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ASSESSMENT OF STIMULUS PREFERENCE AND REINFORCER VALUE WITH PROFOUNDLY RETARDED INDIVIDUALS

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We evaluated a procedure for identifying potential reinforcers with profoundly retarded individuals. In Experiment 1, six persons were repeatedly exposed to 16 stimuli, and approach behaviors to each stimulus were used to identify preferred and nonpreferred stimuli. In Experiment 2, we examined the reinforcing properties of preferred and nonpreferred stimuli by delivering them contingently on the occurrence of arbitrarily selected responses. Results revealed that the preferred stimulus conditions typically produced higher rates of responding than did either the baseline or the nonpreferred stimulus conditions, suggesting that the procedure can be used to assess reinforcer value for individuals with limited behavioral repertoires.

DESCRIPTORS: assessment, preference, reinforcement, retarded persons

Reinforcement is a central mechanism in the development of operant behavior. In attempting to apply operant techniques to establish or maintain socially desirable outcomes, considerable emphasis is placed on the selection of suitable reinforcement schedules and contingencies; however, the process of reinforcer identification is often taken for granted. Thus, it is likely that at least some of the failures to effect behavior change can be attributed to defective stimulus selection rather than to contingency mismanagement (Repp, Barton, & Brulle, 1983).

Potential reinforcers may be identified quite readily for some individuals by simply asking them what they prefer (Barrett, 1962), or by exposing them to an array of stimuli and recording the duration or frequency of interaction with each stimulus (Quilitch, Christopherson, & Risley, 1977). In contrast, for many impaired individuals who may be nonverbal and do not engage in spontaneous play, or who have limited sensory and motor capabilities, the identification of reinforcing stimuli has been problematic (Egel, 1981; Rincover, Newsom, Lovaas, & Koegel, 1977).

Although the literature contains numerous examples of successful training programs with profoundly retarded subjects, many practitioners find that the usual methods of reinforcer selection are not always effective (cf. Favell & Cannon, 1976). The purpose of our investigation was twofold: first, to evaluate a formal method for identifying reinforcers in profoundly retarded individuals, and second, to validate empirically these putative reinforcers.

EXPERIMENT 1: ASSESSMENT OF STIMULUS PREFERENCE

METHOD

Participants and Setting

Six profoundly retarded individuals (three males and three females) between the ages of 3–18 years of age participated. All were completely dependent on others to meet their daily needs and were chosen to participate due to the absence of appropriate behaviors (e.g., self-help skills, instruction following). At the time of the study, all were inpatients

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at a pediatric hospital for the developmentally disabled. None evidenced any obvious sensory impairments, although Polly and Mick were nonambulatory.

All sessions were conducted in a 15 × 8 m group activity room containing a variety of toys and educational materials. Three to seven patients and two or three staff were present in the activity room at any given time.

Stimuli and Materials

Sixteen stimuli were chosen for their general accessibility and ease of presentation (Table 1).

The specific characteristics of the stimulus items were (a) light: a metal box with a 15 × 23-cm translucent surface superimposed on four colored lights that flashed, (b) mirror: 30 × 48 cm-mirror, (c) song: one of several cassette tape-recorded songs, (d) beep: a cassette tape-recorded repetitive beep from a chronograph watch alarm, (e) coffee: ground, dark coffee, (f) flower: dried hibiscus, (g) juice: 2 tablespoons of fruit punch or juice, (h) cracker: a 0.64 square cm of graham cracker, (i) vibration: a 15-cm cylinder powered by a "C" battery, (j) fan: a folded manilla file folder, (k) heat: a 30 × 48-cm heating pad for 55 watts/115 volts, (l) cool: a 8 × 20-cm frozen gelatine ice block wrapped in brown paper, (m) swing: a seat hung from a beam by heavy chain, (n) rock: movement of a chair back and forth, (o) clap: hand clapping performed by an experimenter, (p) hug: encirclement of participant with arms, back pats, and caresses.

