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Passive and Active Approach Responses in Preference Assessment for Children With Profound Multiple Disabilities and Minimal Movement

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Abstract

We assessed the activity preferences of three children with profound multiple disabilities and minimal movement using a single stimulus presentation procedure. We recorded active approach, passive approach, and rejection responses on each trial during the assessments. Active approach included reaching for, touching, or manipulating the stimulus. Passive approach included looking at or orienting toward the stimulus and happiness indicators such as smiling. Active approaches and rejection responses were infrequent, but preference hierarchies based on passive approaches emerged for all three children. Two children were available for reinforcer testing after the preference assessments. The identified high preference activities based on passive approach responses maintained higher rates of switch pressing than the low preference activities for one child and maintained approximately the same rates of switch pressing for the second child.

Preference assessment involves presenting an array of stimuli, usually one or two at a time, and evaluating the person's response or interaction with the presented stimuli (Fisher et al., 1992). Conducted systematically, preference assessment can be used to identify enjoyable leisure activities or reinforcers for teaching programs (Ivancic, 2000). Direct preference assessment is particularly relevant for people with profound multiple disabilities (PMD) who lack communication skills. Reid, Phillips, and Green (1991) described a person with PMD as someone with "profound mental retardation, physical disabilities that prohibit ambulation, and at least one other type of handicap (e.g., sensory impairment)" (p. 321). Studies have shown that preference assessment for people with profound developmental disabilities can be done using active approach responses such

as pointing to or reaching for a presented stimulus (Ivancic), or more passive approach responses such as looking at or orienting towards the stimulus (Ivancic & Bailey, 1996; Kennedy & Haring, 1993; Piazza, Fisher, Hanley, Hilker, & Derby, 1996; Spevack, Yu, Lee, & Martin, 2006), happiness indicators such as smiling and laughing (Green & Reid, 1996; Green et al., 1988; Ivancic & Bailey; Logan et al., 2001) and engagement (Hagopian, Rush, Lewin, & Long, 2001). Among studies with persons with PMD, however, few have focused on persons with minimal movement.

Ivancic and Bailey (1996) used the single stimulus method (presenting one stimulus on each trial) to test the preferences of individuals with PMD and with minimal movements. Their measures included active (e.g., reaching for the stimulus) and passive (e.g., smiling or turning toward the stimulus) approach responses and avoidance. They compared the results between 5 participants with high levels of movement (controls) and 10 participants with minimal movements, who were described as having "chronic training needs." The extent of movements by participants was observed using an interval observation method. The participants in the control group moved during an average of 99% of intervals, while individuals in the minimal movement group showed movements during an average of 51% of intervals. The authors were able to identify high preference stimuli for all control participants, but for only 2 of the 10 participants with minimal movements. In a subsequent assessment, the preferred stimuli were found to be reinforcers for 4 of the 5 control participants and for neither of the participants with minimal movement. Spevack et al. (2006) showed that passive approach responses yielded preference hierarchies for two children with PMD and minimal movement. Moreover, they found that the identified high preference activities were reinforcers for passive responses such as eye gaze during reinforcer testing, but not for an active response such as switch pressing.

Considering the paucity of preference assessment studies with persons with PMD and minimal movement, systematic replications of previous research would be valuable. Therefore, the purpose of this study was to evaluate active and passive approach responses in preference assessments for children with PMD and minimal movement. In addition, we compared the assessed preference hierarchies to their teacher's rankings, and tested the relative reinforcing effects of the activities identified as most and least preferred activities.

Method

Participants and Setting

Two boys and one girl participated. The children were students at the St. Amant School in Winnipeg, Manitoba, Canada. Child 1 was 10 years, 11 months old. He was diagnosed with profound mental retardation, spastic quadriparesis, cortical blindness, and holoprosencephaly. Child 2 was 9 years, 7 months old. She was diagnosed with severe mental retardation, microcephaly, seizure disorder and cortical blindness. Child 3 was 5 years, 11 months old. He was diagnosed with severe developmental disabilities, spastic quadriparesis, cerebral palsy, and seizure disorder. All children were nonambulatory. Children 1 and 3 accepted their nutrition through gavage feeding and all three were receiving medication to control seizures. All three children showed minimal movement based on our assessment (described below). All children participated in the preference assessment phase, but only Children 2 and 3 were available for the reinforcer testing phase. All assessments were conducted in a quiet

session room with only the child and the experimenter, except for those sessions when an observer was also present to conduct reliability checks.

