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A PRACTICAL STRATEGY FOR ONGOING REINFORCER ASSESSMENT

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There is a need for practical methods of reinforcer assessment that systematically track ongoing changes in clients' preferences. In this study, the effects of a time-efficient reinforcer assessment package were evaluated in a multiple baseline across 3 preschoolers with autism, comparing individualized item selections by experienced teachers with children's presession preferences for items of various sensory qualities. Systematic assessment of children's reinforcers for correct responding virtually eliminated nontargeted maladaptive behaviors, as well as yielding expected improvements in accuracy. The powerful side-effects of potent reinforcers underline the importance of increased attention to reinforcer assessment in research and practice.

DESCRIPTORS: reinforcer assessment, side-effects, maladaptive behaviors, autism

Despite recognition that reinforcer potency is central to efforts to affect behavior, attention to reinforcer quality is sporadic in both applied research and practice. The complexities of systematic reinforcer assessment often relegate this process to the art of informal observation, staff guessing, and self-report. These circumstances suggest a need for a practical tool to assess client preferences, a tool that reflects changes in reinforcer variance across differing situations.

There is a body of innovative research on applied reinforcement procedures, primarily aimed at the problem of restricted preferences in people with severe developmental disabilities. Examinations of the reinforcement value of various sensory events expanded capabilities of individualizing reinforcers (Bailey & Meyerson, 1969; Ferrari & Harris, 1981; Rincover & Newsom, 1985; Rincover, Newsom, Lovaas, & Koegel, 1977). In a comparison of constant versus varied delivery of edibles, Egel (1981) demonstrated the importance of reinforcer variance in reducing satiation. Findings that acquisition by children with autism improved when there was a functional relationship between responses and reinforcers (Williams, Koegel, & Egel, 1981) turned out to have explanatory value for the current trend of in-context interventions. Moreover, descriptive and functional analyses showed that participation in child-preferred activities was inversely related to social avoidance behaviors (Koegel, Dyer, & Bell, 1987).

A contribution to the process of reinforcer assessment came from a systematic validation of stimulus preferences of clients with profound retardation (Pace, Ivancic, Edwards, Iwata, & Page, 1985). High-value reinforcers were selected by sampling from a large pool of items representing various sensory qualities; preferences were established by measuring approach, avoidance, smiling, vocalizations, and compliance to instructions. This type of comprehensive assessment was adapted for use by clients with gross motor impairments (Datillo, 1986; Wacker, Berg, Wiggins, Muldoon, & Cavanaugh, 1985), and in comparison to preference predictions by staff, comprehensive assessment of sensory preferences proved to be a more accurate means of reinforcer selection (Green et al., 1988). Dyer (1987) recently added an alternative comprehensive procedure for examining the effects of systematic

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assessment on levels of stereotypies in children with autism.

However, these substantial advances in reinforcer assessment technology appear to have yielded little impact on other areas of applied research. For example, a survey of Volume 19 of the *Journal of Applied Behavior Analysis* (1986) reveals that only three of 44 studies (7%) reported a systematic method of reinforcer selection (see Shafer, Egel, & Neef, 1984, for an example of how reinforcer selection might be detailed in investigations of other response parameters). More often, there appears to be an implicit assumption that investigators use preferred stimuli as reinforcers, or that the standard edibles, praise, and/or tokens are sufficient for even the lowest functioning clients.

Presumably, the scant attention given to reinforcer assessment is even more pronounced in service settings, where realistic time constraints may prohibit the type of comprehensive assessment proposed by Pace et al. (1985) or Dyer (1987). It remains an empirical question as to how often reinforcer assessment is needed for each client. In pilot work for this study, Farmer-Dougan and McGee (1986) found that children's preferences varied not only from day to day, but also across sessions and teachers (e.g., one hyperactive child stated that although he selected balloons and paint to work with the female experimenter at the beginning of the day, he preferred to play with trucks with a male teacher after lunch). The challenge of setting-specific reinforcer assessment accentuates the need for a practical tool (i.e., one that does not take up most of the teaching session time and does not squander the potency of the upcoming teaching trials).