Table 1
Stimulus Items and Methods of Stimulus Presentation

Stimulus item	Occasion to respond
Mirror	Held at a 45° tilt raised toward the child.
Light	Inactive light box placed 20 cm in front of the child.
Song	Inactive tape player placed 20 cm in front of the child.
Beep	Inactive tape player placed 20 cm in front of the child.
Coffee	Closed can with coffee placed 20 cm in front of the child.
Flower	Closed plastic container with hibiscus placed 20 cm in front of the child.
Juice	Cup of juice placed 20 cm in front of the child.
Graham cracker	Piece of cracker placed 20 cm in front of the child.
Vibrator	Inactive vibrator placed 20 cm in front of the child.
Fan	Fan placed down flat 20 cm in front of the child.
Heat pad	Heated cloth pad placed 20 cm in front of the child.
Cool block	Frozen package placed 20 cm in front of the child.
Swing	Child faced to the swing within reach.
Rock	Therapist's hands placed on the child's chair.
Clap	Therapist brought hand poised to clap within reach of the child.
Hug	Therapist leaned forward with hands outstretched to within 0.5 m of the child.

Procedure

Each session consisted of 20 trials, during which four predetermined stimulus items were presented five times each in a counterbalanced order. Over the eight assessment sessions, each of the 16 stimuli was presented 10 times, with one exception. The swing was not presented to Bart because it was not large enough to accommodate him.

The method for assessing stimulus preference consisted of measuring approach to each of the 16 stimuli. A trial began by presenting a stimulus to the patient. If the patient approached the item within 5 s, the stimulus was made available for an additional 5 s. For example, a trial with the light stimulus would begin by placing the inactivated light box in front of a patient (stimulus probe). If the patient approached the box, the flashing light was activated for 5 s. If there was no approach within 5 s, the occasion to respond was removed and the patient was prompted to sample the stimulus (the prompt component was included to ensure that a patient's lack of "preference" was not solely a function of unfamiliarity with the stimulus). For example, in prompting the light, the therapist ensured that the child was making eye contact with the box, and activated the light for 5 s. A second probe was then provided; if an approach

response occurred, 5 s access to the stimulus was provided. If the child again did not respond in 5 s, the stimulus was removed and the next stimulus was presented.

Data Collection and Reliability

The responses used to measure preference of stimuli were approach and nonoccurrence. Approach was defined as the child moving toward the object or event with hand or body within 5 s of either the first or second stimulus probe. Nonoccurrence was defined as the absence of any differential response within 5 s.

Interobserver agreement was assessed on approach across all participants during 71% of the sessions. Occurrence, nonoccurrence, and overall reliability percentages were calculated by dividing the number of agreements by the number of agreements plus disagreements, and multiplying by 100 (Bailey & Bostow, 1979). Occurrence, nonoccurrence, and overall agreement each averaged above 96%.

Results and Discussion

Figure 1 shows the percentage of trials on which approach responses were observed for each participant across all 16 stimulus items. Polly, Ben, Mick, and Tracy were very responsive, approaching several of the assessment stimuli on 80% or more of the trials. On the other hand, Gina and Bart were generally unresponsive, consistently approaching only one or two of the stimuli.

The data indicate that all participants differentially approached the assessment stimuli. In addition, patterns of responding were idiosyncratic; that is, there was no consistent between-child approach to any of the 16 stimuli. These results suggest a formal means of identifying reinforcers for profoundly retarded individuals. However, the reinforcement value of a stimulus cannot be determined on the basis of preference alone. A reinforcing stimulus must also be associated with an increase in the frequency of a response on which it is contingent. Therefore, we conducted a second study to determine the reinforcement value of preferred and nonpreferred stimuli.

EXPERIMENT 2: ASSESSMENT OF REINFORCEMENT VALUE

Method

Participants, Setting, and Stimuli

The participants and setting were the same as those used in Experiment 1. Preferred stimuli were defined as those approached on at least 80% of the trials during Experiment 1, whereas nonpreferred stimuli were defined as those stimuli approached on 50% or less of the trials.

Procedure and Design

Each session consisted of 10 trials. During each trial, the therapist presented a vocal request and a motor gesture of the target response. For example, the therapist said "Polly reach," and simultaneously modeled a reach response. During baseline, the therapist simply presented each request with an intertrial interval of approximately 10 s; no systematic consequences were provided for complying with the request. During preferred conditions, the preferred stimulus was provided for 5 s contingent upon the occurrence of the target response within 5 s of the request; nonpreferred conditions were identical, except that the nonpreferred stimulus was made contingent on the requested response. Baseline, preferred, and nonpreferred conditions were arranged in a reversal design (Baer, Wolf, & Risley, 1968), with the order of conditions varied across subjects.