The children's primary teacher (same teacher for all children) ranked the stimuli. She had worked with the children for an average of 3 years (range 1.5 to 4 years). This study received ethics approval from the University of Manitoba Psychology/ Sociology Research Ethics Board.

Materials

The stimuli used during preference assessment were 12 activities representing the sensory areas of visual, olfactory, auditory, tactile, and thermal. The teacher was consulted to ensure that the activities were safe for all participants. The stimuli (designated A through L) were: (A) a musical animal toy, which had lights and music that were activated when buttons were pressed or the animals were pushed; (B) an unlit soap-scented candle that was passed in front of the participant's face; (C) a hand-held fan that was waved in front of the participant's face; (D) a green-coloured flashlight that was shone in the participant's face; (E) hands lightly rubbed; (F) Lion King music; (G) a storybook held so the participant could see it while it was read aloud; (H) an unlit cherry-scented candle passed in front of the participant's face; (I) hands lightly rubbed while the experimenter talked to the participant; (J) a soft teddy bear put into contact with the participant's hands or face; (K) a vibrating pillow held against the participant's hands; and (L) a warm, moist facecloth held against the participant's hands.

All stimuli were presented to each child except for Child 2 who did not experience the flashlight or the vibrating pillow, due to the possibility of triggering seizures. A micro-switch approximately 6 cm in diameter, which required 2-3 g of force to activate, was used during the reinforcer assessment phase.

Procedures

Movement assessment. Each child was observed using a partial-interval recording (5 s observation and 5 s recording) method (Martin & Pear, 2003), in the classroom for a total of 7 minutes across two different days. The definition of movement was the same as that of Ivancic and colleagues (1996, 1997). Movement was considered to have occurred if any body parts (e.g., arms, legs, head, torso) moved more than 2 cm during an interval. Involuntary movements that may be caused by breathing, blinking, hiccupping or coughing were excluded. As well, movement was only scored during those intervals when the participant was awake, which was defined as the participant having his or her eyes open for the whole interval.

Preference assessment. A single-stimulus presentation was used during preference assessments. On each trial, the experimenter presented a stimulus, provided a verbal prompt for the participant to attend to the stimulus, and then monitored the participant's response for 60 s. A trial was terminated immediately before it reached 60 s, however, if a rejection response occurred. If no response occurred during the 60 s interval, the trial was repeated once. Stimuli were presented in a predetermined, random order until each had been presented 10 times. Between 6 and 14 trials were conducted in a session. Each session lasted up to 30 minutes and sessions occurred once to three times per week. Assessment continued until all 12 stimuli (activities) had been presented.

An active approach response was defined as reaching for, touching, or manipulating the stimulus. A passive approach response included turning one's head or body toward the stimulus, looking at the stimulus,

or happiness indicators such as smiling and laughing (Green & Reid, 1996). For Child 1, happiness also included instances where the child appeared agitated at the beginning of the trial, and became calmer once the activity was presented. A rejection response was defined as the child turning away from the stimulus, withdrawing his/her hand from the stimulus, pushing away or dropping the stimulus, or exhibiting an unhappiness response such as frowning, grimacing, and crying.

The first response observed during each trial was recorded. If two or more responses occurred simultaneously, each response was recorded. For the purpose of data analysis, trials were classified into four mutually exclusive types. A trial was "active" if it contained an active approach response (regardless of whether it was accompanied by a passive approach response) and no rejection response. A trial was "passive" if it contained a passive approach response (without an active approach response) and no rejection response. A trial was a "rejection" if a rejection response occurred during the trial. Lastly, a trial was classified as "no response" if none of the behaviours described above occurred during the interval.

