JOURNAL OF APPLIED BEHAVIOR ANALYSIS 2006, **39,** 189–202 NUMBER 2 (SUMMER 2006)

SOME DETERMINANTS OF CHANGES IN PREFERENCE OVER TIME

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Results of longitudinal studies suggest that the stability of preferences varies across individuals, although it is unclear what variables account for these differences. We extended this work by conducting periodic assessments of preference for leisure activities over 3 to 6 months with 10 adults with developmental disabilities. Although previous research has collectively shown that preferences identified via repeated assessment are highly variable, our results showed that preferences were relatively stable for the majority (80%) of participants. In an attempt to identify some environmental determinants of shifts in preference, we provided extended daily access to high-preference items (preference-weakening manipulation) and paired access to low-preference items with social and edible putative reinforcers during brief sessions (preference-strengthening manipulation). Preference assessments continued over the course of these manipulations with 2 participants. Results showed that changes in preference across time could be produced systematically and suggest that naturally occurring changes in establishing operations or conditioning histories contribute to temporal shifts in preference. Implications for preference assessments, reinforcer usage, and planned attempts to change preferences are discussed.

DESCRIPTORS: conditioning, developmental disabilities, imposed variability, longitudinal assessment, preference assessment, preference stability, satiation

The selection of reinforcers is an important process in the development of both skill-acquisition and behavior-management programs for individuals with severe disabilities. Pace, Ivancic, Edwards, Iwata, and Page (1985) illustrated a two-step model in which the outcomes of empirical preference assessments were predictive of subsequent reinforcement effects. These results have been replicated many times across several different types of assessment techniques (e.g., DeLeon & Iwata, 1996; Fisher et al., 1992; Roane, Vollmer, Ringdahl, & Marcus, 1998); as a result, various indexes of preference (e.g., approach, selection, duration of engagement) are now used as the basis for selecting reinforcers during treatment as well as for arranging leisure-activity schedules.

Assuming that initial success is observed during intervention, subsequent fluctuations or decrements in performance may occur due to changes in preference over time as well as other factors. Mason, McGee, Farmer-Dougan, and Risley (1989) conducted two preference assessments approximately 1 month apart with 3 young boys with autism; Carr, Nicholson, and Higbee (2000) conducted eight assessments over a 1-month period with 3 young children with autism; and Zhou, Iwata, Goff, and Shore (2001) examined the stability of preference in

This research was supported in part by a grant from the Florida Department of Children and Families.

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doi: 10.1901/jaba.2006.163-04

22 adults with severe developmental disabilities, with assessments spaced approximately 16 months apart. The results were difficult to compare because assessments were conducted using different procedures, and results were reported in somewhat different ways. Mason et al. listed approach percentages in a table, Carr et al. presented bar charts showing item rankings across all eight assessments, and Zhou et al. presented bar charts of item rankings for 2 participants whose data showed a high degree of stability and instability. Zhou et al. also calculated Spearman rank order correlations for each of the 22 pairs of assessments.

To provide a comparable basis for summarizing results from the three studies, we (a) assigned ranks to the items in the Mason et al. (1989) study based on the percentage of trials on which the items were selected, (b) calculated rank order correlations between rankings in the initial and subsequent assessments (Mason et al.) or among rankings across assessments (Carr et al.), and (c) compared the obtained correlation coefficients in all three studies to a critical *r* value (Salkind, 2001) of .58. We selected .58 as a guideline because it was derived from a statistical textbook (Salkind), it produced reasonable agreement when compared to visual inspection of the data, and it was similar to Cicchetti and Sparrow's (1981) cutoff of $r = .6$ for a good test–retest reliability coefficient. The resulting coefficients for participants in the Mason et al. study were .26, .49, and .48, showing small or moderate positive correlations between the first and second assessments (none of the correlations exceeded the critical value). Correlation coefficients between each assessment and every other assessment were averaged to yield correlations of .14, .64, and .75 for the 3 participants in the Carr et al. study. Two of the three correlations exceeded the critical value, suggesting that their preferences were relatively stable. This outcome is consistent with the authors' conclusion based on visual inspection of the data. Finally, although positive correlations were obtained for 16 of the 22 participants in the Zhou et al. study, only six of these correlations exceeded the critical *r* value. Taken together, the results of these studies indicate that preferences were stable (i.e., measures on two or more assessments yielded highly similar results) for only 8 of a total of 28 participants (29%).

Thus, the literature suggests that preference, in addition to being idiosyncratic initially, may be relatively unstable across time. Although only a small amount of data is available, it appears that the lack of stability does not seem to be related to the age or disability of participants, the type of items included in the assessments, or the length of time between assessments. Interestingly, the largest proportion of participants whose preference patterns appeared to be stable was in the Carr et al. (2000) study, in which the paired-stimulus assessment (Fisher et al., 1992) was used. Because only 3 individuals participated in the Carr et al. study, the initial part of the current investigation involved an extension of Carr et al. through repeated assessment of preference for leisure items using the paired-stimulus format across varying lengths of time.

