

ASSESSING CHOICE MAKING AMONG CHILDREN WITH MULTIPLE DISABILITIES

JEFF SIGAFOOS

THE UNIVERSITY OF QUEENSLAND

AND

ROSLYN DEMPSEY

XAVIER SPECIAL SCHOOL, BRISBANE, AUSTRALIA

Some learners with multiple disabilities display idiosyncratic gestures that are interpreted as a means of making choices. In the present study, we assessed the validity of idiosyncratic choice-making behaviors of 3 children with multiple disabilities. Opportunities for each child to choose between food and drink were provided under two conditions. In one condition, the children were given the food or drink item corresponding to their prior choice. In the other condition, the teacher delivered the item opposite to that chosen. It was reasoned that valid choice-making behaviors would be reflected in a greater tendency to accept the chosen item and refuse the unchosen item. Direct observations revealed all children consistently indicated choices during both conditions. Choices of both the food and drink items were made by all 3 children. A reversal design demonstrated that acts of refusal were more frequent when choices were followed by delivery of the item opposite to that chosen. Similar assessment procedures may be effective in determining the function of idiosyncratic gestures exhibited by persons with multiple disabilities. For children lacking such skills, intervention to teach valid choice-making behaviors may be needed to complement assessment procedures.

DESCRIPTORS: choice, assessment, children, multiple disabilities

Providing opportunities to make choices is one way to increase the independence and improve the quality of life for persons with severe disabilities (Guess, Benson, & Siegel-Causey, 1985; Shevin & Klein, 1984). Incorporating opportunities for choice making into classroom instructional routines has also been identified as one measure of a high-quality educational program for learners with severe and multiple disabilities (Meyer, Eichinger, & Park-Lee, 1987). Despite general consensus on the importance of choice making, some evidence suggests that educational personnel provide few opportunities for students with severe disabilities to make choices and may fail to respond appropriately to the choice behaviors exhibited by their students (Houghton, Bronicki, & Guess, 1987).

A potential means to increase choice making may be to provide students with opportunities for selecting one object from among two or more offered alternatives. Several studies have demonstrated that learners with severe disabilities can make reliable selections when repeated opportunities to choose between two objects are arranged systematically (Dattilo, 1986; Dattilo & Mirenda, 1987; Parsons & Reid, 1990). Furthermore, Mithaug and Hanawalt (1978) demonstrated that 3 young adults with severe mental retardation learned to make fairly consistent selections when offered a choice between objects representing various vocational tasks. After selecting an object representing a particular task (e.g., a folded sheet of paper), the learner was required to participate in the associated vocational activity (e.g., stuffing envelopes). In a follow-up study, Mithaug and Mar (1980) demonstrated that the tendency to select a particular object could be increased or decreased depending upon whether that choice was followed by participation in a task associated with a more or less frequently selected

Preparation of this manuscript was supported in part by Special Project Grant 122 5292 05 from The University of Queensland. Requests for reprints should be sent to Jeff Sigafoos, Fred and Eleanor Schonell Special Education Research Centre, The University of Queensland, Queensland 4072, Brisbane, Australia.

object (and hence also followed by a presumably more or less "preferred" vocational activity). These results suggest that the activity associated with the object selected from a two-choice array may indeed represent a more effective type of reinforcement in comparison to the activity associated with the object not selected. When given a choice between food and drink, for example, selection of the food item may indicate that eating was the more effective reinforcer at that particular moment. This relationship between the frequency of choosing an object and the reinforcing value of the associated activity may depend upon a prior history in which the learner consistently gained access to the activity associated with the item selected.

Persons with severe or profound intellectual disabilities, in combination with impaired motor development, are often physically incapable of selecting objects directly. Nonetheless, these persons may display other behaviors to indicate a choice. It has been demonstrated that behaviors such as looking at an item, movement towards an item, and positive vocalizations, when emitted by learners with multiple disabilities in the presence of a single offered object, can often indicate reliably if the object will function as a reinforcer (Green et al., 1988; Pace, Ivancic, Edwards, Iwata, & Page, 1985). A related issue is whether similar actions might reflect a means of choosing one of two offered objects.

