer of the first seven presentations, the item was taken out of the assessment. Each item not eliminated was presented 10 times. A FO assessment was conducted as described in experiment 1.

Roane et al. (1998) concluded that the FO assessment has several advantages over the PC assessment, including taking less time to conduct and evoking fewer problem behaviors. The short time it takes to conduct an FO assessment allows for frequent assessments to be conducted (perhaps daily). Conducting frequent assessments increases the likelihood that items being used in reinforcer-based treatments will serve as reinforcers to the participant. Participants displayed less problem behavior during the FO assessment than the PC assessment. This may have been due to no preferred stimuli being removed from the participant in the FO assessment, as they are in the PC assessment. This could be particularly noticeable if the participant being assessed has a tangible function (i.e., problem behavior is maintained by gaining access to tangibles). If the participants engaged in problem behaviors in order to gain access to attention (an attention function) or their problem behavior was automatic (no known environmental

function) having continuous access to stimuli may compete with those reinforcers and thus result in decreased problem behavior than in the PC assessment. A disadvantage to the FO assessment is the participant may become satiated from continuous access to stimuli and require a break between the FO assessment and reinforcer-based treatments.

Roane et al. (1998) extended research on multiple stimulus presentations by developing a brief (5-min) assessment in which individuals have free access to an array of stimuli. They evaluated the reinforcing efficacy of the stimuli identified as preferred in the free operant procedure and then compared the free operant and paired procedures. The free operant procedure identified one or more preferred stimuli for each participant. The stimuli identified as preferred increased responding on a target response in comparison to low preferred and no stimuli. The free operant procedure takes less time to complete than the paired choice procedure and elicits fewer problem behaviors from participants. Conducting a preference assessment that takes only 5 min. allows frequent (e.g., daily) assessment to be conducted. Which allows daily preference changes to be assessed and increases the likelihood that the stimuli being used that day will serve as reinforcers. A rank order of preferences was not obtained in the free operant assessment as in the paired choice assessment. The free operant assessment, as in the other multiple stimulus assessments, identifies the most potent reinforcers; therefore other potential reinforcers may not be identified.

DeLeon, Iwata, Conners, & Wallace (1999) evaluated stimuli that were identified as ambiguous in a preference assessment via duration-based measures. Four individuals (ages 32-52) participated in the study. All of the participants were diagnosed with mental

retardation and had very limited expressive communication skills. Seven nonfood stimuli were assessed. Two preference assessments were conducted five times each. The multiple stimulus without replacement (MSWO) assessment was conducted as described in DeLeon and Iwata (1996), with approach to the stimulus being measured. The second assessment conducted was a single stimulus (SS) assessment with duration of engagement and physical proximity to the stimulus being measured. The SS assessment consisted of one stimulus being placed on a table in front of the participant for 2 min. All stimuli were presented individually for 2 min. during each session.

DeLeon et al. (1999) conducted a reinforcer assessment for two of the participants. In the baseline condition the stimuli being assessed were not in view of the participants and emitting the target response resulted in verbal praise. In the reinforcer assessment, the stimuli assessed were the ones approached during the MSWO assessment at comparable levels of several other stimuli in the MSWO assessment and had been manipulated more than 50% of the time in the SS duration assessment. One participant was also assessed on a stimulus they had approached on low levels in the SS assessment and had low stimulus contact with during the MSWO preference assessments. Emitting the target response resulted in 30s access to the stimulus being assessed. The stimulus to be delivered contingent on a response was placed behind the task. Verbal prompts to complete the target response were given every minute. The sessions lasted 5 min.

DeLeon et al. (1999) concluded that for all of the participants in the MSWO assessment, only one item was approached greater than 50% of the time and most of the stimuli were approached around 25% of the time. In the SS duration assessment, the majority of stimuli were manipulated for over half of the time they were available. The

SS duration assessment also resulted in somewhat more differentiated results of preferences amongst stimuli. Stimuli that were engaged with for high durations during the SS assessment increased responding above baseline rates in the reinforcer assessment. Stimuli that were approached at low rates in the MSWO assessment and low duration in the SS assessment did not increase responding above baseline rates. These results suggest duration is a valid measure of a stimulus' reinforcing value.