Although results from repeated assessments provide a descriptive analysis of the stability of preference, a determination of why preferences may or may not remain stable over time requires analysis of a different sort. Time per se does not produce a change in preference but is only correlated with other events that an individual experiences. Moreover, we assume that variability in preference is more likely to be imposed by these environmental events rather than being an inherent characteristic of behavior (Sidman, 1960). Thus, changes in preference among activities could result from the acquisition of new skills with respect to those activities, intervening conditioning histories in which particular items have been paired with other reinforcing events, or temporary changes in the reinforcing characteristics of particular items

due to their repeated presentation (i.e., satiation) or continued absence (i.e., deprivation) (Hanley, Iwata, & Lindberg, 1999; Hanley, Iwata, Roscoe, Thompson, & Lindberg, 2003; Klatt, Sherman, & Sheldon, 2000; Vollmer & Iwata, 1991).

Vollmer and Iwata (1991) provided an early demonstration that the efficacy of reinforcers could be influenced by deprivation and satiation conditions immediately prior to sessions. More recently, Hanley et al. (2003) showed that pairing one item with other reinforcing events could elevate its preference relative to another item that was not paired with other events. The second part of the current study extended the findings of Vollmer and Iwata and Hanley et al. by combining elements of these prior studies and examining the effects of satiation and conditioning procedures in a broader context involving multiple stimuli, longer delays between satiation and conditioning operations and the assessment of their effects, and repeated preference assessments.

METHOD

Setting and Participants

Ten adults ranging in age from 26 to 62 years participated. All had been diagnosed with a developmental delay (mild to severe), were ambulatory, and could follow single-step instructions. The participants attended a workshop program and were enrolled in this project to identify preferred activities that could be scheduled at times when work was unavailable. Sessions were conducted in the workshop cafeteria or in conference rooms that contained tables, chairs, and, at times, other workshop employees. All participants were given the opportunity to refuse to attend any session (this never occurred).

Descriptive Assessment of Preference Stability

Reinforcer assessment interviews for the severely disabled (Fisher, Piazza, Bowman, & Amari, 1996) were conducted with participants or staff members who worked with participants to identify items likely to be preferred. The nine items ranked highest by a respondent were included in repeated preference assessments that were conducted in a paired-stimulus format (Fisher et al., 1992). Each of the nine items was paired once with every other item during each assessment (resulting in 36 trials per assessment). An approach response, defined as reaching towards one of the items, was scored during each trial (approaching both items simultaneously was blocked). The participant was given 10- to 15-s access to each item following an approach response. If no item was approached on a given trial, both items were described to the participant, and a new trial was initiated. Proportions were calculated for each item by dividing the number of trials on which an item was approached by the total number of trials on which that item was presented. The items then were ranked inversely to their proportions (e.g., the item associated with the highest proportion received a rank of 1; the item associated with the lowest proportion received a rank of 9). Items that were selected on an equal number of trials were assigned an average rank (e.g., if two items were both selected on eight of nine trials, both would be assigned a rank of 1.5).

Subsequent assessments with the same items were conducted with each participant at approximately the same time of day across a 2- to 6-month period. The items used during the preference assessments were not explicitly made available outside the assessment sessions, but similar items (magazines, radios) were available in the participants' homes throughout the evaluation (as is typically the case when items from a preference assessment are used in behavioral programs). The median number of preference assessments conducted with each participant was 11 (range, 6 to 16; see Table 1). The minimum number of days between assessments was 7 for all participants, and the mean

Table 1
Summary Data for the Descriptive Assessment of Preferences

	Participant									
	Abe	Bo	Cathy	Dana	Ed	Fay	Gina	Han	Inga	Jan
Total number of PAs	11	11	11	11	9	10	8	6	11	16
Number of baseline PAs	11	11	11	11	9	10	8	6	4	6
Mean number of days between PAs	9	9.6	8.9	9.2	12.6	9.2	8.7	25	9.7	11.4
Range of days between PAs	7–13	7–13	7–11	7–15	7–26	7–13	7–19	8–106	7–13	7–22
Total number of days in assessment	90	96	89	92	101	83	70	151	97	181
Percentage of PAs with IOA	63.6	81.8	63.6	63.6	66.7	70	50	50	63.6	68.8
Mean IOA	100	99.4	99.2	99.2	100	97.2	100	100	98.4	99.5
Lowest IOA score		94.4	94.4	94.4		94.4			88.9	94.4
Mean correlation between each PA and every other PA (stability measure)	.28	.18	**.68**	.57	**.65**	**.60**	**.71**	**.74**	**.70**	**.76**
Mean correlation between first and subsequent baseline PAs (predictive validity measure)	−.11	.15	.32	.44	.49	**.64**	**.67**	**.85**	**.77**	**.71**

Note. The numbers in bold face represent mean correlation coefficients that exceeded a critical *r* value. PA = preference assessment; IOA = interobserver agreement.

number of days between assessments ranged from 8.7 to 25 across participants (see Table 1).