Siegel-Causey and Guess (1989) have argued that idiosyncratic gestures of this type often represent a "nonsymbolic" means of communication for some learners with severe disabilities. It may be reasonable to speculate that behaviors such as "looking at an item" or "movement towards one of two alternatives" could be shaped as choice-making behaviors, given an appropriate history of reinforcement. For example, if a learner were consistently given access to items looked at or moved towards, such actions may eventually come under the control of these consequences. As a result, the learner may come to look at or move towards one of two objects representing the more effective reinforcer at that particular moment, because in the past doing so was followed by access to that item.

Without information concerning a learner's history of reinforcement, however, it may be difficult for educators to determine whether such idiosyncratic gestures displayed towards one of two alternatives represent a valid (i.e., discriminated) indication of choice making. Practical methods for assessing the validity of choice behaviors among children with multiple disabilities therefore seem warranted. Logically, if a particular idiosyncratic gesture were indeed a valid indication of choice making, then a learner would be more likely to accept the item corresponding to his or her presumed choice and more likely to refuse an item that did not match the prior choice. The present study followed this line of reasoning to assess the validity of choice behaviors among 3 children with multiple disabilities.

METHOD

Subjects

Three children with multiple disabilities were subjects. Selection was based upon information supplied by an interdisciplinary team. Team members agreed that each child exhibited idiosyncratic gestures that appeared to function as choice behaviors. An assessment was deemed necessary, however, to substantiate this interpretation.

After the present study was completed, each child's adaptive behavior was rated by the classroom teacher using the TARC Assessment System (Sailor & Mix, 1975). This device was developed with a sample of 283 children with severe disabilities (3 to 16 years of age). It yields standard scores with a mean of 50 and a standard deviation of 20 in self-help, motor, communication, and social-skill domains. A standard score of 68 in the receptive language domain, for example, indicates that the student "understands and usually responds when talked with." This level of receptive language placed the student nearly one standard deviation above average (e.g., "understands some spoken words and responds") when compared to the standardization sample. In contrast, a standard score of 26 in expressive language (i.e., "babbles only") indicates performance over one standard deviation

below the average of the standardization sample (e.g., "uses a few understandable words").

Doug was a 6-year-old boy. He was described as nonverbal and nonambulatory. Medical records indicated diagnoses of severe spastic quadriplegia and delayed development resulting from a near drowning at 14 months of age. Although Doug was capable of some movement (e.g., rolling) he was dependent on others for feeding, dressing, and toileting. On the TARC, Doug obtained an overall standard score of 24 and standard scores of 68 and 26 in the receptive and expressive communication domains, respectively. Doug received 0.5 mg of Valium® three times a day to control seizures.

Ruth, a 7-year-old girl, was nonverbal and nonambulatory as a result of a near drowning at 2 years of age. She was described as severely physically handicapped with diagnoses of cerebral palsy and spastic quadriplegia. Ruth could hold her head upright for short periods of time and could visually track movement, but was dependent upon others for feeding, dressing, and toileting. Standard scores from the TARC for Ruth were 25 overall, 54 for receptive communication, and 26 for expressive communication. She had previously received Valium® to control hypertonicity. During the course of the present study she was not receiving any medication.

Mathew was a 7-year-old boy with spastic quadriplegia and microcephaly resulting from birth asphyxia. Motorically, Mathew could execute a segmented roll in both directions and maintain head control but was otherwise nonambulatory. He could bring food placed in his hand to his mouth and drink from a cup but required considerable assistance with dressing and toileting. Mathew frequently vocalized and could say "yes" and "no." Accordingly, his expressive communication skills as rated with the TARC were equivalent to a standard score of 52, and receptive communication and the overall standard scores were 39 and 30, respectively. Mathew received 150 mg of Epilim® twice a day and another 100 mg once a day in addition to Tegretol® (100 mg three times per day) and Valium® (as needed). These medications were prescribed for seizure control.