Bojak and Carr (1999) evaluated the displacement of leisure items by food during multiple stimulus preference assessments. Four adults (ages 29-44) with severe mental retardation participated in the study. Sessions were conducted in individual rooms. Stimuli were chosen from the modified Reinforcer Assessment for Individuals with Severe Disabilities (Fisher, Piazza, Bowman, & Amari, 1996). Sixteen stimuli, eight food and eight leisure items, were assessed. The preference assessment was conducted similar to DeLeon et al. (1997). Thirteen multiple stimulus without replacement (MSWO) preference assessments were conducted with each participant. Eight stimuli were simultaneously placed on a table in front of the participant. The participants were allowed to consume the food chosen or engage in the leisure item chosen for 30s. The stimulus selected was not replaced in the array. The session ended when all stimuli were chosen. The percentage chosen (based on the availability of the item) and the order chosen were measured. Two phases of this assessment were conducted.

In phase 1 of Bojak and Carr (1999), three MSWO assessments were conducted consecutively. The first assessment was conducted with eight food stimuli. The second assessment was conducted with eight leisure stimuli and the third assessment evaluated

the four most preferred items from the previous assessments. In phase 2, the items from the third assessment (i.e., the top four food and the top four leisure stimuli) were assessed for 5 consecutive days, immediately before and after the evening meal. Therefore, 10 assessments were conducted within five days. When food and leisure items were present in the same assessment, the food items ranked the highest (1-4) and the leisure items ranked the lowest (5-8). Assessing the stimuli before and after meals did not change the rank order of preferences more than one place.

Bojak and Carr (1999) conducted multiple stimulus without replacement preference assessments with food and leisure stimuli separately and then with the most preferred food and leisure items assessed together. The results indicate that the food items were always more preferred than the leisure items. The most preferred food and leisure stimuli were then assessed before and after the participants evening meals. The results indicate that the food items were always more preferred than the leisure items, whether the participants were assessed before or after their evening meals. This suggests that food and leisure items should be assessed separately so as to obtain an accurate ranking of leisure items when food items are not available. The results also suggest it does not matter when a preference assessment of food is conducted. The results of the assessment will be similar regardless of when they are assessed in comparison to mealtime.

Summary of multiple stimulus presentation procedures

Multiple stimulus preference assessments successfully identify preferences for persons with severe disabilities as described in Favell and Cannon (1976), Windsor et al.

(1994), DeLeon and Iwata (1996), Roane et al. (1998), DeLeon et al. (1999), and Bojak and Carr (1999). The multiple preference assessment is completed in a shorter period of time than the paired choice assessment, as described in Windsor et al. (1994), DeLeon and Iwata (1996) and Roane et al. (1998). DeLeon and Iwata (1996) also found that the multiple stimulus format was conducted in less time than the multiple stimulus without replacement format and that the multiple stimulus format identified the most potent reinforcers, whereas the multiple stimulus without replacement format and the paired choice formats identified several stimuli that were at least minimally reinforcing. Roane et al. (1998) not only found that the multiple stimulus preference assessment they conducted (the free operant assessment) was more time efficient than the paired choice assessment, but that the free operant assessment also resulted in the participants displaying fewer problem behaviors. Due to the length of the study (10 weeks), Favell and Cannon (1976) and Roane et al. (1998) were both able to evaluate changes in participants' preferences over time.

DeLeon et al. (1999) conducted a multiple stimulus without replacement and single stimulus preference assessment. Approach to stimuli was measured in the multiple stimulus without replacement assessment and duration of engagement was measured in the single stimulus preference assessment. Stimuli identified as preferred via duration measures were identified as effective reinforcers. This suggests that duration is a valid measure of reinforcer potency. This allows another option for staff when measuring a person's preference. Bojak and Carr (1999) conducted multiple stimulus without replacement assessment with food and leisure items separately and then together. The food and leisure stimuli were then assessed before and after meals. The results indicate

that when food and leisure stimuli are assessed together, food is ranked before leisure stimuli and the timing of food assessment before or after meals does not significantly affect the rank order of preferences. Therefore, when conducting preference assessment, food and leisure items should be assessed separately, and it does not matter when food items are assessed in comparison to mealtimes.