Experimental Analysis of Preference Stability

Results from several studies have indicated that variability is often evident when repeated preference assessments are conducted (Carr et al., 2000; Mason et al., 1989; Zhou et al., 2001). We examined whether similar variability could be imposed on otherwise stable preference patterns. Toward that end, two procedures, one for decreasing and one for enhancing the reinforcing value of an item, were implemented with Inga and Jan, who were selected because stability was most evident in their repeated preference assessments. Correlations between preference assessments (measures of stability) were well above our critical *r* value for four of Inga's five assessments and for six of Jan's seven assessments. These assessments served as the baselines from which the effects of satiation and conditioning procedures were evaluated.

The satiation procedure was applied to items that were consistently ranked the highest during the baseline assessments. This item was a Walkman® radio, which Inga selected most often in all baseline assessments and Jan selected most often in six of the seven baseline assessments. When the satiation procedure was in effect, free access to the radio was available to Inga and Jan for a minimum of 2 hr and a maximum of 3 hr each day, except on days in which a preference assessment was conducted, when it was unavailable. This was accomplished by providing Jan or Inga with the radio during the morning shift and periodically checking on her to be sure it was accessible and operating (checking batteries, etc.). It is important to note that there was

always at least a 24-hr period between free access to the radio and a preference assessment.

During the same period in which the satiation procedure was implemented, conditioning trials were conducted with items that were rarely selected during baseline assessments. Bubbles (*M* rank = 8.3) and a drawing book (*M* rank = 8.3) were included in the initial conditioning trials for Inga and Jan, respectively. The conditioning procedure involved pairing these less preferred items with social reinforcement (continuous attention) and consumable items (diet soda and salty snack foods). The reinforcing efficacy of these items had been demonstrated in previous unrelated research projects (Thompson, Iwata, Hanley, Dozier, & Samaha, 2003) or was presumed based on the number of requests made for these items and interactions in the past. Because access to the item to be conditioned was a requirement for conditioning to occur and this access may have mitigated the effects of conditioning, an attempt was made to equate exposure time with other less preferred items. Therefore, conditioning sessions involved 15 consecutive 1-min trials in which one of three items was available singly (i.e., each item was available for five trials). During the bubbles (Inga) and drawing book (Jan) trials, diet soda and low-fat snack foods were accessible, and the therapist interacted and conversed with the participant continuously and praised all forms of engagement. By contrast, when the other two low-preference items were available (drawing and puzzles for Inga; beads and office task for Jan), soda or snacks were not present, and the therapist directed his or her attention to a task (i.e., no attention was delivered to the participant). One conditioning session was conducted each day except on days when preference assessments were conducted (i.e., there was always at least a 24-hr period between a conditioning session and a preference assessment).

Aftereffects of the satiation and conditioning procedures had been observed with the first set of items, the satiation procedures were reassigned to the office task (*M* rank = 3.4) and the magazines (*M* rank = 2.9), and the conditioning procedures were reassigned to the writing pad (*M* rank = 7.3) and sewing activity (*M* rank = 6.8) for Inga and Jan, respectively. The effects of the satiation and conditioning procedures were determined by discontinuing the procedures with the initial set of items (radio and bubbles for Inga; radio and drawing for Jan) and reassigning the procedures to new sets of items. Thus, an ABA reversal design was used to assess the effects of the satiation and conditioning procedures with the initial set of items, whereas a multiple baseline design was used to determine the effects of the same independent variables across sets of items.

RESULTS

Preference patterns ranged from highly stable to quite variable across the 10 participants. Figure 1 shows two extreme patterns. Han's six assessments are characterized by a high degree of stability. For instance, the radio always retained a rank of 1 or 2, and the beading materials always retained a rank of 8 or 9. Some variability may be noted for other items such as cologne or bubbles, but the initial hierarchy among the nine items usually held across repeated assessments. By contrast, Abe's initial six preference assessments (Figure 1, bottom) show a high degree of variability (only six are displayed to provide an easier visual comparison with Han's data). Six of the nine items shifted four or more ranks across six assessments. The items ranked highest and lowest initially (massager and jigsaw puzzles, respectively) were ranked seventh and first, respectively, by the sixth assessment.