Reinforcer assessment. Following the preference assessment, the highest and lowest ranked stimuli were presented as consequences for a switch-pressing response for Children 2 and 3. Switch pressing was a behaviour that the children used in their classroom to activate various leisure activities (e.g., toys). During each session, every switch press was consequated with the presentation of one of the stimuli for 15 seconds. Two 15-minute sessions were conducted for each stimulus. To ensure that an equal amount of time was available for responding across sessions and stimuli, the time spent (15 s) on accessing the activity after each switch press was excluded by stopping the session timer. For Child 2, the switch was placed within reach on the tray of her wheelchair. For Child 3, it was mounted on a bracket a short distance from his head, so that he could activate the switch by turning his head. A switch press was defined as the child depressing the micro-switch such that a distinctive click was produced. One stimulus was used as the consequence in each session and one session was conducted per day. Number of switch presses per minute was calculated for each session.

Teacher's rankings. Before the preference assessments were completed, the children's primary teacher was asked to rank each stimulus according to what she believed were the children's preferences. The item that she believed would be the most preferred stimulus for a child was assigned a 1, the next most preferred a 2, and so on. For stimuli with tied ranks, the mean ranking was assigned.

Interobserver Reliability

Movement assessment. Reliability checks were conducted for 83% of the movement assessment sessions for all children. During reliability checks, an observer independently recorded the movement of the child during each interval. An interval was scored as an agreement if both the observer and the experimenter recorded the occurrence or the nonoccurrence of movement, and a disagreement if one recorded an occurrence and the other a nonoccurrence. Percent agreement was calculated by dividing the number of agreements by the total intervals (agreements plus disagreements) and multiplying by 100%. Agreement averaged 93% (range 80–100%) across the children.

Preference assessment. During reliability checks for preference assessment, an observer independently recorded the

children's responses on each trial. A trial was considered an agreement if the observer and the experimenter recorded the same response and a disagreement if the recordings differed. Percent agreement per session was calculated for each response measure by dividing the number of agreements by the number of agreements plus disagreements, and then multiplying by 100%. Reliability checks were conducted for 54% of preference assessment trials across all children. Agreement scores averaged 97% (range 95–100%) for active approach, 99% (range 94–100%) for passive approach, 98% (range 96–100%) for happiness, and 100% for rejection.

Reinforcer assessment. During reliability checks for reinforcer testing, an observer independently recorded the number of switch presses during each session. Percent agreement per session was calculated by dividing the lower number of recorded switch presses by the higher number of recorded switch presses, and then multiplying by 100%. Reliability checks were conducted for all reinforcer assessment sessions for both children. Agreement scores per session on the frequency of switch presses averaged 99% (range 93–100%).

Procedural Integrity

Procedural integrity was evaluated during preference and reinforcer assessments using a procedural checklist by an observer. On each preference assessment trial, the observer recorded whether the experimenter presented the stimulus and verbal cue correctly, and removed the stimulus promptly following a rejection. On each reinforcer assessment trial, the observer recorded whether the experimenter presented the consequence promptly and correctly following each switch press, and stopped and started the session timer after each response and reinforcement interval, respectively. A trial was considered to be delivered correctly only if the experimenter carried out all the steps appropriately. For preference assessments, procedural integrity checks were conducted for 45% of the trials across all children, with a mean accuracy of 99.9% (range 99–100%). For the reinforcer assessments, procedural reliability checks were conducted for 41% of trials across the children, with a mean accuracy of 100%.

Results

During movement observations, Child 1 showed movement during an average of 43% of intervals (range 35-50%), Child 2 averaged 60% (range 45-75%), and Child 3 averaged 3% (range 0-5%). These levels were similar to those reported for children considered to have minimal movement in previous studies, which ranged from 4% (Ivancic, Barrett, Simonow, & Kimberly, 1997) to 51% (Ivancic & Bailey, 1996).

Figure 1, [page 66], shows the percentage of trials classified as active, passive, and rejection during the preference assessment for each child. The activities have been ordered on the horizontal axis from highest to lowest according to passive approach responses, which best differentiated the preference hierarchy for all three children. For Child 1, the percentage of trials with passive approaches ranged from 100% (activity I) to 0% (B and L). For Child 2, activities A, C, and F tied at 50% as the highest ranked stimuli and activities L and I were the two lowest at 10% and 9%, respectively. For Child 3, the highest and lowest ranked activities were D (82%) and E (8%), respectively, based on passive approaches. Most of the passive approaches consisted of happiness for Child 1 (85%), whereas most of the passive approaches were looking or orienting towards the stimuli for Children 2 (96%) and 3 (93%). Active approach was infrequent (Children 1 and 2) or absent (Child 3) during preference assessments.