Data Collection and Reliability

The responses used to measure the effects of preferred and nonpreferred stimuli consisted of adaptive behaviors the participants exhibited at low rates prior to the assessment. *Reach* was defined as any part of the child's arm or hand extending to or crossing a line that was drawn on a table 8 in. in front of the child. *Look* was defined as maintaining eye contact with the experimenter for 1 s. *Raise your hand* was defined as raising the hand above the head. *Touch my hand* was defined as making contact with the experimenter's hand, which was placed approximately 8 in. in front of

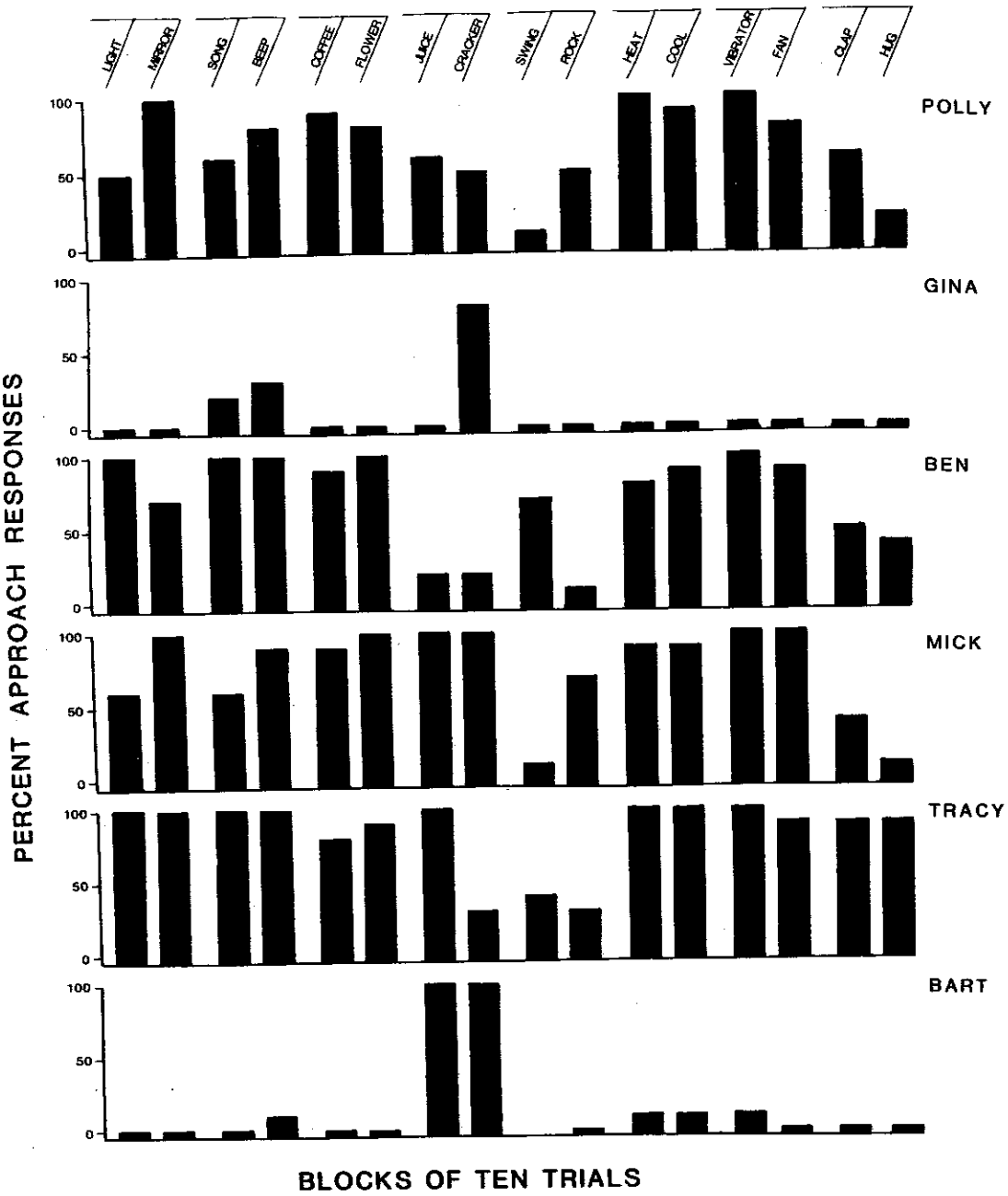

Figure 1. Percentage of approach responses to each of the 16 stimuli for each of the six participants.