Less extreme patterns of responding were more difficult to identify through visual inspection of bar graphs, especially as the number of assessments increased beyond six. Therefore, rank-order correlation coefficients were calculated to determine the correspondence between

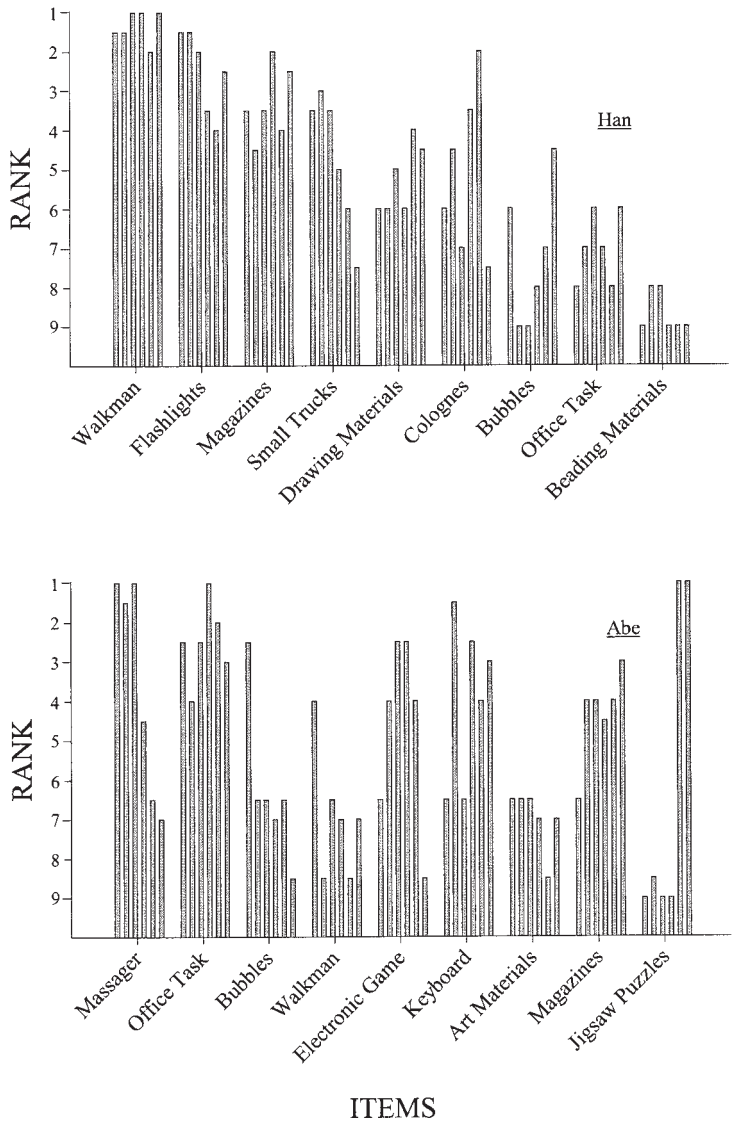

Figure 1. The results of six consecutive preference assessments are shown for Han and Abe. The items with the highest selection percentages were assigned a rank of 1, and the items with the lowest selection percentages were assigned a rank of 9.

the each assessment and every other assessment by assigning ranks based on selection percentages (1 for the item with the highest selection percentage; 9 for the item with the lowest) and comparing the ranks from each assessment with every other assessment. Because Spearman rank order correlation cannot be calculated with noninteger ranks that we assigned to stimuli selected on the same number of trials, we calculated Pearson correlation coefficients for each assessment comparison. Each mean correlation coefficient is displayed for all participants (including Abe and Han) in Figure 2. The results of each preference assessment were considered to be consistent with the results of other preference assessments if the mean correlation coefficient equaled or exceeded the critical *r* value of .58 (Salkind, 2001). Strong