Triad Presentation Procedures

Becker and Ferguson (1969) assessed the vocational interests of individuals with mild to moderate mental retardation through non-reading techniques. Males and females with the mean age of about 17 years 5 months participated in the study. The stimuli assessed were the job activities performed at the state school for the mentally retarded, where the participants resided. Stimuli were placed in major categories from which sketches of the activities were made. The sketches included all the necessary tools needed to engage in the activity and the environmental variables of the activity. Separate sketches were made for male and female participants. In addition, three sports items were included in the sketches for motivating purposes. The preference assessment was conducted by presenting the participants with three sketches that were placed on a booklet and instructing the participants to choose the one they "like best" (Becker and Ferguson, 1969, p. 21). The participants chose the stimulus they 'liked best' by circling the preferred item in the test booklet. The preference assessment took about 15 minutes to administer, and another 15 minutes to score. This assessment can be administered to participants in groups or individually. Any person who is familiar with the directions for administering, scoring and profiling the results can administer this assessment. A two-

week retest of some of the participants indicated a test-retest reliability correlation in the .70s and .80s.

Hanley, Iwata, & Lindberg (1999) evaluated activity preference as a function of differential consequences. Four individuals (ages 25-41) with moderate to profound mental retardation and limited communication skills participated in the study. All lived in a state residential facility for persons with developmental disabilities. They all engaged in problem behavior (aggression or self-injurious behavior) though it did not interfere with the study. All but one of the participants worked 3 to 6 hours a day. When not at work, the participants mainly lounged at home. The stimuli assessed were chosen by staff perception of participants' preferred leisure activities and available chores for the participant to engage in. Individual pictures of each participant engaging in each activity were taken. The pictures were grouped according to the location the activities occurred in. Three preference assessments were conducted with each participant. Sessions were conducted four to five days a week, one to five times a day. The sessions were conducted either in or right outside of the participants' home.

In Hanley et al. (1999) one set of the activities was assessed each session via concurrent schedules. Three photographs were simultaneously presented to the participant. Two of the photographs were the activities being assessed; the third was a control picture. The control was a picture of the participant doing nothing in particular (presumed to have no reinforcing value). The participant was prompted to touch each of the three photographs, taken to the area the activity occurred in and prompted to engage in each activity being assessed before new activities were assessed. The following

sessions began by prompting the participant to touch each of the photographs and then verbally telling them what each activity consisted of. In one assessment, when the pictures were presented, the participant was asked to touch the picture/activity they liked best. Touching the picture resulted in praise for choosing. Not choosing resulted in verbal prompts every 20s to choose, until a choice was made. Ten trials were conducted per session. Pictures were repositioned to account for position preferences. Sessions took 3 to 10 min. A second assessment was conducted similar to the first assessment, though touching a picture resulted in brief access to the activity chosen. This assessment took 23 to 40 min.

Three individuals participated in the third assessment conducted in Hanley et al. (1999), which evaluated modifying individuals preferences. Stimuli were chosen from either a preference assessment conducted according to Fisher et al. (1992) or an informal assessment. Additional reinforcers were added in the pictures of activities that were not highly preferred, though desirable by staff (e.g., food). Choosing the activity resulted in access to the chosen activity and the additional reinforcer.

Hanley et al. (1999) concluded that preferences were idiosyncratic and undifferentiated when choices were made on pictorial representation only. The individual needed to experience the chosen item in order for their choices to become differentiated. Associating an additional reinforcer with the less preferred but staff desired behavior increased the participants' behavior of choosing that activity.

Summary of triad presentation procedures

The triad format for conducting preference assessments successfully identified

preferences for the participants in both Becker and Ferguson (1969) and Hanley et al. (1999). Though Hanley et al. (1999) found it was necessary to have differential consequences for choosing a stimulus in order for the preferences to be differentiated. Becker and Ferguson (1969) assessed vocational interests of individuals with mild to moderate mental retardation via pictures. The participants were not required to read, though they were required to have adequate vision and hand-eye coordination. In Hanley et al. (1999) the participants increased their choice making on their less preferred activities (and staffs more preferred activities for the participant to engage in) by associating the less preferred activity with a reinforcer. This could assist care providers in helping participants choose activities that can benefit them over the long run instead of only choosing activities that will satisfy them in the moment.

Verbal Presentation Procedures

Northup, Jones, Broussard, & George (1995) evaluated the treatment utility of three preference assessments: verbal nomination, verbal paired choice questionnaire, and direct observation. There were ten participants (ages 5-8 years) with Attention Deficit Hyperactivity Disorder (ADHD) that participated in the study. The participants had been referred to a university-based clinic for evaluation; none were on medication at the time of the assessment. Three preference assessments were conducted with each participant. Five stimuli were assessed. The stimuli were chosen by age appropriateness and common availability.

Northup et al. (1995) conducted the nomination assessment, which consisted of showing the child five toys and asking, "Of all the toys, which one is your favorite?"