In this study, we examined the effects of a practical reinforcer assessment package, consisting of an initial administration of the comprehensive Pace et al. (1985) assessment in combination with a presession mini-assessment. Earlier pilot research (Farmer-Dougan & McGee, 1986) had shown that baseline rates of the primary treatment targets, engagement and verbalizations, were high during all one-to-one sessions; therefore, to permit sensitive comparison of typical teacher-selection procedures and ongoing child-selection conditions, the primary dependent variables were levels of maladaptive behaviors as a function of reinforcement for correct responding. Direct effects on accuracy were also measured, as were side-effects on out-of-seat behavior. Additionally, efficiency parameters of selection strategies were examined, along with changes in the preferences of children with autism across time.

METHOD

Subjects

Participants were 3 boys who presented characteristics of autism, as defined by the National Society for Autistic Children (Ritvo & Freeman, 1978). The children were receiving early intervention at the Walden Learning Center; Child 1 had been enrolled for 13 months, Child 2 for 5 months, and Child 3 had entered treatment 1 month prior to the onset of the study.

Child 1's chronological age was 4 years, 10 months, with performance on the Kaufman Assessment Battery for Children (K-ABC) indicating cognitive functioning in the range of 8 months to 1 year below age level. Language assessment on the revised Peabody Picture Vocabulary Test (PPVT) placed him at the 3-year level. Developmental and adaptive functioning scales indicated wide scatter across areas, with a general delay of 1.5 years. He could follow routine directions and speak in three- to five-word sentences, although noncompliance and echolalia typically occurred at high rates during structured one-to-one teaching sessions.

Child 2 was 5 years, 1 month of age. He scored at a 3.5- to 4-year cognitive level on the K-ABC, and the PPVT placed him at the 3-year level. Mute upon program entry, Child 2 had recently acquired functional speech. Areas of strength included counting and some sight-word reading. Although ritualistic behaviors had decreased since program entry, low intensity eye poking and hand biting occurred frequently.

Child 3 was 4 years old. The K-ABC indicated functioning in the 1st percentile, with no basal scores in verbal behavior. Assessment with the Mecham Language Development Scale produced a combined receptive and expressive score at the 1-year level. Child 3 was toilet trained in the course of

this study, and he was learning to follow simple directions. He was able to decode written words, and he could discriminate numerous varieties of automobiles. Stereotypic hand flapping, finger manipulation, body rocking, and noise making occurred at high levels.

Setting and Stimuli

Sessions took place in an open classroom in a socially integrated preschool. Children were accustomed to circulating among incidental teaching zones, such as free play, small group activities, and brief one-to-one sessions. The classroom-wide behavior management strategy emphasized problem prevention via maintenance of high levels of engagement, with planned ignoring of stereotypies. Child 1 also received individualized treatment for disruptive behavior (consisting of redirection to alternative zones), but these consequences were not in effect during experimental sessions.

The study was conducted in a low-activity corner of the classroom, with the child seated at a table adjacent to the experimenter. During the mini-assessment, stimuli were displayed on the table out of reach of the child.

Consequent stimuli during baseline consisted of items or events identified as child-preferred by teachers, who had been working in the classroom for at least 15 hours per week for an average of 10 months (the range of teachers' onsite experience was 4 to 20 months). Baseline consequences selected by teachers included food, social activities (e.g., tickles, praise, singing, etc.), and classroom toys. Traditional preschool toys included singular and multiple component stimulus qualities (e.g., books were largely visual stimuli, whereas a pretend gasoline pump included colors and moving pictures as well as sounds when activated). Regular classroom procedures consisted of daily rotation of baskets of various manipulative toys (e.g., bristle blocks, legos, cars), along with weekly or monthly rotation of more standard classroom materials (e.g., toy piano, dress-ups). Classroom toys were freely available in typical preschool zone arrangements (e.g., blocks were stored on child-accessible shelves in free play, tea sets were in a housekeeping area, books were on a display shelf in a comfortable reading area, juice was offered in the kitchen during meals and after recess). Teachers also had an option of selecting nondisplayed toys from storage shelves, a common practice when attempting to secure improved performance from an unengaged child.