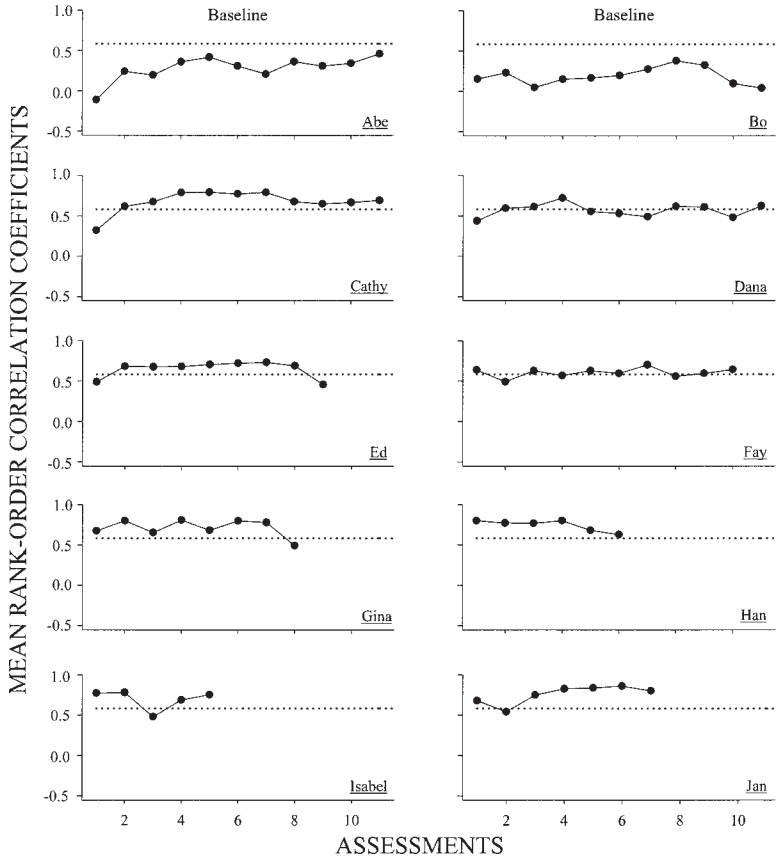

Figure 2. A description of preference stability for each participant is shown in each of the 10 panels. Mean rank order correlation coefficients were derived by comparing ranks from each preference assessment with ranks from every other preference assessment. Points above the dotted lines indicate strong positive correlations, exceeding a critical *r* value.

positive correlations were exclusively observed with Han (Figure 2), consistent with the bar-chart data that showed Han's repeated assessment data to be quite stable (Figure 1). By contrast, Abe's mean correlation coefficients were quite variable, with all falling below our critical *r* value, also consistent with his graphically depicted data.

Preference measures appeared to be highly unstable for 2 of the participants (Abe and Bo; Figure 2). Consistently low mean correlation coefficients showed that Bo's assessment outcomes were the most inconsistent, whereas with Abe, assessment outcomes were becoming more consistent across repeated exposures. Preference measures appeared to be generally stable for 7 participants (see the data for Cathy, Ed, Fay, Gina, Han, Inga, and Jan in Figure 2), in that the majority of mean correlation coefficients met or exceeded our critical *r* value. Stability was difficult to determine for Dana, whose coefficients varied above and below the criterion throughout her evaluation.

Table 1 shows that the mean correlations between preference assessments for each participant mapped onto the conclusions derived from Figure 2 in that preferences were deemed highly variable for 2 participants, stable for 7 participants, and slightly below stability criterion for 1 participant. By comparing each assessment to every other assessment, we were able to determine the consistency of preference measures collected with the same participant; hence, a measure of preference stability was

derived. In contrast, by comparing the results of the initial assessment with those of each subsequent assessment, we were able to derive a measure of the predictive validity of the initial preference assessment.

The mean of the correlations between the first preference assessment and each subsequent one are shown in Table 1 for each participant. These data are important because preference assessments are often conducted only once, and the capacity to predict preferences at a different point in time based on the initial assessment results is integral for the success of teaching and behavior-management programs. The correlation coefficients derived from comparing the initial assessment with each subsequent assessment were found to be above the critical *r* value for half of the participants.

The bottom panels of Figure 2 show the rank order correlation coefficients for Inga and Jan, the 2 individuals who participated in the satiation and conditioning procedures. Their baselines were stable, in that all but one assessment shared a strong positive correlation with the other assessments. Subsequently, variability was imposed on their stable preference patterns by providing free access to their highly preferred items on days prior to the preference assessment (the satiation procedure) and by pairing originally nonpreferred items with social and consumable reinforcers (the conditioning procedure). Figure 3 provides a detailed examination of the independent contributions of the satiation and conditioning procedures with Inga and Jan. The top panel shows that the radio was consistently ranked first (*M* rank = 1) and that the bubbles activity was ranked low (*M* rank = 8.3) in the majority of Inga's baseline assessments. Her preference for the radio was disrupted during the satiation procedure, as evidenced by a decreasing trend in rank (*M* rank = 6.2). By contrast, the rank for the bubbles activity shows a slight but noticeable increase (*M* rank = 5.8). Baseline preference ranks were recovered when the satiation and conditioning procedures were removed from the radio (*M* rank = 2.5) and bubbles (*M* rank = 9), respectively. Inga's preference rankings for the office task (second panel) were variable in baseline but were consistently high just prior to arranging daily access to this activity (*M* rank = 3.4). By contrast, the writing pad was consistently ranked low during the same baseline period (*M* rank = 7.4). When the satiation and conditioning procedures were applied to the office task and the writing pad, respectively, the rank for the office task decreased (*M* rank = 5.7), whereas the rank for the writing pad increased immediately (*M* rank = 4.2).

The third panel of Figure 3 shows the ranks for the two items that were present during conditioning sessions but were not paired with social or edible reinforcers. The fourth panel shows the remaining three items that were included in each preference assessment. Data for these five items show that there were no systematic changes in rank following implementation of the initial or subsequent satiation and conditioning procedures for the other four items.