(Northrup et al., 1995, p. 99). In the paired choice questionnaire all combinations of the five toys were verbally presented. The child was asked "Would you rather play with [Toy 1] or [Toy 2]" (Northrup et al., 1995, p. 99). Toys were ranked by frequency of selection. A 10 min. free play followed immediately. All five toys were placed in a room and the child was told, "Do whatever you want and we will be back in a little bit." (Northrup et al., 1995, p. 99). Toys were ranked by percentage of intervals the toy was engaged with.

Northup et al. (1995) then conducted a reinforcer assessment within a simultaneous treatment design. Four worktables with identical tasks were simultaneously available. Each worktable had item(s) that were chosen as the most preferred in one of the preference assessments conducted. Therefore, the stimulus identified as most preferred in the nomination preference assessment was associated with work completion at one table, the stimulus identified as most preferred in the verbal paired choice questionnaire was associated with work completion at another table, and the stimulus found to be most preferred in the free play was associated with work completion at a third table. The fourth table was a control table. It had the same work task as the other tables, though no stimulus was associated with it. The child was told to work at the table with the toy they wanted to earn, they could switch worktables any time, and it was okay to do nothing. After the work was completed the child was allowed 2-min. of free play with the stimuli earned.

Northup et al. (1995) concluded that each preference assessment always identified a toy that was preferred, though identified preferred toys varied highly across assessment methods. The assessments disagreed on the items chosen as preferred more often they

agreed. The verbal nomination assessment was least likely to identify a reinforcer, whereas the verbal paired choice questionnaire and the direct observation assessments were about equally likely to do so. Asking ADHD children to name their reinforcers may have limited treatment validity, though using a verbal paired choice format may increase the likelihood of verbal preference assessment finding potent reinforcers.

Northrup, George, Jones, Broussard, & Vollmer (1996) evaluated the use of verbal stimulus-choice procedures in identifying reinforcers via three preference assessments and a reinforcer assessment. Participants included four typically developed elementary children diagnosed with ADHD. The participants were between the ages of 6-9 yrs and were attending a summer program for children with ADHD. The participants were not receiving medication for their ADHD during this study. The three preference assessments conducted were: a verbal reinforcer survey; a verbal stimulus-choice questionnaire, and a pictorial stimulus-choice procedure. The choice procedures were similar to Fisher et al (1992).

Fifteen stimuli, organized into five categories, were assessed in Northrup et al. (1996). The stimuli were selected based on the results of a modified version of the Child Reinforcement Survey (CRS) according to Fantuzzo, Rohrbeck, Hightower, & Work (1991), and random selection. The first preference assessment conducted was the modified child reinforcement survey. The CRS included lists of reinforcers from textbooks on behavior analysis and experienced teachers' ratings on stimuli appropriate for the classroom. A negative reinforcement category was also included. It was presented as "Get out of..." (Northrup et al., 1996, p. 203). The children ranked their

preference for each item as “not at all, a little, or a lot” (Northrup et al., 1996, p. 204).

“A control category was developed by combining one randomly selected item from each of the five categories that was rated ‘not at all’ on the survey” (Northrup et al., 1996, p. 203). Each item was presented individually and verbally. A category with a 75% or higher score was considered to be high preference.

The second preference assessment conducted in Northrup et al. (1996), was the verbal stimulus choice assessment. This was a verbal questionnaire that included ten questions. Each category was compared once with every other category during the assessment. Every question included three examples of the category in the question. A category with a 75% or higher score was considered to be high preference. The third preference assessment conducted was the pictorial stimulus choice assessment. It was conducted the same as the verbal stimulus choice except the two choices were presented by the coupons (representing the same categories as the verbal stimulus choice) and the child was told to “pick just one” (Northrup et al., 1996, p. 204). Different colored coupons were used to represent the five categories. The coupons were also distinguished by having pictures representing the categories on them. The child responded by picking the preferred coupon rather than responding verbally, as in the CRS and verbal stimulus choice assessments.

Northrup et al. (1996) then conducted a reinforcer assessment to assess the reinforcing effects of the stimuli selected in the preference assessments. Six different colored coupons represented the six categories being assessed. A baseline condition was conducted in which the child was presented with a coding worksheet (described as easy by the children). The child was told,

You can earn as many coupons as you want for doing coding. You will have a chance to earn all of the coupons. You can do as much as you want, as little as you want, or none at all. We will stop and go on to another coupon if you don't do any for 2 minutes or if you say, "I'm done" (Northrup et al., 1996 p. 205).