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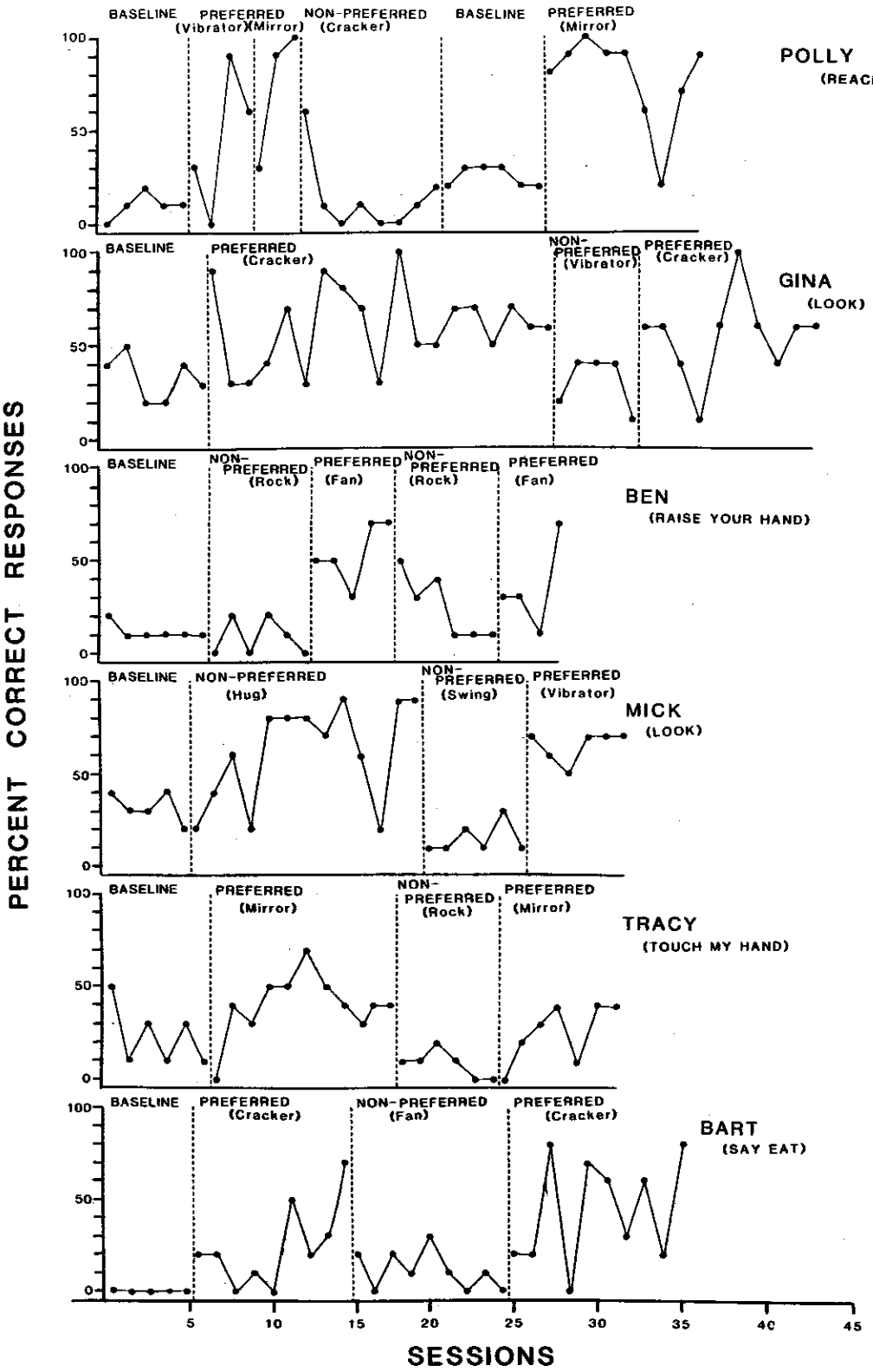
Figure 2. Percentage of trials each child engaged in the target response during baseline, preferred, and nonpreferred conditions. Specific stimuli and target responses are indicated for each child.