The reinforcer assessment package involved two stimuli from each of the following categories: (a) olfactory (potpourri, coffee beans); (b) gustatory (juice, animal crackers or cookies); (c) visual (flashing light, mirror); (d) tactile (vibrating wind-up toy, fan); (e) thermal (ice, heating pad); (f) vestibular (rocking, spinning); (g) auditory (touch-tone telephone beep; music); and (h) social (clapping, hugs). These items were selected by an experimenter who had no other experience in the classroom; selections were based on the criteria of including a singular sensory output. With the exceptions of gustatory and social stimuli, particular items used in the reinforcer assessment condition were available only during research sessions; however, in most cases, similar items were usually on display in the classroom (e.g., a different tape recorder, other vibrating wind-up toys, a full-length mirror, etc.).

The number of consequent stimuli used in teaching was individualized, based on approximately half the number of stimuli identified as preferred during the initial comprehensive assessment. Some variability in the number of items per session occurred when teachers listed more or less than the requested number of items, or when children refused both of a pair of stimuli that had been previously identified as preferred. Child 1 averaged five items in both conditions, Child 2 averaged three items during teacher-selection conditions and five items during child selections, and Child 3 averaged three items during teacher selections and two items during child selections.

Design

The effects of a reinforcer assessment package in reducing individually defined maladaptive behaviors were assessed in a multiple baseline across subjects (Baer, Wolf, & Risley, 1968). Effects on correct responding on a discrimination task were also examined, along with collateral effects on out-of-seat behavior. A brief assessment of stimuli used to reinforce correct responses preceded daily teach-

ing sessions. Teachers selected stimuli during baseline, and children identified stimuli with the reinforcer assessment package during intervention. Criterion for introduction of the reinforcer assessment package was three sessions of stable or ascending trends in maladaptive behaviors.

Teaching Sessions

Throughout the study, two-choice receptive discriminations of simple body parts were taught to each child during one-to-one discrete-trial sessions. The task of body-part identification was selected by the classroom's lead teacher because it appeared as an individualized educational objective for each of the participants, who had been unable to display these skills on standardized developmental inventories.

Daily sessions of 10 trials lasted approximately 13 min during baseline and 7 min during intervention. Trials began with an instruction to "Touch your (ankle)." Incorrect responses produced a prompt sequence consisting of a repeated instruction, a modeled demonstration, and gentle physical assistance to complete the response, with a 5-s opportunity to respond between each prompt component. Correct responses to verbal or modeled prompts were followed by praise and 5-s access to a reinforcing stimulus. Stimulus consequences alternated arbitrarily across trials to prevent satiation. Only descriptive feedback (e.g., "that's your ankle") followed physical assistance prompts. Consequences were independent of the occurrence or nonoccurrence of maladaptive behaviors.

Each of a pair of body parts was taught to criterion (three consecutive sessions at a minimum of 80% correct responding), followed by discrimination training via randomly alternating trials on both body parts. A new pair of body parts was introduced after acquisition of the preceding pair discrimination.

Baseline

The selection of consequent stimuli during baseline simulated typical classroom strategies. Immediately prior to the teaching session, the experimenter approached 1 of 4 experienced teachers who had daily contact with the child; teachers alternated across days, providing several respondents. The teacher was asked, "Will you list (x number of) items (Child 1) will work for in my next session?" The teacher usually paused and scanned the room to search for items the child seemed to like. Often, teachers commented on their reasons for various selections, suggesting that they usually based their decisions on their recall of high frequency activities in which the child engaged ("Well, he plays with the cash register and the shape box. He looks at books all the time. He likes to ruffle paper through his hands. Lately, he's been playing with the magnetic letters, and, let's see, he likes to bang on the xylophone alot."). Upon the teacher's listing of the final item, the stimuli and child were retrieved, and the teaching session began.

