

EFFECTS OF CHOICE MAKING ON THE SERIOUS PROBLEM BEHAVIORS OF STUDENTS WITH SEVERE HANDICAPS

KATHLEEN DYER

THE MAY INSTITUTE

GLEN DUNLAP

FLORIDA MENTAL HEALTH INSTITUTE, UNIVERSITY OF SOUTH FLORIDA

AND

VINCENT WINTERLING

UNIVERSITY OF KENTUCKY

This study assessed the impact of choice making on the serious problem behaviors of 3 students with severe autism and/or mental retardation. In the context of within-subject reversal designs, the results showed consistently reduced levels of problem behaviors (e.g., aggression) when the students were given opportunities to make choices among instructional tasks and reinforcers. Additional data showed no systematic differences in the rate of correct responding between the two conditions. The results are discussed in relation to the continuing search for effective, nonintrusive solutions to the occurrence of serious problem behavior.

DESCRIPTORS: severely handicapped, choice behavior, problem behavior, autistic children

A growing emphasis of research and practice has been on the development of effective, nonintrusive techniques for managing the serious problem behaviors of persons with developmental disabilities (Horner et al., in press). Numerous authors have argued in favor of restricting the use of invasive procedures and promoting the development of positive, educative approaches to behavior management (e.g., Evans & Meyer, 1985; Lovaas & Favell,

1987). It has been recognized by many that continued progress in this area will rely on applied research designed to delineate and document interventions that are both effective and respectful of a person's dignity (Bannerman, Sheldon, Sherman, & Harchik, 1990; Dunlap, 1985; Horner et al., in press).

One rapidly expanding research emphasis has been on the effects of learners' preferences and choice-making opportunities (Guess, Benson, & Siegel-Causey, 1985; Houghton, Bronicki & Guess, 1987; Kishi, Teelucksingh, Zollers, Park-Lee, & Meyer, 1988; Parsons & Reid, 1990; Shevin & Klein, 1984). The success of procedures using choice and preference for individuals with severe handicaps has been documented in studies showing reductions in social avoidance behavior (Koegel, Dyer, & Bell, 1987), increases in spontaneous communication (Dyer, 1987; Peck, 1985), and improvements in task performance (Mithaug & Mar, 1980; Parsons, Reid, Reynolds, & Bumgarner, 1990). There has also been some suggestion that choice making may result in reductions in serious problem behaviors. For example, Dyer (1987) showed that when children with autism were given choices of preferred

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Correspondence and requests for reprints should be sent to Kathleen Dyer, The May Institute, Box 703, 100 Sea View Street, Chatham, Massachusetts 02633, or to Glen Dunlap, Department of Child & Family Studies, Florida Mental Health Institute, University of South Florida, Tampa, Florida 33612-3899.

rewards, decreases were shown in stereotyped self-stimulatory behaviors that had been reduced previously only with contingent restraint. This study also indicated that there were improvements in other problem behaviors, but these indications came from global ratings of on-task behavior rather than from direct observations of specific responses. Therefore, the purpose of the present experiment was to expand the literature on choice making by focusing explicitly on the serious problem behaviors (including aggression and self-injury) of school-age students with severe handicaps. In this case, a choice-making package was implemented in which students were permitted to make selections of rewards as well as the tasks and materials with which they would be engaged.

METHOD

Subjects

Three children (Lori, Mary, and George) participated in this experiment. All of the children exhibited high levels of serious disruptive behavior such as aggression, self-injury, and tantrums. The behaviors resulted in placement in a residential treatment center for Lori and Mary. George had also been institutionalized because of his problem behaviors, but at the time of this study he was living at home and receiving assessment and training services from a university-based program. Lori was 5 years old, and Mary and George were 11. Lori was diagnosed as having a developmental delay with autistic features, Mary as having pervasive developmental delay with autistic features, and George as having severe mental retardation. On the Vineland Social Maturity Scale, Lori and Mary were estimated to have social age scores of 1.8 years and 1.0 years, respectively. George received an adaptive behavior composite of 1.5 years on the Vineland Adaptive Behavior Scales. Lori was non-verbal and used gestures and a small number of signs to communicate. Mary had a vocabulary of approximately 10 words that served requesting functions. George was primarily echolalic, but he occasionally used phrases of two to four words to express needs and desires.