Similar shifts in rank as a function of the satiation and conditioning procedures were observed with Jan (Figure 4, top two panels). During baseline, the radio was ranked first during all but one assessment (*M* rank = 1.7), whereas drawing was consistently ranked low (*M* rank = 8.3). Gradual shifts in rank for these activities were observed during the satiation and conditioning conditions. Preference for the radio (satiation procedure) steadily decreased and was ranked 9 for the last two sessions, whereas the rank of the drawing book (conditioning procedure) increased (*M* rank = 7.4). During the return to baseline, the rank of the radio increased (*M* rank = 4.8), although the level observed in the initial baseline was not recovered, and the rank of the drawing book decreased to previously observed levels (*M* rank = 8.8). The high rank associated with the

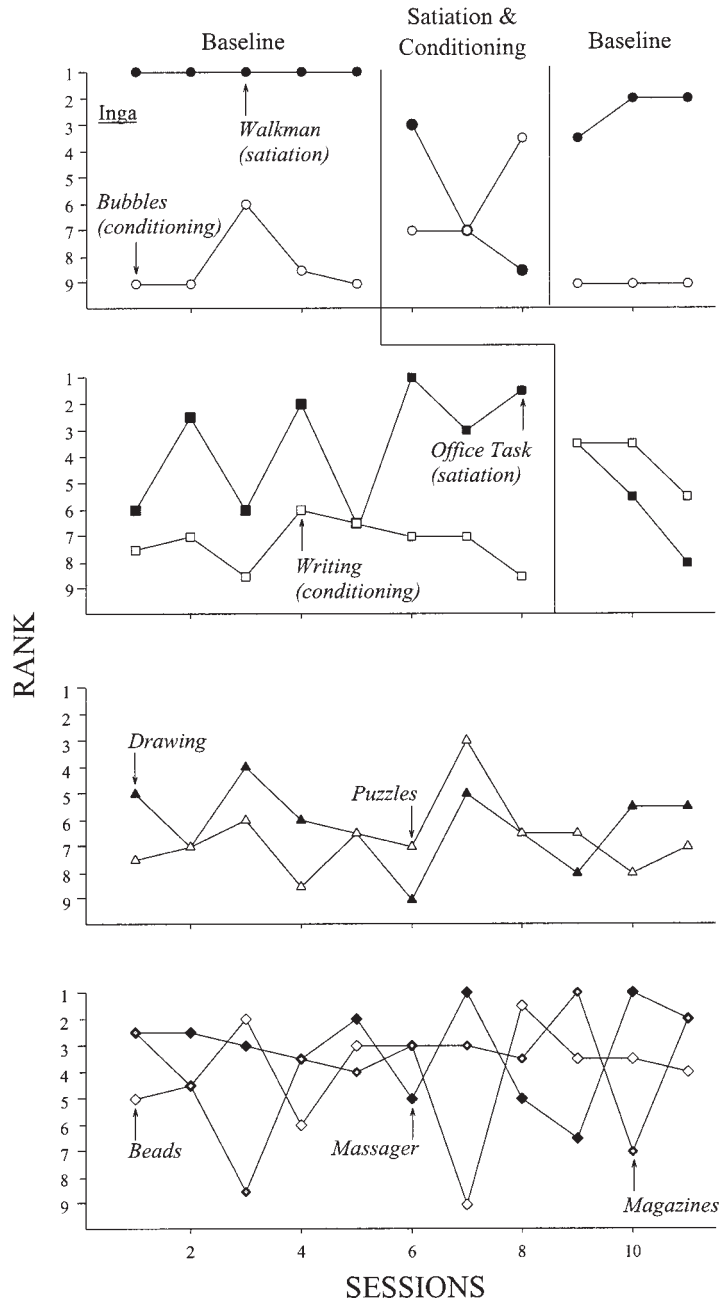

Figure 3. The results of the experimental analysis of preference stability are shown for Inga. The first and second panels show the results of the satiation and conditioning procedures for the first and second set of items, respectively. The third panel shows the rank for the two items that were present during conditioning sessions but were not paired with social or edible reinforcers. The fourth panel shows the remaining three items that were included in each preference assessment.