Reinforcer Assessment Package

A comprehensive reinforcer preference assessment was administered as described by Pace et al. (1985), at the beginning and end of the study. In summary, an experimenter (who was initially unfamiliar to the children) presented single-item trials of a pool of stimuli representing different sensory categories. Each item was alternated randomly among stimuli for 10 trials. If a child failed to approach (i.e., reach for or correctly label) an item within 5 s of its display, the experimenter prompted the child by providing a model of the response (i.e., the experimenter picked up and manipulated the item), and then re-presented the trial after a 5-s latency; it may be noted that this step was a slight variation from the Pace et al. (1985) procedure, in that children were not directly prompted to manipulate or contact the items. Preferred items were those that children approached on 80% of the initial trials.

The daily presession mini-assessment consisted of one presentation of each of the items designated as preferred in the initial comprehensive assessment. The experimenter simultaneously displayed two preferred stimuli; the order and position of items varied across presentations, and two stimuli from

the same sensory category were never presented as pairs. The child was given one instruction to "Pick one." There were no time limitations on how long the child could take to make a selection, and the experimenter continued to display the two items until a selection or active rejection was made. However, if the child pushed the stimuli away or requested an alternative item, the stimuli were discarded and the next set of stimuli was presented. On early sessions for Child 1, a prior prompt to keep one hand in his lap was needed to force single choices. For each pair of stimuli, the experimenter set aside the first item the child touched for use as a reinforcer in the upcoming teaching session.

Measurement

Occurrences and nonoccurrences of target responses were scored within discrete trials, beginning with the first verbal instruction ("Touch your ___") and ending with the final verbal feedback statement ("Great, you touched your ___" or "That's your ___"). Primary dependent variables were individually defined maladaptive behaviors. For Child 1, *aggression* was scored for pinches, kicks, or slaps to others, as well as for throwing objects; *spitting* included dripping saliva past his lower lip, or blowing air through his teeth. Child 2's maladaptive behaviors included *eye poking* (presses finger or object to the eye for 1 s or longer) and *finger and/or hand biting* (contacts any portion of the finger or hand to lips or mouth for 1 s or longer). Child 3 was monitored for instances of *aggression* (pinches or slaps others), *finger and/or hand manipulation* (flaps hands above waist level, or claps hands with intertwined fingers), and *noises* (whines, cries, or emits perseverative echolalia for 1 s or longer).

Additional dependent variables for all children were *correct responses* and *out-of-seat behaviors.* Correct responses were independent body-part identifications that occurred within 5 s of the first verbal instruction. Out-of-seat was any within-trial occurrence of the child's buttocks lifting off the chair.

Pertinent measures of the independent variables were durations of the stimulus assessment phases that preceded each teaching session. Observers used stopwatches to time the duration of the selection process. During baseline, timing began with the experimenter's question to the teacher and ended with the teacher's listing of the final item. Timing of the mini-assessment began with the first display of two stimuli and ended with the child's last selection. Neither the teachers nor the children were informed regarding timing procedures. Observers recorded durations rounded to the nearest minute.

Interobserver Agreement

Two independent observers assessed interobserver agreement at least twice in each condition for each subject in an average of 46% of the total number of sessions. The first author served as experimenter, collecting primary data in the course of conducting all sessions. Interobserver agreement data were obtained by one of four pretrained graduate students; secondary observers were seated at least 32 cm away from the experimenter, positioned for clear visibility to observe children's target behaviors.

Trial-by-trial comparisons were made for occurrences and nonoccurrences of each dependent variable, and calculations were computed using a standard formula (agreements divided by agreements plus disagreements). Overall mean agreement was 100% for Child 1, 100% for Child 2, and 99% (range, 90% to 100%) for Child 3. The mean levels of occurrence agreement for maladaptive behavior were 99.9% (range, 90% to 100%) for Child 1, 100% for Child 2, and 95.5% (range, 80% to 100%) for Child 3. The mean occurrence agreement for each level of responding to a prompt (independent, verbal, model, physical guidance) was 100%, mean agreement for durations was 100%, and mean occurrence agreement for out-of-seat behavior was also 100% for each child. It is probable that agreement levels were high because the topographies of the target behaviors and the teaching prompts were not transient, because measures sampled occurrence within intervals rather than frequencies, and because behaviors were recorded only during trials (and not during the intertrial intervals). It is also likely that high duration agreements