Setting

Opportunities for choice making were provided in the children's classroom by their teacher. This classroom was located in a public school for children with physical and intellectual disabilities. The classroom typically contained seven children, the special education teacher, and one teaching assistant. In addition, physical, occupational, and speech therapists, as well as parents, were occasionally present to implement educational programs.

Materials

Children were given opportunities to choose between a food and beverage item during assessment sessions. The food and beverage items used were those sent with the child from home for a morning snack. These items often varied from day to day but typically consisted of either milk or juice and some type of cake or cookie.

Definition of Target Behaviors

Three categories of responses were recorded. Target responses were identified based upon each child's existing idiosyncratic gestures as reported by the interdisciplinary team. Definitions of these choice behaviors were derived from Green et al. (1988) and Pace et al. (1985). A *choice* was recorded when the child reached for or exhibited any motion towards one of the two offered items within 15 s of the items being offered, maintained physical contact with one of the items for 3 s, looked at one of the items for at least 3 s, *or* exhibited a positive facial expression (e.g., smile) or vocalization while looking at one of the items.

After a choice had been made, the child was given one of the offered items. During this time, the presence of acceptance or refusal responses was recorded. An *acceptance* was recorded if the child consumed the item. Typically, the teacher placed the item (e.g., a piece of a cookie, a cup containing a small amount of milk) in the child's hand and then assisted the child to bring the item to his or her mouth. (With Mathew, however, the teacher merely placed the item in his hand because he was capable of bringing food to his mouth and drinking from a cup independently.) *Refusals* were recorded

if the child (a) pushed the item away as the teacher attempted to place it in his or her hand, (b) dropped or threw the item after it had been placed in his or her hand, (c) resisted assistance from the teacher in bringing the item to his or her mouth, (d) turned head away or closed lips as the item was brought near the mouth, (e) expelled the item after it had been placed in the mouth, or (f) exhibited a negative facial expression (i.e., frowning) as the item was offered.

Procedures

Assessment sessions. The 3 children were assessed as a group during the morning snack time. Assessment sessions occurred two or three times per week. Sessions consisted of spaced opportunities (Mulligan, Guess, Holvoet, & Brown, 1980) to choose between the offered food and beverage item. The first opportunity was always provided to Mathew, with the second and third opportunities provided to Doug and Ruth, respectively. This sequence was then repeated until each child had received a total of five opportunities. The amount of time between successive opportunities varied depending on how long it took the teacher to assist a child in consuming an accepted item and the amount of time needed to arrange food and drink items for the next choice-making opportunity. Intertrial intervals were calculated from videotapes made during one session from each phase of the study. These intervals ranged from 55 s to 3 min 50 s, with a mean of 2 min 26 s.

Procedural overview. The teacher placed a small portion of the designated food and beverage items on the child's wheelchair laptray to initiate choice-making opportunities for Ruth and Doug. Items were spaced approximately 60 cm apart. Because Mathew did not use a wheelchair, the teacher held one item in each of her hands spaced approximately 60 cm apart. The left/right placement of items was altered randomly across opportunities. The teacher called the child's attention to the items in place and instructed the child to make a choice (e.g., "Look Ruth, here is some cake [pointing to the cake] and some juice [pointing to the cup of juice]. What would you like?"). Any indication of

a choice during the ensuing 15 s was followed by delivery of one of the items and observation of acceptance or refusal. Items refused were withdrawn immediately. After the child had accepted or refused an item, a choice-making opportunity was initiated with the next child. If 15 s elapsed without an indication of choice, the items were removed and an opportunity to choose was provided to the next child. At the end of each opportunity, the teacher recorded the type (e.g., cake, juice) and topography (e.g., no choice, looked at item, reached for item) of choice behavior. Also recorded was whether the child had accepted or refused the item. When a refusal occurred, its topography (e.g., turned head away, expelled item) was noted.

Experimental design. A reversal design (Sidman, 1960) was used to compare choice-making and acceptance/refusal behaviors under the two conditions described below. The reversal design was repeated with Doug, providing an additional replication.