Rejection responses were infrequent for Children 1 and 3, but Child 2 showed rejection responses for 8 of the 10 stimuli, ranging from 50% (E) to 10% (A and F).

Figure 2, [page 67], shows the mean number of responses per minute during reinforcer assessment sessions for the most and least preferred stimuli. Child 2 averaged 0.43 responses per minute for the high preference stimulus (activity A) and 0.1 responses per minute for the low preference stimulus (I). Child 3 averaged 0.23 responses per minute for the high preference stimulus (D) and 0.27 responses per minute for the low preference stimulus (E).

Spearman's rank-order correlations between the teacher's ranking and direct preference assessment were low and not statistically significant. Correlations for Children 1 through 3 were .05, .32, and –.08, respectively.

Discussion

Based on range, gradation, and ties, the passive approach differentiated preferences well for Children 1 and 3 and moderately for Child 2. We expected that the identified high preference

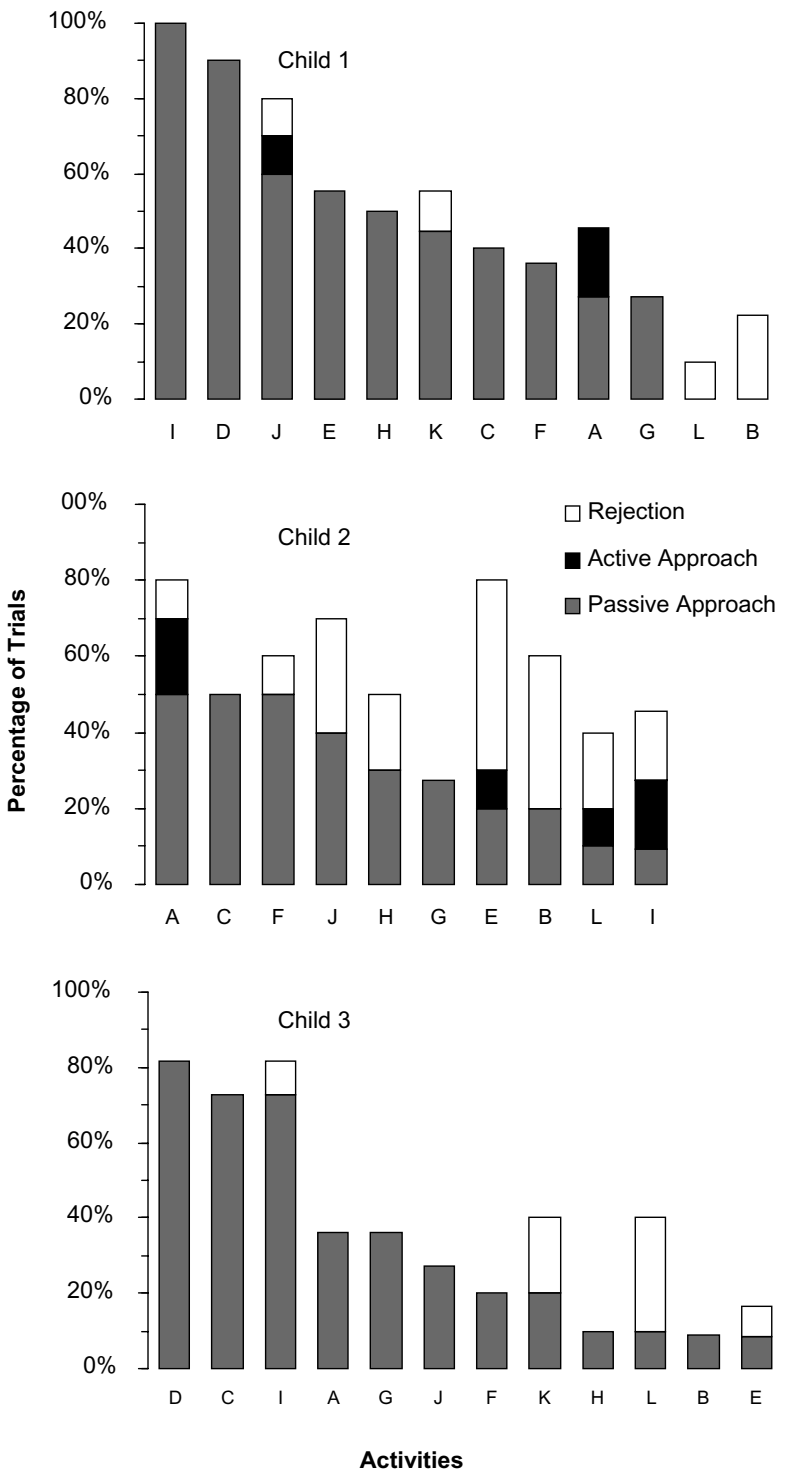

Figure 1. The Percentage of Trials With Active Approach, Passive Approach, and Rejection Responses Across Activities (A through L). Activities are Ordered From the Highest to the Lowest Based on Passive Approach for Each Child

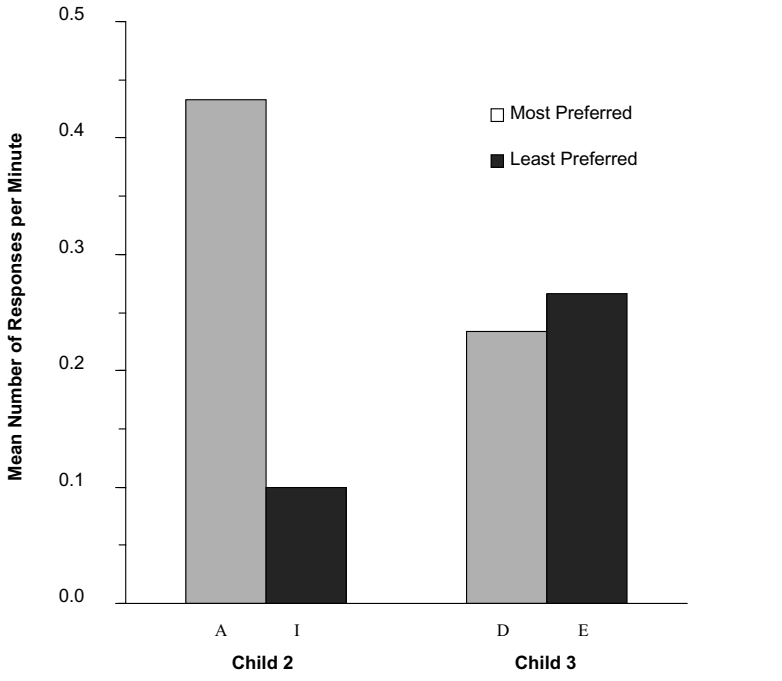

Figure 2. Mean Number of Responses per Minute for the Highest and Lowest Preferred Activities During Reinforcer Tests

stimulus would function as a stronger reinforcer than the less preferred stimulus by maintaining higher rates of switch presses during reinforcement assessments. This was true for Child 2, but both stimuli were approximately equally effective in maintaining responding for Child 3. That is, the less preferred stimulus was also a reinforcer for Child 3.

Previous research with persons with severe and profound intellectual disabilities has reported poor correspondence between caregivers' opinions of participants' preferences and direct preference assessment (Logan & Gast, 2001; Lohrmann-O'Rouke & Browder, 1998). We found similar results in this study.

The rejection measure was uninformative in this study, but its usefulness may have been limited artificially because stimuli known to be disliked by the children were not included. Therefore, we do not recommend excluding rejection responses as a measure in future research or in practice because they could be informative when testing new stimuli with unknown values.

A limitation of the reinforcer testing procedure in this study was that we compared the "relative" reinforcing effects of the high and low preference stimuli rather than testing the effect of each stimulus against a baseline. It is possible that neither, one, or both stimuli were reinforcers. Establishing a stable baseline prior to the introduction of the stimulus as a consequence will provide a stronger test of the reinforcing effects of the stimuli.

The present study added to the paucity of research on preference assessment with persons with PMD and minimal movement. Moreover, it extended previous research by evaluating the separate contribution of passive and active approach responses. Our results support the use of passive approach responses for persons with PMD and minimal movement in preference assessment.

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