BASELINE
PREFERRED (Vibrator)(Mirror)
NON-PREFERRED (Cracker)
BASELINE
PREFERRED (Mirror)
POLLY (REACH)
BASELINE
PREFERRED (Cracker)
NON-PREFERRED (Vibrator)
PREFERRED (Cracker)
GINA (LOOK)
BASELINE
NON-PREFERRED (Rock)
PREFERRED (Fan)
NON-PREFERRED (Rock)
PREFERRED (Fan)
BEN (RAISE YOUR HAND)
BASELINE
NON-PREFERRED (Hug)
NON-PREFERRED (Swing)
PREFERRED (Vibrator)
MICK (LOOK)
BASELINE
PREFERRED (Mirror)
NON-PREFERRED (Rock)
PREFERRED (Mirror)
TRACY (TOUCH MY HAND)
BASELINE
PREFERRED (Cracker)
NON-PREFERRED (Fan)
PREFERRED (Cracker)
BART (SAY EAT)
100
50
0
5
10
15
20
25
30
35
40
45
PERCENT CORRECT RESPONSES
SESSIONS

the subject. *Saying eat* was defined as repeating the word eat following the experimenter's prompt.

Interobserver agreement was assessed on the occurrence of target responses across all participants on 49% of the sessions. Occurrence, nonoccurrence, and overall measures of agreement were calculated for each child and averaged at least 96%.

Results and Discussion

The effects of preferred and nonpreferred stimuli on each child's target response are shown in Figure 2. Generally, the contingent use of preferred stimuli increased the occurrence of target behaviors relative to baseline and nonpreferred conditions. This finding was consistent when conditions were shifted from baseline to preferred (Polly, Gina, Tracy, and Bart), nonpreferred to preferred (Gina, Ben, Mick, Tracy, and Bart), and preferred to nonpreferred (Polly, Gina, Ben, Tracy, and Bart).

The most notable exception was the result of a hug (nonpreferred stimulus) on Mick's "look" response. Within five sessions, contingent hugs increased *looking* from approximately 40% to 80% of the trials. Figure 2 reveals that the introduction of a second nonpreferred stimulus, the swing, produced the expected decrease in the target behavior.

The apparent reinforcing effect of a "nonpreferred" stimulus may exemplify a lack of correspondence between preference and reinforcement value, or it may simply reflect the development of social reinforcers. That is, it is possible that the social stimuli used required some minimal level of familiarity with the social agent prior to acquiring positive motivational properties (Zajonc, 1968). In Mick's case, the assessment was administered by a novel experimenter who, by the mere passage of time, had become more familiar at the point the validation was administered.

Of course, familiarity with any of the assessment stimuli may affect their reinforcement value. No attempt was made to determine which stimuli were familiar or novel to the participants prior to the study. Clearly, the role of preference and familiarity are related and should be investigated in future research.

GENERAL DISCUSSION

The results indicate that the assessment procedure was effective in identifying reinforcing stimuli for six profoundly retarded individuals. The extent to which this formalized method of reinforcer selection is more effective or efficient than the usual process cannot be determined at this time. Nevertheless, the procedure represents an empirical model of investigating an individual's reinforcers.

The assessment procedure was easy to administer, time efficient, and economical: It most likely could be conducted by any level of staff, it requires only 2 hr per patient to complete, and it makes use of commonly available stimuli and measurement apparatus. It is difficult to determine if the most salient, usable stimuli were assessed in this investigation. However, any stimuli could be used; those we examined were chosen because they represented some of the more commonly used stimuli found in studies concerned with motivating profoundly retarded individuals (Ferrari & Harris, 1981; Rincover et al., 1977).

Although we focused on the identification of positive reinforcers, the assessment procedure can also be used to identify stimuli that can function as negative reinforcers. This could easily be accomplished by including avoidance responses in addition to approach responses and introducing potentially aversive stimuli (e.g., noise, odors, reprimands.).

Previous reports have suggested procedures for increasing a reinforcer's effectiveness once reinforcers have been identified (cf. Egel, 1981; Rincover et al. 1977). Future research will be necessary to determine if the effectiveness of reinforcers identified by the present procedure can be enhanced by these and other techniques, so that they may function as durable reinforcers capable of developing and maintaining complex behavior.

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