Choice delivered. In this condition, when a child exhibited a choice behavior, the item corresponding to that choice was delivered. If each child's idiosyncratic gestures were indeed valid indications of choice, this condition would likely generate high rates of choice behaviors and concomitant levels of acceptance. All 3 children were first exposed to this condition to document the presence of the idiosyncratic gestures that may function as choice-making behaviors.

Opposite item delivered. In this condition, when a child exhibited a choice behavior, the teacher delivered the noncorresponding item. For example, if a child indicated a choice for the offered beverage item, he or she received the food item instead. If each child's idiosyncratic gestures were valid indications of choice, this condition would likely generate higher rates of refusals compared to the first experimental condition.

Interobserver Agreement

One session during each phase was videotaped and later scored for interobserver agreement by an independent observer. These measures were obtained on 8%, 18%, and 22% of the opportunities

for Doug, Ruth, and Mathew, respectively. Separate measures were calculated on a trial-by-trial basis for occurrence agreement, nonoccurrence agreement, and total agreement across each category of target behavior by dividing the number of agreements by the number of agreements and disagreements and multiplying by 100.

Total agreement across target behaviors (i.e., choice for food, choice for drink, no choice, acceptance, and refusal) ranged from 96% to 100%. Occurrence agreement was 91% for choice for food, 100% for choice for drink, 75% for no choice, and 100% for both acceptance and refusal. Agreement on nonoccurrence was 100% for all of these target behaviors except choice for drink, which was 93%. Because of the subtle nature of the target behaviors and the relatively low percentage of opportunities scored for reliability, these interobserver agreement data were later supplemented by a naive observer who viewed the videotapes and recorded the occurrence and nonoccurrence of each target behavior. These measures were then compared to those obtained initially by the first independent observer. Total agreement between these two individuals ranged from 92% to 100%. Agreement on occurrences was 91% for choice of food, 100% for choice for drink, 66% for no choice, and 100% for acceptance and refusal. Agreement on nonoccurrences was 100% for choice for food, 92% for choice for drink, 95% for no choice, 100% for acceptance, and 95% for refusal.

RESULTS

Figure 1 shows the cumulative number of choice behaviors and acceptance responses across opportunities. Choices for the food and drink items are plotted separately. Missing data points indicate opportunities during which the child made no choice.

Doug consistently indicated a choice for one of the offered items. A total of eight (13%) of the opportunities ended without Doug indicating a choice. Of these eight opportunities, five occurred during the condition in which the chosen item was delivered. This represented 11% of the total opportunities provided under this condition. No

choices, recorded when the opposite item was delivered, represented 21% of the total opportunities provided under that condition. Although the drink item was chosen relatively more frequently than the food item, there was considerable oscillation between the two items across opportunities. Over 80% of Doug's choice behaviors consisted of looking at one item for at least 3 s. On other occasions this behavior was combined with smiling. The frequency of acceptance and refusal responses varied across the two experimental conditions. During opportunities when a prior choice occurred, 6.8% of these were followed by a refusal when the chosen item was provided. In contrast, Doug did not accept any item during the condition in which the teacher attempted to deliver the nonchosen object. Acts of refusal displayed by Doug included turning his head away, negative facial expression, and tightly closing his lips, with no single form dominating.

Choices by Ruth were fairly evenly divided between food and drink. On no occasion did an opportunity elapse without Ruth indicating a choice for one of the offered items. Most (85%) of the time, Ruth indicated a choice by looking at one of the offered items for at least 3 s; sometimes she also vocalized or smiled. In addition, a choice was occasionally indicated by arm movement towards an object. Only once did Ruth refuse to accept the item provided during the initial experimental condition. Nearly half (46%) of the opportunities ended with a refusal, however, when Ruth was given the item opposite to that chosen. All refusals consisted of turning her head away.

