ABA Literature Summary

e-newsletter

Topic : Evaluating Preference Assessment Approaches

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Special Learning

Effectiveness of Preference Assessments by Stimuli

Preference assessments are used to identify the preferences of individuals with disabilities, which are then used as reinforcers of behavior. This literature summary reviews the major preference assessment formats and methodologies and their effectiveness on behavioral interventions. Analyzing the plethora of recent research, we examine the effects of specific approaches to, and components of, preference assessments on identifying and applying reinforcers (Ciccone, Graff & Ahearn, 2005; Ciccone, Graff & Ahearn, 2006; Daly, Well, Swanger-Gagne, Carr, Kunz & Taylor, 2009; DeLeon & Iwata, 1996).

A preference assessment should begin with an evaluation of preferred and non-preferred stimuli. Stimulus preference has been shown to have a significant impact on reinforcer value. As the repertoire of stimuli, and direct and indirect procedures for assessing preferred stimuli expands, it is useful to assess various types of stimuli conditions used in preference assessments and their effectiveness in behavioral interventions.

A. Activities as Stimuli in a Stimulus Preference Assessment

Activities used as stimuli in a stimulus preference assessment were found to serve as effective behavioral reinforcers by Daly et al. (2009). A multiple-stimulus without replacement (MSWO) preference assessment was implemented to identify preferred activities that function as reinforcers in the classroom with individuals with behavioral disorders. To establish a hierarchy of preferences for activities, student participants chose one activity written in the center of a card from an array of eight activity cards in total until all cards were ranked. The effects of high-, moderate-, and low-preference activities and doing nothing on reinforcer value were compared.

Methodology:

The independent variable during the preference assessment was activities written on cards used as stimuli. During the reinforcer assessment, high-, moderate-, and low-preference stimuli were used. The dependent variable during the preference assessment was the stimulus response selection. For the reinforcer assessment, it was the number of math problems accurately completed. In this alternating treatments design study, four participants, each 9 years old, who had been classified as students with behavioral disorders by their school district participated.

Results/Outcomes:

Regardless of the activities available, all participants demonstrated an increase in performance when reinforcing contingencies were introduced when compared to baseline. The "do-nothing" contingency, although intended as a control condition, may have functioned as a negative reinforcement contingency, a positive reinforcement contingency, or the combination of both. The authors concluded that the MSWO preference assessment format can effectively identify reinforcing activities in a classroom setting, and even low-preference items may serve as reinforcers.

B. Pictorial Stimuli Preference Assessments

The use of pictures versus tangibles was evaluated during a paired-stimulus (PS) preference assessment by Graff, Gibson, and Galiatsatos (2006). The "tangible" items used were edibles, such as marshmallows and chips. The procedures during the pictorial PS were identical to those of the tangible PS assessment, except the stimuli used in the pictorial PS were pictures of the stimuli rather than the actual item. The data from the reinforcer assessment suggested the stimuli identified by each of the assessments were effective reinforcers.

Methodology:

This study used an alternating treatments design embedded within a reversal design. The independent variables for the preference assessments were the pictures of stimuli for the pictorial PS, and tangible items for the tangible PS. The reinforcer assessments evaluated the items categorized as highly preferred and less preferred. The dependent variables for the preference assessments were the approach responses (picking up an item during tangible assessments or touching a line drawing during pictorial assessments.) For the reinforcer assessments, the highly preferred and a less preferred item were evaluated with maintenance tasks; for two of the participants, the task was placing an envelope into a jig and stamping it, another participant's task was sorting silverware, and the other participant's task was copying a letter from a sample onto a worksheet. Of the four participants in this study aged 14 to 15, two were diagnosed with autism, one was diagnosed with a chromosomal disorder, and one was diagnosed with attention deficit hyperactivity disorder.

Results/Outcomes:

The authors found that both preference assessment formats produced similar preference hierarchies. While the low-preference stimuli were associated with weak reinforcement effects, higher response rates were obtained during the high-prefer-

ence stimulus condition, as shown by both the tangible and pictorial assessments.