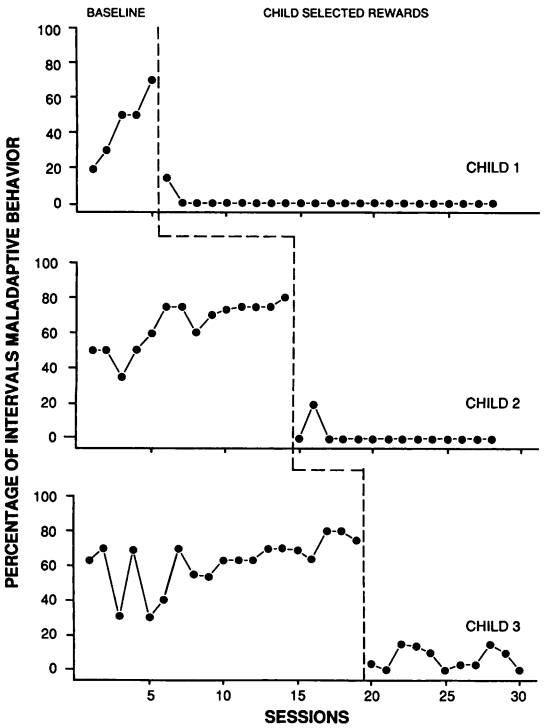

Figure 1. Percentage of trials on which each child displayed one or more individually defined maladaptive behavior(s) across experimental conditions.

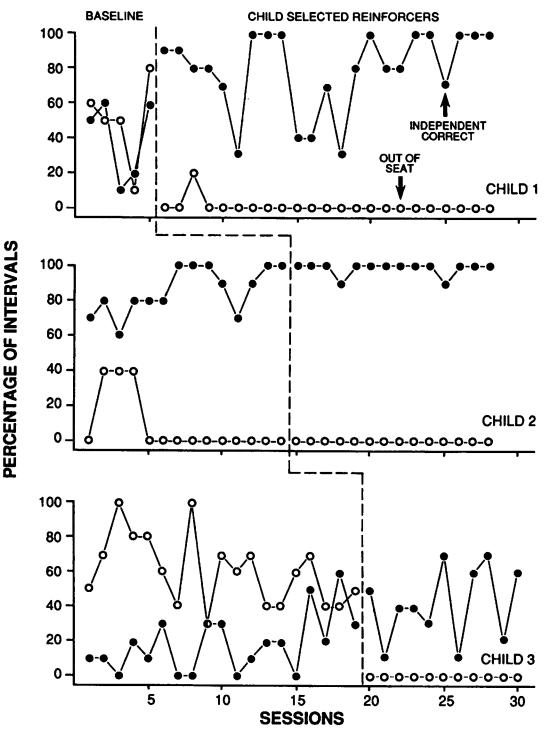

Figure 2. Percentage of trials of each child's independent correct responding (closed circles) and out-of-seat behavior (open circles) across experimental conditions.

were partially attributable to procedures of rounding to the nearest minute. Across all measures, mean levels of agreement for total, occurrence, and nonoccurrence data remained unchanged from baseline to intervention.

RESULTS

Figure 1 shows the reductive effects of daily reinforcer assessment on combined levels of children's maladaptive behaviors in subsequent teaching sessions. For Child 1, the mean percentage of trials scored for the occurrence of aggression and/or spitting decreased from 44% (range, 20% to 70%) in baseline to 1% (range, 0% to 15%) in the reinforcer assessment condition. Child 2's combined levels of eye poking and hand biting decreased from a mean occurrence of 63% (range, 30% to 80%) in baseline to a mean occurrence of 1% (range, 0% to 15%) in reinforcer assessment. Similarly, Child 3's maladaptive behaviors (aggression, hand flapping or finger manipulation, and noises) decreased from a mean of 59% (range, 30% to 75%) during baseline to a mean occurrence of 7% (range, 0% to 15%) during reinforcer assessment. Virtually identical results were evident in separate examinations of the seven maladaptive responses.