Mathew chose food more than drink, but, as with Doug, selection between the two items oscillated. In addition, choices were made on nearly every opportunity to do so with a total of three no choices recorded. Mathew's choice behaviors consisted primarily of reaching towards one of the items (56%), sometimes while vocalizing "yes" (35%). Refusals were less frequent (19%) when the chosen item was delivered compared to when the opposite item was delivered (50%). Mathew engaged in a number of refusal behaviors, such as dropping the item, resisting assistance, turning his head away, and on two occasions saying "no." On two other

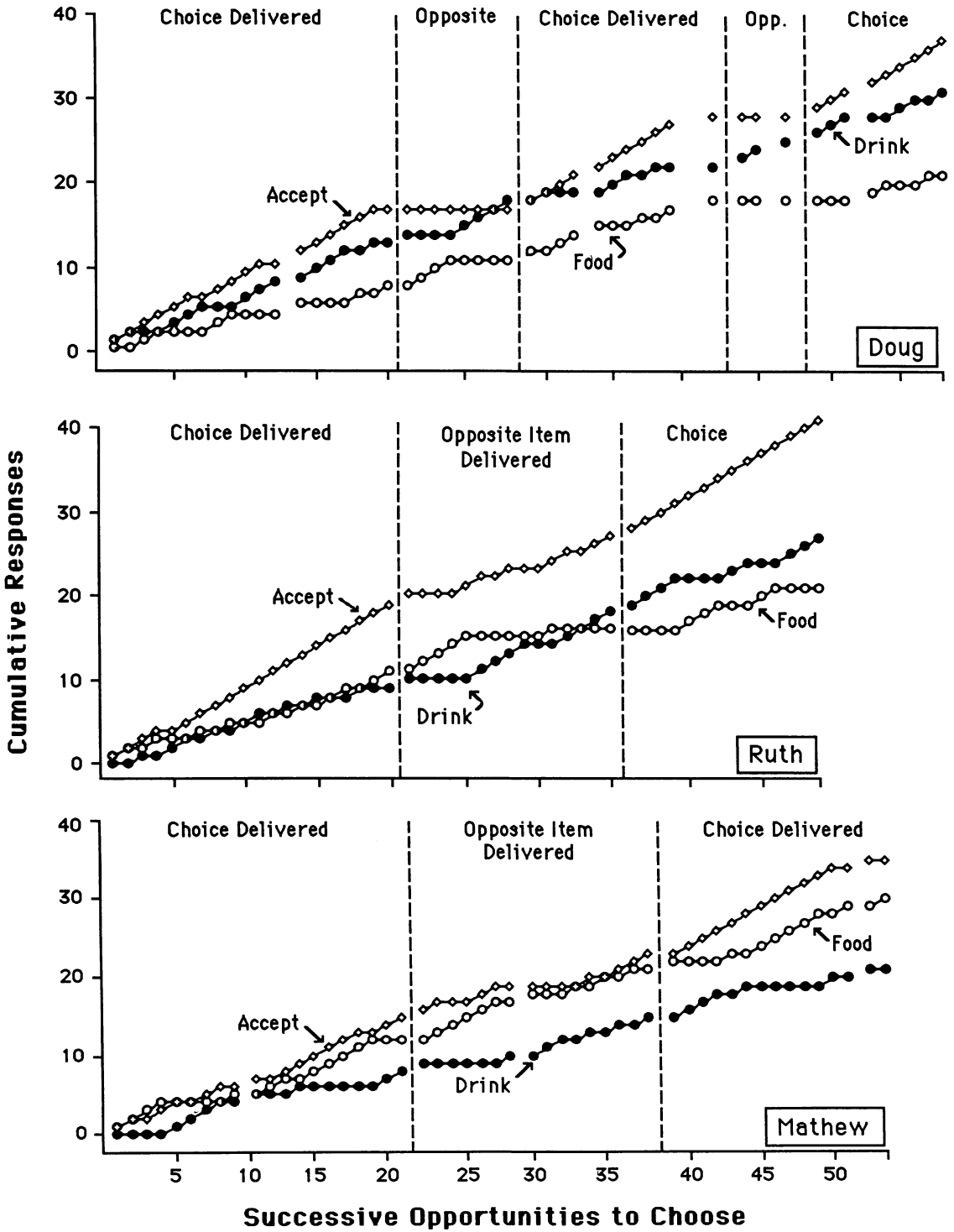


Figure 1. Cumulative number of choices for food and drink and the cumulative number of times the delivered item was accepted across opportunities.

occasions, Mathew refused the item by giving it back to the teacher. These latter two behaviors were unexpected but were nonetheless accepted by the teacher as indications of refusal.