C. Olfactory Stimuli

The effectiveness of olfactory stimuli was evaluated in a paired-stimulus preference assessment format by Wilder et al. (2008). The stimuli were solid air fresheners with six different odors: apple, citrus, lavender, rain, raspberry, and vanilla. The bottles were wrapped in natural-colored papers so they all appeared visually identical.

Methodology:

In this reversal with a multi-element design study, the independent variable for the preference assessments was the olfactory stimuli--such as citrus, apple, lavender, and vanilla--used in a paired choice stimulus preference assessment (Fisher et al., 1992). The reinforcer assessment used high-, moderate-, and low-preference olfactory stimuli. The dependent variable for the preference assessment was the choice (as indicated by touching an item). A percentage score was then calculated for each olfactory stimulus by dividing the number of times the stimulus was chosen by the number of times it was available to choose, and multiplying by 100%. For the reinforcer assessment, it was responses per minute; the task was sorting colored index cards. There were three participants, ages 13 to 38, diagnosed with mental retardation and autism.

Results/Outcomes:

Wilder et al. (2008) reported positive findings, and responding increased for all of the participants. The stimuli identified as high-preference by the PS produced the highest responding when compared to the moderate- and low-preference olfactory stimuli. Results from the PS correspond with the data from the reinforcer assessments, indicating it may be an effective method of identifying reinforcing olfactory stimuli for people with autism.

D. Vocational Tasks as Stimuli

To identify the work preferences of five adults with autism, Lattimore, Parsons, and Reid (2003) evaluated the utility of a multiple-stimulus assessment. A prework preference assessment was conducted prior to the on-the-job preference assessment to determine each worker's preferred and non-preferred office cleaning tasks. Then, on-the-job preference assessments were conducted in an attempt to validate task preferences previously identified during the prework assessment. The assessments were conducted prior to beginning supported employment. Eight preference assessments were conducted and all participants were described as having a history of challenging behaviors, such as aggression, property destruction, and/or self-injury while they were at the work site.

Methodology:

The independent variable for the prework preference assessment was a MSW preference assessment in which three or four office cleaning tasks were assessed. For the on-the-job preference assessment, office cleaning tasks were assessed; a preferred task was paired with one or two less preferred tasks (as determined by the prework preference assessment). The dependent variable for the prework preference assessment and the on-the-job preference assessment was choice of work tasks, which was defined as the worker touching a material that represented a work task when two or more were presented for a choice selection. In addition, work engagement was measured, defined as manipulating work materials in the manner the materials were intended to be used in order to complete the work task, or looking at the job while the job coach provided instructions regarding task completion.

This study involved five participants, ranging in age from 26 to 38 years old, diagnosed with autism as well as severe or profound mental retardation, and one participant was also diagnosed with Fragile X Syndrome. Cumulative graphs were used to interpret the data in which the cumulative number of choices during the regular job routine for work tasks identified on the prework assessment to be more and less preferred was graphed. Bar graphs were used to graph the mean percentage of on-the-job choices for the worker groups that had strong and weak preferences on the prework assessment.

Results/Outcomes

For all five of the on-the-job validations, the workers reliably selected the tasks during the regular job routine as previously indicated by the prework preference assessment (MSW). The applied application of their findings suggest that when adults with autism display a strong work preference for a work task using the MSW, assigning that task during subsequent work routines will likely represent a work activity the workers prefer. Although the data were less clear on the strong preference group, there appeared to also be utility in the prework assessment for workers who displayed a weak preference for a specific work task.

Effectiveness of Preference Assessments by Type

Since the first single-stimulus preference assessment was conducted, different types of preference assessments have been developed to improve the effectiveness of identifying reinforcers, and thus behavioral interventions. Multiple stimuli, for example, allow for a hierarchy of preferences to be established thereby improving reinforcer effectiveness. These studies comparing single-stimulus, paired-stimulus and multiple-stimulus approaches provide useful evaluations of their effectiveness under different conditions.

A. Single-Stimulus preference assessments

Pace, Ivancic, Edwards, Iwata, and Page (1985) sought to discover an effective and systematic way to identify preferences of individuals with severe to profound developmental disabilities. They noted the difficulties in assessing the preferences of individuals who do not engage in spontaneous play, are non-verbal, and/or have limited motor and verbal capabilities. Their response was the first formal preference assessment (i.e., the single-stimulus approach).