Otherwise the session lasted 5 min. No consequence was provided for on or off-task behavior. In the reinforcer assessment condition, the children were required to complete a predetermined number of coding problems to gain access to a coupon. Except during the 10 min. experimental conditions, tokens could be exchanged at any point for immediate access to the reinforcer. Each coupon equaled three items that were chosen by random selection from the items chosen 'a lot' in each category.

In Northrup et al. (1996), one coupon could be exchanged for one of the three items within the category. "Edible, tangible, and attention were provided on a 1:1 ratio." (Northrup et al., 1996, p. 204). Activity and escape coupons 2 min. were worth access to the reinforcers. All coupons had to be exchanged by the end of the morning. At the beginning of each reinforcer assessment session a coupon was randomly picked for a participant to earn after completing their work. The participant could pick up a coupon after a certain number of problems were completed on their worksheets, the criterion number to earn a coupon was written on the student's worksheet. If the child did not work for 2 min. or said "all done" a different coupon was presented until all five coupons and the control coupon were presented. Thus, six trials were conducted each session. Therefore, a participant could end a trial by not working for 2-min or saying "all done". They could also work indefinitely and earn an unlimited number of coupons.

A second administration of the three preference assessments was conducted after the reinforcer assessment was completed. The preference assessments were conducted identical to the first administration and occurred approximately 10 days after the first one.

Northup et al. (1996) conducted the second administration to assess the stability of the children's preferences and to assess the effect of repeated exposure and familiarity of the assessment procedures.

Northup et al. (1996) concluded that the verbal stimulus choice and pictorial stimulus choice assessments were more likely than the verbal survey to identify distinctly different high and low preferences; and that the verbal survey was substantially more likely to identify multiple categories as high preferences and less likely to identify low-preference categories. The verbal stimulus choice and pictorial stimulus choice method were also time efficient, taking 2-3 minutes and 5 minutes respectively to complete. It is possible that the physical representation, even if symbolic, may be more salient to children than a verbal statement alone; suggesting that asking verbal children only to name their preferences may not identify potent reinforcers; even if the questions are based on a structured survey. When the preference assessments were readministered there was a 65% agreement between the verbal surveys, a 60% agreement between the verbal choice assessments and an 80% agreement between the pictorial stimulus choice assessments. This suggests that the pictorial stimulus choice assessment identifies reinforcers that are more stable over time than the verbal survey and the verbal stimulus choice assessments. The results of this study demonstrate the limitations of reinforcer assessments that rely on verbal report even for verbal children.

Summary of verbal presentation procedures

Northrup et al. (1995) and (1996) both found verbal stimulus choice assessments identify more differentiated preferences and more effective reinforcers than verbal

nomination. Northrup et al. (1995) identified direct observation to be the most effective format for identifying potent reinforcers when comparing it to verbal presentations.

Northrup et al. (1996) identified pictorial stimulus presentation to identify more potent and stable reinforcers than both verbal assessments. Both studies found that the most effective verbal presentation was verbal stimulus choice, though the formats with visual stimuli (i.e., free play, and pictorial) identified the most effective reinforcers.

CHAPTER 3

IMPLICATIONS OF PREFERENCE ASSESSMENT PROCEDURES FOR REINFORCER-BASED TREATMENTS

Treatment Implications

When implementing a reinforcer-based treatment it is critical to have a stimulus that serves as an effective reinforcer. The research reviewed suggests that all of the assessment presentation methods, except verbal nomination, are effective in identifying preferences and reinforcers for individuals with disabilities. Therefore, single stimulus, paired choice, multiple stimulus (with and without replacement) and triad presentation all identify effective reinforcers for individuals with disabilities. The methodologies differ on the types of preferences identified (e.g., rank ordered, more high preferred than low preferred) and their potency as reinforcers. As described in Pace et al. (1985) the single stimulus approach is more likely to identify multiple preferences that will generally serve as reinforcers to the participant and does not provide information regarding the rank order of preferences as the paired choice methodology does. The single stimulus methodology provides information on which stimuli would be generally reinforcing to a participant in a reinforcer-based treatment when no other competing stimuli are present. The paired choice methodology, as described in Fisher et al. (1992) identifies stimuli that will be the most potent reinforcers for participants. The paired choice methodology identifies a rank order of reinforcers so the therapist implementing the reinforcer-based treatment knows which stimulus will produce the highest level of responding for a particular participant. It also provides information on which stimulus will produce the second highest and third highest level of responding, so if one stimulus is not available, the second most