Before the experimental sessions were conducted, each child received pretraining on how to express choices. Lori and Mary were taught to point to a preferred object when presented with two objects and the statement, "Show me which one you want." For George, the pretraining involved teaching him to discriminate such questions as "What do you want to work on?" and to limit his selections to the materials that were available and designated as options. Prior to the experiment, the children were also exposed to sessions in which definitions of the dependent variables were developed and the teachers were trained to use the procedures.

Setting

All sessions were conducted with one-to-one teacher-student ratios in rooms located on the campuses of the residential center or the university. The rooms contained at least one table, several chairs, instructional tasks, and videotape equipment. Sessions ranged in length from 10 to 20 min, with no more than four sessions per day and 5 days between sessions.

Selection of Tasks and Reinforcers

During all sessions in each experimental condition, three to four educational tasks were used for each student. The students had demonstrated the ability to perform each of the tasks during previous educational activities. The tasks involved pre-occupational and pre-academic skills and were selected because they could be handled easily in table work sessions and because they were judged by the students' teachers to be of approximately equivalent preference.

Also used in each session were three to five preferred stimuli that were reported by the children's teachers to be functional reinforcers in other contexts. These preferred stimuli were used as reinforcers for correct performance on instructional tasks. The schedules of reinforcement, determined by the teachers, were variable-ratio schedules (e.g., VR 3, VR 5) that were maintained throughout all phases of the experiment. Table 1 lists the tasks and reinforcers available for each child.

Table 1
Tasks and Reinforcers for Each Student in Each of the Experimental Conditions

Student	Tasks	Reinforcers
Lori	Nine-piece puzzle Inserting sticks into a slot Shape box	Soda Crackers M&M® candies
Mary	Seven-piece puzzle Inserting pennies into a bank Inserting buttons into a slot	Teddy bear Cookie Juice
George	Large form puzzle Stacking disks onto a spindle Sorting spoons by color Labeling picture cards*	Crackers Soda Juice Candy Potato sticks

* Used only in the final choice condition.

Dependent Variables

The primary dependent variable in this experiment was the percentage of intervals that included instances of serious problem behavior. Problem behaviors were defined individually for each child and included aggression (biting, hitting, kicking, pinching, and scratching) and object misuse (throwing, tearing, banging, and destroying objects) for all 3 children, tantrums (screaming, whining, and crying) and bolting (moving more than 2 ft from the table) for Lori and George, and self-injury (slapping the face or body, punching self, head banging, elbow and wrist banging, and forcefully pressing objects to the face) for Lori. For a self-hit or self-slap to be scored, it had to be forceful and be initiated from a distance of more than 6 in. Measures of problem behavior were obtained with a 30-s continuous-interval system of data recording.

To obtain measures of task performance, correct responses were counted and then translated into measures of rate for each task. To be scored as a correct response, performance on the educational materials had to conform to the task definitions. Responses that were prompted with physical assistance were not counted as correct. Response definitions for each child's tasks are as follows:

Lori. A correct response on the puzzle was scored when Lori placed one puzzle piece into its accompanying space on the template. The stick task involved inserting sticks into a small hole on top of

a can. A correct response for this task was scored when one stick was put completely into the slot. A correct response on the shape box was scored when Lori placed a block into its accompanying hole in a container.

Mary. A correct response on the puzzle was scored when Mary placed one puzzle piece into its accompanying space on the template. The button task involved inserting buttons into a small hole on top of a can, with a correct response being scored when one button was put completely through the slot. A correct response on the penny task was scored when Mary put a penny into a slot in a bank.

George. A correct response on the puzzle task was scored when a puzzle piece was inserted into its appropriate place. A correct response on the stacking spindles was counted when a donut-shaped disk was placed successfully on a spindle. Plastic spoons were sorted by color and a correct response was recorded when a spoon was placed in its appropriate receptacle. Responses to the picture cards were scored as correct when George accurately labeled a picture upon request.

Reliability of Dependent Variables

Reliability measures were obtained for each of the dependent variables during the experiment or from videotape obtained throughout each experimental condition. Interobserver agreement on the occurrence of problem behaviors was assessed for 21% of the experimental sessions, and reliability

of the task performance data was assessed for 61% of the sessions. An agreement in the recording of problem behavior was counted when two independent observers scored a 30-s interval in an identical manner.