Methodology:

This was a reversal design study. The independent variable for the preference assessments were 16 stimuli consisting of both edibles and tangibles individually presented to each participant 10 times. For reinforcer assessments, "preferred" and "non-preferred" stimuli were evaluated. The dependent variable for the preference assessment was the approach behaviors, measured in an attempt to differentiate between preferred and non-preferred stimuli. For reinforcer assessments, the percent of correct responses of adapted behaviors, such as "reach," "look," "raise your hand," touch my hand," and "saying eat" were measured. In this reversal design, six participants ages 3 to 18 with intellectual disabilities participated.

Results/Outcomes:

The authors concluded that the assessment was effective in identifying reinforcing stimuli for six individuals with intellectual disabilities. However, the extent to which the single-stimulus method was more effective or efficient was not known and it was difficult to conclude which stimuli were preferred versus non-preferred in this study. Nonetheless, this study was a significant advancement in the field of developmental disabilities and behavior analysis.

B. Comparing the Single-stimulus Approach to the Paired-stimulus Approach

To address the limitations posed by Pace et al., (1985), Fisher et al. (1992) developed the first forced choice (FC), also called the paired-stimulus (PS) preference, format. A concurrent operants paradigm was used as an extension of the single-stimulus (SS) to determine whether the FC could better identify preferred and non-preferred stimuli.

Methodology:

The individual variables for the preference assessments (both SS and FC) were sixteen stimuli per participant, including edibles and tangibles. The reinforcer assessment included stimuli approached in at least 80% of trials on both stimulus preference and forced-choice assessments ("high-high stimuli"), and the stimuli approached in at least 80% of stimuli preference trials and 60% or fewer on forced-choice trials ("SP-high stimuli). For the dependent variable for the preference assessment, the approach was measured. The reinforcer assessment measured "in-square" or "in-chair" behaviors. In this A-B-A using a concurrent operants paradigm study, four participants, ages 2, 5, 7, and 10, diagnosed with mental retardation and other developmental disabilities participated.

Results/Outcomes:

The authors found that all of the items identified as highly preferred by the forced choice method were also identified as highly preferred using the SS method. Data from this study suggested the FC presentation had good concurrent validity while the SS presentation may tend to have false negatives when identifying high-preference. The authors suggested that the SS approach may still be applicable when working with individuals who have difficulty making reliable choice responses.

C. Evaluation of the Multiple-Stimulus Approach

DeLeon and Iwata (1996) compared the multiple-stimulus format (multiple-stimulus with replacement, or the MSW, and multiple-stimulus without replacement, also known as the MSWO) to the paired-stimulus (PS) approach. Edible and tangible stimuli were used with seven adults with developmental disabilities.

Methodology:

The independent variable during the preference assessments (MSW, MSWO, & PS) were seven stimuli, both edible and tangible, per participant. During the reinforcer assessment, high-, moderate-, and low-preference stimuli were used.

The dependent variable for the preference assessment was the stimulus response selection. The reinforcer assessment used the number of correct responses individualized per participant (These included placing pieces in the game Connect Four, using an ink stamper, activating a micro switch, and placing a block in a basket.)

Nine adults with developmental disabilities participated in the preference assessments. Four of these participants then participated in the reinforcer assessment. For two of the participants, an A-B-A reversal design was implemented. For another participant, a B1-A-B2-A reversal design was implemented. The authors stated that for one of the participants, responding during a FR 1 schedule of reinforcement was not successful, so a reversal seemed unnecessary. Instead, a single-session probe was attempted.

Results/Outcomes:

The data revealed all three preference assessment formats (i.e., the PS, MSW, and MSWO) produced similar results in identifying the high-preference stimuli. The hierarchies produced by the MSWO and PS procedures were more consistent across administrations when compared to the MSW. However, it took the MSWO substantially less time to administer than the PS (i.e., the MSWO took 15.5 minutes and the PS took 53.3 minutes). The ability to effectively identify reinforcing stimuli in a relatively short amount of time makes the MSWO a more practical choice for use in applied settings.

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