Although more variable, Figure 2 reveals similar reinforcer assessment effects on correct responding and out-of-seat behaviors. Child 1's mean levels of correct responding increased from 40% (range, 10% to 60%) in baseline to 80% (range, 30% to 100%) during reinforcer assessment. Corresponding decreases were seen in Child 1's out-of-seat behavior, from a mean of 50% (range, 10% to 80%) in baseline to 1% (range, 0% to 20%) during the reinforcer assessment condition. Child 2 averaged 85% (range, 60% to 100%) correct responding in baseline, increasing to a mean of 98% (range, 80% to 100%) during reinforcer assessment; his out-of-

Table 1
Pre- and Postassessment Preference Means (%)

	Social	Visual	Auditory	Tactile	Vestibular	Gustatory	Olfactory	Thermal
Child 1								
Pre	85	95	95	100	85	90	80	85
Post	100	100	100	100	100	100	100	100
Child 2								
Pre	80	75	70	95	60	60	65	35
Post	100	70	70	100	90	90	90	70
Child 3								
Pre	25	80	90	55	45	20	25	30
Post	40	70	80	100	70	70	70	90

seat behavior decreased from 8% (range, 0% to 40%) to 0% during the reinforcer condition. Child 3 also increased correct responding and decreased out-of-seat behavior, showing average baseline to reinforcer assessment changes of 18% (range, 0% to 60%) to 41% (range, 10% to 70%) in correct responding, and 61% (range, 30% to 100%) to 0% in occurrence of out-of-seat behavior.

Efficiency data on the presession selection procedures indicate that the process of obtaining information from experienced teachers averaged 5 min for Children 1 and 3 and 4.7 min for Child 2. The average duration of the mini-reinforcer assessment was 1 min for Children 1 and 2 and 30 s for Child 3.

Table 1 details the children's individual preferences for various categories of reinforcers on the overall stimulus preference assessment (Pace et al., 1985), administered pre- and postreinforcer assessment conditions. These data illustrate idiosyncratic reinforcer preferences and changes in preferences across a 1-month period. Data on each child show a trend of broadening interests across time.

DISCUSSION

These results demonstrate that maladaptive behaviors decrease significantly as a function of ongoing reinforcer assessment. The power of this effect is underlined by experimental conditions in which reinforcement was contingent on correct responding, irrespective of the occurrence or nonoccurrence of maladaptive behaviors. Of practical importance were data supporting the efficiency of the presession assessment of children's preferences; these data highlight the feasibility of ongoing reinforcer assessment (i.e., it saves time in looking for preferred items and assures selection of effective consequent stimuli).

This reinforcer assessment package did not eliminate the need for periodic comprehensive assessments that should be part of any good behavioral program. However, preferences did change from month to month (as had been suggested in personal communication with G. M. Pace, April 3, 1987) and also changed from session to session. Specifically, across a total of 49 child-selection sessions, there were only four sessions during which children selected the same constellation of items in two consecutive sessions. Ongoing changes in stimulus preferences may account for some of the variability in the accuracy of the comprehensive assessment data reported by Green et al. (1988), who found that some items identified as preferred did not actually function as reinforcers. In sum, there is a need to assess reinforcers frequently to prevent satiation and to account for idiosyncratic preferences across time.

Findings that children are efficient in selecting their own reinforcers mean that it is easy enough to do systematic reinforcer assessment regularly, and results show that positive effects and side-effects can be substantial. The timing comparisons could have been more precise with less variability in the number of teacher and child selections (although the variance was unilateral), and even careful compli-

ance to procedural protocol does not completely rule out the potential for experimenter bias in minimizing the time taken to conduct presession child selections. Yet, at the least, data on procedural efficiency clearly demonstrate that it is possible to accomplish ongoing reinforcer assessments quickly and effectively.