DISCUSSION

The results of the present study suggest that all 3 children exhibited idiosyncratic gestures that functioned as valid choice-making behaviors. When opportunities for choice were arranged, each child consistently indicated a choice for one of the two offered items. Further, these existing responses appeared to form a class of discriminated operants, as shown by the greater percentage of refusals when the child was given an item that did not correspond to his or her prior choice.

Consistent with previous research (e.g., Dattilo, 1986; Dattilo & Mirenda, 1987; Green et al., 1988; Mithaug & Hanawalt, 1978; Mithaug & Mar, 1980; Pace et al., 1985; Parsons & Reid, 1990), these results suggest the value of providing structured opportunities for learners with severe and multiple disabilities to select from among several available alternatives. The methodology of the present study extends this literature by demonstrating that the systematic manipulation of the consequence provided when a prior choice has occurred may represent a useful procedure for identifying choice behaviors in an individual's repertoire.

Idiosyncratic gestures of the type observed in the present study are often interpreted as communicative acts (Siegel-Causey & Guess, 1989). Looking at an item or turning away from an object, for example, might be said to reflect the means for requesting preferred items and rejecting nonpreferred items. If looking at a preferred item were followed consistently by delivery of that item, and if turning away from a nonpreferred one were followed consistently by removal of that item, then looking and turning away will become established as effective communicative or "verbal" behaviors as a result of positive and negative reinforcement contingencies (Skinner, 1957).

One limitation of the present study was that

delivery of chosen items and removal of opposite items were not verified independently as effective reinforcers. Yet because each child had previously been observed to consume these food and beverage items, it may be reasonable to assume that these were preferred items that could function as reinforcers (Pace et al., 1985).

Although it may be reasonable to assume the food and drink items offered during choice-making opportunities were both effective reinforcers, the relatively higher percentage of refusals when children were given nonchosen items suggests the importance of maintaining a correspondence between the item delivered and the learner's prior choice. Some studies have found that a similar practice of reinforcer specificity (Goetz, Schuler, & Sailor, 1979; Reichle, Lindamood, & Sigafoos, 1986) may facilitate acquisition in discrimination training programs for learners with mental retardation (Litt & Schreibman, 1981; Overmier, 1988; Saunders & Sailor, 1979).

Because Ruth and Mathew accepted the opposite item approximately half the time, interpretation of their results is somewhat problematic. Although acceptance of opposite items may indicate that receipt of some object is preferable to none at all, these data also may suggest that at times the pre-defined choice behaviors did not represent an actual choice for one of the offered objects. Perhaps these learners sometimes looked at or moved towards an object for reasons other than to make a choice. A similar interpretation may account for the finding that Mathew refused chosen items 19% of the time. Acceptance of an offered item appears to represent a valid indication of one's partiality to that item regardless of whether or not a prior choice behavior was observed. An additional assessment to address this plausible explanation might be to deliver objects even when no prior choice has been observed. In these instances, refusal of both items would provide some confirmation that the absence of a choice response does indeed indicate a lack of partiality to either of the offered objects. This, in turn, may imply that the presence of a choice behavior might indicate a greater preference for one of the

two available objects. Furthermore, acceptance of opposite items might alternatively suggest that at times the choice responses exhibited by Ruth and Mathew may have represented relatively generalized or nondiscriminated requests for either of the two offered objects. This possibility might be explored by providing opportunities for choosing between one object that is known to be preferred and another object representing either a neutral or a nonpreferred object. When presented with objects of known and differing reinforcing value, choice making and acceptance might become more discriminated, because the consequence for a nondiscriminated choice or acceptance could be the receipt of a nonpreferred object. At any rate, the plausibility of these alternative explanations for the mixed results obtained with Ruth and Mathew necessitates a cautious interpretation of the data.