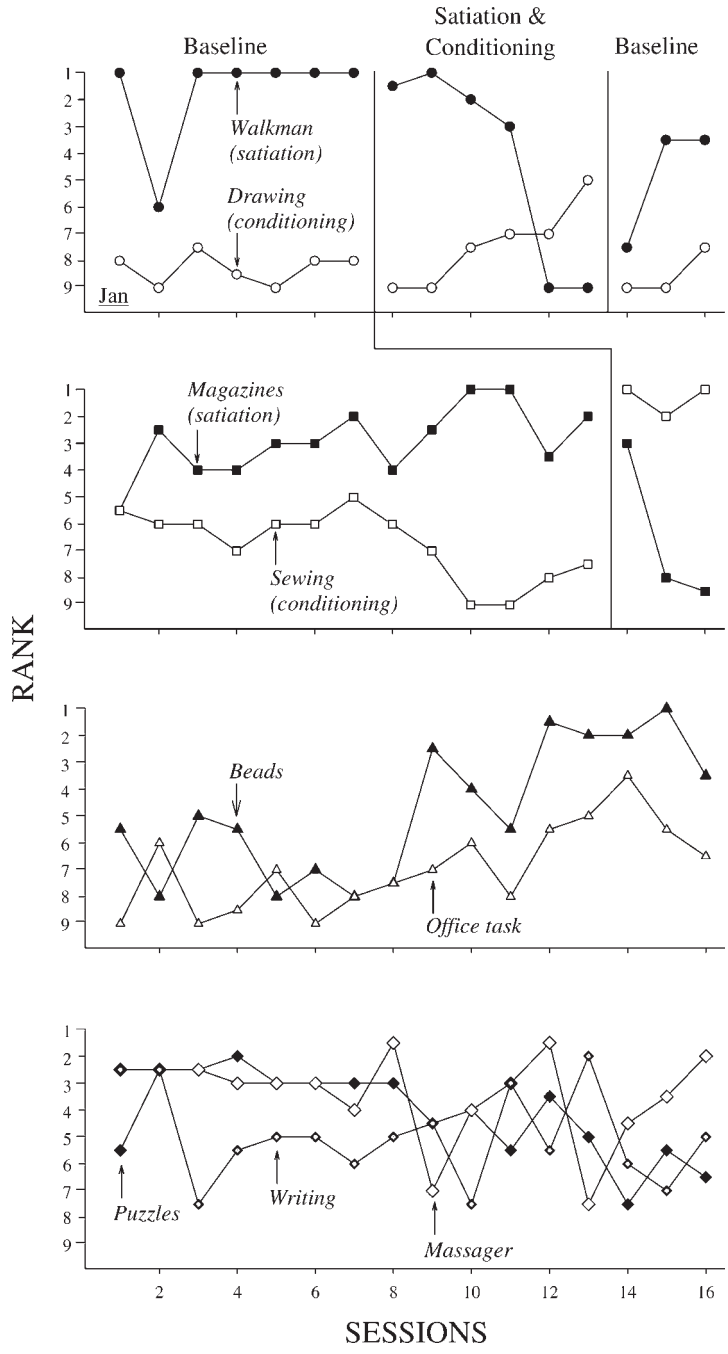

Figure 4. The results of the experimental analysis of preference stability are shown for Jan. The first and second panels show the results of the satiation and conditioning procedures for the first and second set of items, respectively. The third panel shows the rank for the two items that were present during conditioning sessions but were not paired with social or edible reinforcers. The fourth panel shows the remaining three items that were included in each preference assessment.

magazines in baseline (*M* rank = 2.9) was disrupted following the introduction of the satiation procedure (*M* rank = 6.5). By contrast, the rank of the sewing activity, which was relatively low in baseline (*M* rank = 6.8), immediately increased following the introduction of the conditioning procedure (*M* rank = 1.3).

Although an overall increasing trend in rank was observed for the two items that were present during conditioning sessions but were not paired with social or edible reinforcers (third panel of Figure 4), the rank of these items did not systematically change with the onset and withdrawal of the experimental procedures. Unsystematic changes in rankings were also observed for the remaining three assessment items (fourth panel of Figure 4).

DISCUSSION

The longitudinal analysis of preference provided data from repeated measures (6 to 14 times) over a relatively long time span (3 to 6 months) for 10 participants. Preferences were shown to be stable for 7 of the 10 participants. These results are similar to those obtained by Carr et al. (2000), Mason et al. (1989), and Zhou et al. (2001), in that idiosyncratic preference patterns were observed across participants. Taken together, results of the four studies on preference stability show that preferences were stable across assessments for 15 of 38 (40%) individuals for whom repeated assessments have been conducted. Although the samples are small, it is interesting to note that the studies involving the paired-item preference assessment format (Carr et al., 2000; the present study) resulted in more stable preference patterns (67% and 70%, respectively) than the studies incorporating single-item preference assessment formats (0% and 27% for Mason et al., 1989, and Zhou et al., 2001, respectively). This may be a direct function of the assessment format, or it is equally plausible that this difference is attributable to another variable associated with the selection of a particular format (e.g., level of participant disability).

Results of the experimental analysis can be summarized as follows: (a) The largest shifts in activity rank were observed following the introduction of either the satiation or conditioning procedures. (b) The rank of all eight items assigned to one of the procedures changed in the expected direction (i.e., rank of items that received the satiation procedure decreased, whereas rank of items that received the conditioning procedures increased). (c) The satiation operation resulted in a greater change in rank than did the conditioning procedures. Thus, the experimental analysis showed that variability in preference could be imposed by providing frequent access to highly valued items or by pairing less valued items with other reinforcers. Although the imposed variability in the experimental analysis was similar in magnitude to the variability observed with other participants during the descriptive assessments, it is not certain whether similar environmental conditions were responsible for the variability observed during the descriptive assessments. Nevertheless, these data provide direct evidence that preferences may change as a function of specific experiences with the items assessed.