reinforcing stimuli can be substituted in the treatment without fear that the treatment will be severely effected. Whereas, in the single stimulus methodology therapist may have to 'guess' which item is the most potent reinforcer and which is the second, therefore potentially jeopardizing the results of the reinforcer-based treatment. Though despite these differences in the types of preferences and reinforcers found when conducting a single stimulus versus a paired choice methodology, the results of Roscoe et al. (1999) indicate that both methodologies identify successful reinforcers; and when compared both methodologies identified reinforcers that resulted in similar rates of responding for the participants. Therefore, the single stimulus and the paired choice methodology both find effective reinforcers for participants. Therapists can use either one and effective reinforcers will be identified for the participants.

The multiple stimulus presentation identified more differential preferences than the multiple stimulus without replacement and the paired choice methodologies, though as stated earlier, they all were effective in identifying preferences for the participants. The multiple stimulus presentation identifies the most potent reinforcers and the paired choice assessment is the second most effective in identifying the most potent reinforcers, according to DeLeon and Iwata (1996). Within the multiple stimulus presentation the free operant assessment is the most time efficient. Roane et al. (1998) conducted a study in which daily reinforcers were identified within 5 min. utilizing the free operant assessment. The free operant methodology is most useful when the goal of assessment is to identifying the most potent reinforcers on a daily or frequent basis. The free operant is also most useful to conduct when assessing a person with aberrant behaviors, due to the free operant resulting in less aberrant behavior than the paired choice assessment.

The verbal nomination methodology was not effective in identifying reinforcers. However, when verbal paired choice was included reinforcers were more differentially identified for the participants. Though, even when the verbal paired choice method was conducted, utilizing pictures instead of verbal methods resulted in the identification of more stable reinforcers.

Single stimulus, paired choice, multiple stimulus (with and without replacement), and triad presentation are all good methodologies for identifying effective reinforcers for a reinforcer-based treatment. A therapist may want to utilize a single stimulus presentation if the participant has few known preferences to identify several general reinforcers. If a participant has several known reinforcers a therapist may want to conduct a multiple stimulus or paired choice assessment so as to identify the participants most potent reinforcers. If the participant is known to change preferences frequently a therapist may want to conduct frequent free operant assessments or a mini paired choice assessments after conducting a comprehensive assessment.

Within the different methodologies adaptations can be used to assist participants and therapists in identifying preferences and reinforcers. As in Wacker et al. (1985) and Dattilo (1986) the therapist may want to utilize a microswitch for choice making or measure preference behaviors as in Winking et al. (1993). Derby et al. (1995) identified latency to aberrant behavior as an effective measure of preference and DeLeon et al. (1999) identified duration of engagement as an effective measure of preference. Hanely et al. (1999) identified differential access to chosen preferences as a necessary component in a preference assessment for identifying differentiated preferences for individuals. Hanely et al. (1999) also suggests that associating less preferred stimuli with more

preferred stimuli can change preferences chosen. Therefore, within the methodologies the assessments can be individually designed to identify individuals' preferences.

Future Research Implications

Future research should focus on verbal nomination preference assessments. Can reinforcers be identified for typically developed children via verbal nomination? Is there something specific about children with ADHD that impedes the identification of reinforcers via verbal nomination? Are older, typically developed children able to identify reinforcers via verbal nomination? The question of the utility of verbal nomination as a reinforcer assessment is critical for the many reinforcer-based treatments that are conducted in schools and base their identification of reinforcers on verbal nomination. If verbal nomination is not effective in identifying reinforcers many reinforcer-based treatments may be disregarded with the incorrect conclusion that it is not effective. When in fact it could be effective if an effective reinforcer was identified. More research should also be conducted with younger children and children with disabilities to determine if verbal nomination is always ineffective in identifying reinforcers or if changes in the way questions are presented will assist the identification of reinforcers, as Northrup et al. (1996) suggests.

Future research should also focus on determining whether persons with multiple disabilities (both mental and physical) identify more potent reinforcers when their preferences are measured by approach to a stimulus or by pressing a microswitch. Do factors such as closeness, ease of grasp, or colorfulness affect the choice making of persons with multiple disabilities? If so, does choosing the item via a microswitch and

then having the therapist provide them with the chosen stimulus change the items chosen? If the therapist hands them the item the individual would not have to put forth as much effort to make a choice (e.g., reaching, grasping) and may increase the choice of harder to access stimuli.

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