Maintenance of the existing choice behaviors during the initial experimental condition suggests that receipt of a chosen item was an effective reinforcer. In contrast, delivery of the nonmatching item can be viewed as part of an extinction contingency, because the child no longer received the chosen reinforcer. As a result, it might have been predicted that choice behaviors would diminish during this second experimental condition. Although the data for Doug did show a slight tendency toward diminished choice making, the other children continued to indicate choices consistently during both experimental conditions. A prior history of intermittent reinforcement may have made these choice behaviors resistant to extinction. Other evidence, albeit anecdotal, suggests delivery of the opposite item may have constituted an extinction procedure. Specifically, the children sometimes exhibited negative emotional reactions (e.g., frowning) and appeared surprised (e.g., raised eyebrows, looked at teacher) when the teacher attempted to deliver the item opposite to that chosen. Such emotional responses occur frequently when extinction procedures are implemented (Skinner, 1953). Some of these emotional responses (e.g., frowning), however, may have been maintained because they were defined as acts of refusal and were negatively reinforced by removal of the nonchosen item.

Delivery of the item opposite to that chosen also

represented a reversal of the previous reinforcement practices. As a result, the focus of choice-making responses might have changed systematically as a result of the changed contingencies. When the child wanted the food item, for example, he or she might have been expected to now look at or reach towards the drink item. There is little evidence of such an effect, perhaps because these reversed reinforcement practices were kept relatively brief. The reversal phase may have represented only a temporary disruption, evoking acts of refusal but not otherwise affecting the perhaps well-established choice-making behaviors.

The fixed sequence of experimental conditions may have influenced the changes observed when the reinforcement practices were reversed. Because all subjects were first provided with the item chosen for several consecutive opportunities, it is possible that this initial experimental condition predisposed learners to refuse nonmatching items in the subsequent experimental phase during which the opposite item was delivered. If the contrast between conditions did in fact exaggerate the tendency to accept items in the choice-delivered condition and refuse items in the opposite-item-delivered condition, then a possible control for such sequence effects in future studies would be to alternate more rapidly between the two conditions using an alternating-treatments design (Barlow & Hersen, 1984).

When an individual's responses for making choices consists of fairly idiosyncratic acts or when the history of reinforcement responsible for those behaviors is not well known, it may be important for parents or educators to determine empirically the function of what may otherwise be interpreted mistakenly as valid choice-making behaviors. As demonstrated in the present study, the frequency with which chosen versus unchosen items are accepted or refused may serve as a useful measure of validity. However, only choices for food and drink were studied. It remains to be determined whether a similar methodology would be useful in assessing the validity of choices for other objects or activities. In addition, further research is needed to determine whether a similar assessment protocol would effectively identify instances of invalid choice making that might exist in some learners with severe or

multiple disabilities (Tetlie & Reichle, 1986). Finally, the children participating in the present study came to the assessment task with an existing range of choice-making behaviors. However, to complement assessment, teaching valid choice-making behaviors is a priority if persons lacking these skills are to benefit fully from increased choice-making opportunities (Reichle, Sigafos, & Piché, 1989).