Interobserver agreement for problem behavior was calculated by dividing the number of agreements by the sum of agreements plus disagreements and multiplying the obtained quotient by 100. Percentage agreement for problem behavior was 92% (range, 75% to 100%); occurrence reliability was 90% (range, 71% to 100%); nonoccurrence reliability was 91% (range, 75% to 100%). Reliability for rate of correct responding was calculated by dividing the smallest frequency count (obtained by one observer) by the largest frequency count (obtained by the other observer) and multiplying the quotient by 100. Percentage agreement for rate of correct responding was 96% (range, 80% to 100%).

Design and Experimental Conditions

To demonstrate replicability of treatment effects, reversal designs (Barlow & Hersen, 1984) were used, with the order of conditions alternated across children. For each child, two conditions were presented, a choice condition and a no-choice condition. In the choice condition, the child was provided with opportunities to choose from the available selection of tasks and reinforcers. George indicated his selections verbally, and Mary and Lori indicated their selections by pointing. If a task was completed during a session, the child was asked to choose new materials. The children were also permitted to continue work on the same materials if they chose. Also, if the child voluntarily requested a change in materials, such a change was permitted. Reinforcers were also selected, but the opportunity to select a reinforcer was provided in accordance with the prevailing reinforcement schedule.

In the no-choice condition, the same tasks and reinforcers were provided, but always according to an independent schedule and always at the teacher's initiation. To keep the teaching sessions as natural as possible, the specific scheduling of tasks in some of the no-choice conditions was left to the discretion of the teacher. In other no-choice conditions, teach-

ers were given explicit instructions to maintain an equal balance of tasks within the sessions. Any expression of choice that occurred during this condition was followed by a brief explanation that the schedule must be followed (e.g., "We need to do this other work now.").

In all experimental conditions, problem behaviors were addressed according to guidelines set forth in each child's regular program. In general, problem behaviors were ignored whenever possible and aggressive responses were blocked in a protective manner. For all 3 children, physical prompts were used occasionally to continue instruction. For example, if the child engaged in excessive motor activity that prevented attending to task-related instructions, he or she was prompted with verbal and occasional physical guidance to sit quietly. In accordance with her ongoing habilitation plan, some of Mary's problem behaviors were managed with additional contingencies. Specifically, Mary's aggression was followed by a brief regime of contingent exercise, and her instances of object misuse were followed by 5 s of corrective positive practice. All procedures were used in the same manner across all conditions in the experiment.

Teachers and Observers

All teachers had extensive experience in the use of behavioral techniques with severely handicapped children, including a minimum of 1 year supervised practicum in clinic settings. The observers had extensive backgrounds in the recording of operationally defined behavior of children with disabilities. Before any experimental data were recorded, each observer was trained to record each of the dependent variables until interobserver agreement reached at least 80% for three consecutive practice sessions. To control for the potential effects of experimenter bias, the teachers were naive with respect to the experimental hypothesis for 59% of the experimental sessions.

RESULTS

The data points in Figure 1 show the percentage of intervals with problem behavior during each session for each experimental condition in the re-

versal analyses. Each child exhibited lower levels of problem behavior during the choice condition. When choices were first presented to Mary, her problem behavior decreased to a low of 5% during the last session in the condition. A reversal to the no-choice condition resulted in an immediate increase in problem behavior, with an average of 78% across the condition. During the subsequent choice condition, Mary's problem behavior decreased to a low of 0%. The remaining two graphs reveal essentially the same effects for the other 2 children. That is, the choice condition always produced lower levels of problem behavior than did the no-choice condition.

For George and Mary, a subset of their problem behavior (i.e., aggression) was considered to be a most urgent and severe problem (Lori did not display aggression during the experiment). To assess the potential effects of choice on George and Mary's aggressive behaviors, the videotapes were reviewed, and the data on aggressive behavior were separated from the pool of problem behaviors for these 2 children. The shaded portions of Figure 1 show the results of this analysis. Both Mary and George showed higher levels of aggression in the no-choice condition than in the choice condition. Mary's aggressive behavior decreased to 0 during the last two sessions of both choice conditions, and George's did not display any aggressive behavior during any of the sessions in the choice condition.