Analyses of teacher-selected consequent stimuli verify that teachers had at their disposal the same kind of items and events that were used in the reinforcer assessment (i.e., food, social consequences, and toys with various sensory qualities), and they distributed their selections similarly to children's selections. Thus, both teachers and children made relatively few selections for edibles (12% of teacher selections, 12% of child selections), a finding that may well be setting-specific (food was rarely offered outside of snack and lunch times). Although teachers individualized their selection of social consequences across children (41% for Child 1, 18% for Child 2, and 6% for Child 3), they tended to overrate the reinforcing value of social activities (16% of teacher selections, 8% of child selections). And finally, although teachers stated a (Premack) practice of selecting toys that children often played with, familiarity/novelty effects were offset by the fact that teachers had and made use of a far greater variety of multisensory toys than was available during reinforcer assessment. It therefore seems likely that the package of systematic tracking of children's changing selections, rather than the nature of the stimuli per se, accounted for the striking differences in outcomes. It is, of course, certainly possible that children's practice in making choices among stimuli enhanced their immediate interest in the items selected, as well as yielding generalized increases on the postassessment preferences.

As expected, systematic reinforcer assessment yielded general increases in correct responding, along with decreases in out-of-seat behavior. Although correct responding did covary inversely with out-of-seat behavior, the suppression of maladaptive behaviors bore a more direct functional relationship to reinforcer assessment procedures than to targeted correct responses (e.g., Child 2 increased correct responding, but did not reduce stereotypies, prior to reinforcer assessment; Child 3's accuracy data improved but remained highly variable even after reinforcer assessment and reduction of maladaptive behaviors). Such findings appear to rule out a simple differential reinforcement of other behavior effect.

Procedures used in this study were an extension of Pace et al.'s (1985) comprehensive assessment to practical classroom use for young children with autism. Results replicated Dyer's (1987) findings that reductions in stereotypies were side-effects of potent reinforcers for correct responding, which she discussed in terms of a competing reinforcement hypothesis (i.e., external reinforcers compete with reinforcement inherent in stereotypical behavior). In another thoughtful analysis of response covariation of compliant and inappropriate behaviors (Parrish, Cataldo, Kolko, Neef, & Egel, 1986), a hypothesis of concurrent operants (i.e., an increase in the rate of reinforcement for one response produces decreases in the rate of another response) was evoked to explain side-effect data. Perhaps the most parsimonious explanation of the present data is that reinforcer assessment procedures simply primed engagement (i.e., the child is not just ready to answer, but *ready* to answer), and focused engagement seems to be functionally incompatible (see Risley, 1968) with maladaptive behaviors.

Informal social validation of these reinforcer assessment procedures is being accomplished via teacher implementation in two preschool classrooms, including the integrated incidental teaching setting where this study took place and a public school classroom for lower functioning children with autism. A logistical adaptation that facilitates regular classroom use is the organization of toy storage shelves by primary sensory qualities (i.e., shelves labeled for visual toys, auditory toys, tactile manipulatives, etc.). Toy display procedures ensure that some items representing each sensory quality are constantly available in the classroom (an optimal toy rotation plan is to rotate one third of the items across categories each week, providing a balance of familiar and novel items). To permit appropriate individualization in an open classroom environment, periodic comprehensive assessments are used

to identify preferred sensory qualities for each child, and a pool of toys that represent those sensory qualities is assembled; each child's toys are stored in individually labeled "hobby boxes" that are kept on teacher-height shelves around the free-play area. Teachers provide frequent opportunities for toy selections from hobby boxes, contingent on children's engagement in classroom activities. In addition to promoting high levels of engagement, this strategy serves to condition children to teachers' social approaches (cf. Koegel et al., 1987). There remain questions on the effects of preferred stimuli on peer interactions; specifically, which items produce isolated play and which encourage social interaction, parallel play, and conversational language?

The principle that "reinforcement works" is so powerful that the field of behavior analysis has been able to get by with minimal attention to reinforcer selection; these data reaffirm that carefully selected reinforcement "works best." More detailed specification of the reinforcer selection procedures used in research may facilitate replication or potentially alter outcomes. Ongoing reinforcer assessment in applied settings would no doubt substantially enhance treatment effectiveness. In conclusion, serious efforts to effect behavior change via positive reinforcement require systematic attention to reinforcer quality.

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