REFERENCES

- Barlow, D. H., & Hersen, M. (1984). *Single case experimental designs: Strategies for studying behavior change* (2nd ed.). New York: Pergamon Press.
- Dattilo, J. (1986). Computerized assessment of preferences for severely handicapped individuals. *Journal of Applied Behavior Analysis, 19*, 445-448.
- Dattilo, J., & Miranda, P. (1987). An application of a leisure preference assessment protocol for persons with severe handicaps. *Journal of the Association for Persons with Severe Handicaps, 12*, 306-311.
- Goetz, L., Schuler, A., & Sailor, W. (1979). Teaching functional speech to the severely handicapped: Current issues. *Journal of Autism and Developmental Disorders, 9*, 325-343.
- Green, C. W., Reid, D. H., White, L. K., Halford, R. C., Brittain, D. P., & Gardner, S. M. (1988). Identifying reinforcers for persons with profound handicaps: Staff opinion versus systematic assessment of preferences. *Journal of Applied Behavior Analysis, 21*, 31-43.
- Guess, D., Benson, H. A., & Siegel-Causey, E. (1985). Concepts and issues related to choice-making and autonomy among persons with severe disabilities. *Journal of the Association for Persons with Severe Handicaps, 10*, 79-86.
- Houghton, J., Bronicki, G. J. B., & Guess, D. (1987). Opportunities to express preferences and make choices among students with severe disabilities in classroom settings. *Journal of the Association for Persons with Severe Handicaps, 12*, 18-27.
- Litt, M., & Schreibman, L. (1981). Stimulus-specific reinforcement in the acquisition of receptive labels by autistic children. *Analysis and Intervention in Developmental Disabilities, 1*, 171-186.
- Meyer, L. H., Eichinger, J., & Park-Lee, S. (1987). A validation of program quality indicators in educational services for students with severe disabilities. *Journal of the Association for Persons with Severe Handicaps, 12*, 251-263.
- Mithaug, D. E., & Hanawalt, D. A. (1978). The validation of procedures to assess prevocational task preferences in retarded adults. *Journal of Applied Behavior Analysis, 11*, 153-162.
- Mithaug, D. E., & Mar, D. K. (1980). The relation between choosing and working prevocational tasks in two severely retarded young adults. *Journal of Applied Behavior Analysis, 13*, 177-182.
- Mulligan, M., Guess, D., Holvoet, J., & Brown, F. (1980). The individualized curriculum sequencing model (1): Implications from research on massed, distributed, or spaced trial training. *Journal of the Association for the Severely Handicapped, 5*, 325-336.
- Overmier, J. B. (1988, May). *Expectations: From animal laboratory to the clinic*. Paper presented at the Midwestern Psychological Association meeting, Minneapolis.
- Pace, G. M., Ivancic, M. T., Edwards, G. L., Iwata, B. A., & Page, T. J. (1985). Assessment of stimulus preference and reinforcer value with profoundly retarded individuals. *Journal of Applied Behavior Analysis, 18*, 249-255.
- Parsons, M. B., & Reid, D. H. (1990). Assessing food preferences among persons with profound mental retardation: Providing opportunities to make choices. *Journal of Applied Behavior Analysis, 23*, 183-195.
- Reichle, J., Lindamood, L., & Sigafos, J. (1986). The match between reinforcer class and response class: Its influence on communication intervention strategies. *Journal of the Association for Persons with Severe Handicaps, 11*, 131-135.
- Reichle, J., Sigafos, J., & Piché, L. (1989). Teaching an adolescent with blindness and severe disabilities: A correspondence between requesting and selecting preferred objects. *Journal of the Association for Persons with Severe Handicaps, 14*, 75-80.
- Sailor, W., & Mix, B. (1975). *The Topeka Association for Retarded Citizens assessment system*. Austin, TX: Pro-Ed.
- Saunders, R., & Sailor, W. (1979). A comparison of three strategies of reinforcement on two choice learning problems with severely retarded children. *AAESPH Review, 4*, 323-333.
- Shevin, M., & Klein, N. K. (1984). The importance of choice-making skills for students with severe disabilities. *Journal of the Association for Persons with Severe Handicaps, 9*, 159-166.
- Sidman, M. (1960). *Tactics of scientific research: Evaluating experimental data in psychology*. New York: Basic Books.
- Siegel-Causey, E., & Guess, D. (1989). *Enhancing non-symbolic communication interactions among learners with severe disabilities*. Baltimore: Paul H. Brookes.
- Skinner, B. F. (1953). *Science and human behavior*. New York: Macmillan.
- Skinner, B. F. (1957). *Verbal behavior*. Englewood Cliffs, NJ: Prentice-Hall.
- Tetlie, R., & Reichle, J. (1986). *The match between signed requests and object selection in four learners with severe handicaps*. Unpublished Master's thesis, University of Minnesota, Minneapolis.

Received May 12, 1991

Initial editorial decision July 19, 1991

Revisions received December 15, 1991; January 7, 1992

Final acceptance May 19, 1992

Action Editor, F. Charles Mace