Data for rate of correct unprompted responding across all experimental conditions are shown in Table 2. These data show no consistent differences in rate of responding across the conditions.

Data were also collected on the relative proportions of tasks and reinforcers that were presented by the teachers in the no-choice condition and those that were presented (i.e., selected by the children) in the choice condition. These data are shown in Table 3. All of the children selected all of the tasks in the choice condition that were presented in the no-choice condition. Although there was some evidence of preference (e.g., Mary appeared to favor the pennies and buttons over the puzzle), in general there were few consistent differences across tasks and conditions.

The data for reinforcer presentation and selection

are also presented in Table 3. All of the children selected all of the reinforcers in the choice condition that were presented in the no-choice condition. During the choice condition, however, a somewhat higher proportion of crackers and candy were selected by George and Lori, respectively.

In summary, the principal findings from this investigation are that (a) the choice conditions always produced lower levels of problem behavior than did the no-choice conditions, (b) during the choice conditions, levels of serious aggressive behaviors were lower for Mary and nonexistent for George, and (c) there were no systematic differences in the rate of unprompted correct responding across both conditions. In addition, it is important to note that all of the children selected all of the tasks and reinforcers during the choice condition that were presented by the teachers during the no-choice condition.

DISCUSSION

The results of this experiment add to the literature by providing direct evidence that choice making can produce reductions in specific, objectively measured problem behaviors. Although the magnitude of the differences was not always great, a clear distinction was demonstrated by the reversal design. Additionally, whereas other studies used preference assessments that were conducted before each session (Dyer, 1987; Koegel et al., 1987), this study showed that simply providing choices of preferred reinforcers and maintenance tasks during the session reduced problem behavior. Thus, it may not be necessary to conduct daily preference assessments to achieve positive results. Indeed, such assessments can be time consuming and, thus, impractical for many practitioners in applied settings. The present procedure of making choices available on a continuing basis was demonstrated to be effective and may be more efficient than previously reported strategies.

It is important to note that although the provision of choice-making opportunities systematically influenced problem behavior, there were no effects on the rate of responding on the instructional tasks. Similar results were found by Cox (1988),