Results from Carr et al. (2000) provide some indirect evidence that changes in preference may influence the effects of reinforcement-based interventions. These authors showed that items ranked higher in preference assessments were associated with a higher percentage of correct responses during academic tasks than were items ranked lower. These data, combined with results of the present study, suggest that decreases in preference for an item may have an adverse effect on performance. Future research should evaluate more directly whether changes in preference do indeed affect socially relevant performances.

The present results also have implications for the selection and use of reinforcers. For 4 participants, the lowest (Abe, Cathy, and Dana)

or the second lowest mean correlation (Ed) was associated with the initial preference assessment. Although our participants had either experienced the same items or similar items (radios, magazines, drawing materials) prior to our initial preference assessment, these data show that for 40% of participants, the initial assessment yielded results that were inconsistent with their demonstrated preferences over time. Future research should determine whether an additional paired-item assessment or simply longer preassessment exposure would result in an initial assessment that is more highly predictive of future demonstrations of preference.

Regardless of assessment format (single item, paired item, group array), preferences should be evaluated frequently, if possible, so as to reflect changes as a function of exposure. To that end, brief assessment formats (DeLeon & Iwata, 1996; Roane et al., 1998) or assessments embedded into daily routines (Green, Middleton, & Reid, 2000; Parsons & Reid, 1990) may be most desirable. As an alternative, providing varied types of reinforcers (Egel, 1981) or allowing a participant to select from a set of preferred items during the training session (Fisher, Thompson, Piazza, Crosland, & Gotjen, 1997) may also prevent performance decrements as a function of repeated use.

Vollmer and Iwata (1991) showed that extended access to social and food reinforcers immediately prior to experimental sessions decreased the rate of responses maintained by these reinforcers. This study demonstrated the conceptual and practical importance of establishing operations, which alter the reinforcing effects of stimuli and the likelihood of behaviors that have produced those stimuli in the past (Michael, 1982, 1993). In a related study, Gottschalk, Libby, and Graff (2000) showed that free or restricted access to stimuli prior to a preference assessment influenced preference rank. The current study extends these results by showing that access to preferred events well before the assessment of preference for them (24 to 72 hr) can have a similar influence. In other words, establishing operations do not require close temporal proximity to alter the influence of reinforcers on behavior.

Klatt et al. (2000) showed that the extent to which individuals engaged in preferred activities was positively correlated with the duration of deprivation from those activities. A separate and interesting outcome of their study was that deprivation had no appreciable effect on engagement in less preferred activities. This outcome is noteworthy because increasing engagement with less preferred activities is often an important goal for individuals with limited activity preferences or for individuals who avoid habilitative activities. To that end, Hanley et al. (1999, 2003) showed that less preferred activities may become highly preferred when already-established reinforcers are permanently embedded within less preferred activities or if a sufficient number of pairings of established reinforcers and less preferred activities is arranged. Both are practical strategies for promoting selection and engagement of less preferred activities, but two different outcomes with different practical implications may result.

One outcome is that the temporary value of an activity is increased by the presence of the other reinforcers. This shift is evident by the immediacy with which low-preference activities resume their former status once the embedded reinforcers are removed (see Hanley et al., 1999, 2003). The alternative outcome is that a previously less preferred activity may acquire reinforcing properties (i.e., there is a more enduring change in the value of the stimulus). This change in the function of the item has been shown by the continued selection and engagement of the item even when other reinforcers are not present and have not been present for some time. The pairing procedures used in Hanley et al. (2003) and in the present study resulted in changes in the value of items that persisted when the paired items were no longer present, a process presumably consistent

with conditioning (Williams, 1994). However, conditioned preferences persisted for both participants in Hanley et al. (2003), whereas the conditioning effects were shown to dissipate rapidly when the pairing procedure was terminated in the current study (see the drawing activity for Jan and the bubbles activity for Inga). Several factors may account for differences in conditioning durability across the two studies, including longer pairing periods and gradual elimination of pairings in the Hanley et al. (2003) study. To better understand and promote enduring changes in the value of important activities, future research should be directed towards determining the optimal duration and amount of exposure to pairings and the most effective method of eliminating the primary reinforcers.

There are several limitations to the current study. First, the satiation and conditioning procedures were implemented simultaneously in the experimental analyses; thus, the combined effects of the two variables may have been more influential than the separate effects of each. Second, only one type of reinforcer (leisure activities) was evaluated, and with a limited population (adults with developmental disabilities). Finally, changing preference for leisure activities may be considered socially unimportant given that all were seemingly appropriate (activity assignment to the satiation and conditioning procedures was based purely on baseline rank). However, the primary contribution of this experiment is that it may provide a better understanding of specific learning processes that influence preference, which may yield practical strategies for altering preference among simultaneously available activities when it is important to do so.

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Received November 22, 2004
Final acceptance January 20, 2006
Action Editor, Wayne Fisher