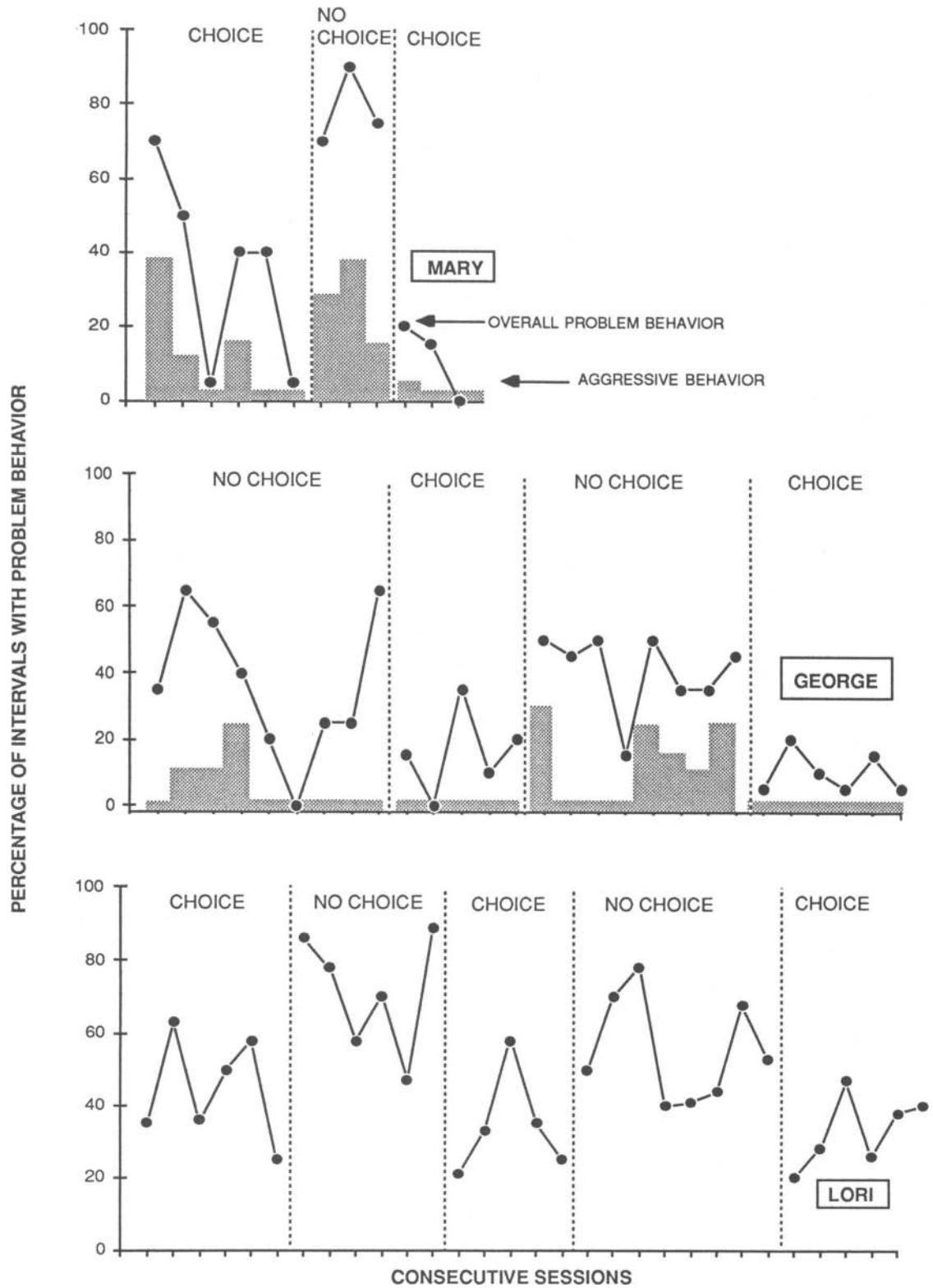


Table 2
Rate of Unprompted Correct Responding Across Each Experimental Condition

Child	Condition	Task			
		Pennies	Buttons	Puzzle	
Mary					
	Choice	3.61	7.58	1.00	
	No choice	5.30	6.00	0.20	
George	Choice	7.00	6.00		
		Sorting spoons	Stacking spindles	Rubber puzzles	Picture cards
	No choice	6.36	10.49	7.89	
	Choice	8.60	9.00	8.00	
	No choice	6.70	10.47		
	Choice	6.75	10.65		3.81
Lori		Sticks	Blocks	Puzzle	
	Choice	5.49	4.13	1.67	
	No choice	7.06	6.89	7.90	
	Choice	8.07	6.40	8.60	
	No choice	7.00	7.02	6.84	
	Choice	9.19	6.75	9.55	

who suggested that systematic differences in performance across choice and no-choice conditions might not occur in tasks that have been previously acquired by the study participants. Thus, it is important to evaluate the effects of this procedure on new skills.

Because the independent variable in this study was a package that permitted choices of both reinforcers and tasks, the effects of each element on problem behavior cannot be separated. However, the data on the children's selection of tasks and reinforcers offer some suggestions. Specifically, because Mary selected the puzzle at a relatively low rate during the choice condition, it is possible that this task was less preferred and that the problem behavior served an escape function during the no-choice condition (Carr & Durand, 1985). In contrast, George and Lori selected a particular reinforcer at a relatively high rate during the choice condition. This suggests that for these children, the reinforcers provided by engaging in the task com-

peted with the reinforcers provided by engaging in problem behavior (Dyer, 1987; Lovaas & Newson, 1976).

It might be argued that similar results could be achieved by having the teachers deliver optimal proportions of preferred tasks and reinforcers rather than by providing choices. However, a number of studies (e.g., Dyer, 1987; Green et al., 1988; Parsons et al., 1990) have shown that teachers' selections are not as effective in identifying reinforcers as is a procedure of systematic assessment of preferred stimuli. Also, in the present study, Mary's teacher was naive with respect to the experimental hypothesis during all but the last session, and Lori's teacher was naive throughout the entire experiment. Further, during Lori's sessions in the no-choice conditions, the proportions of tasks and reinforcers were nearly equivalent. These controls reduce the potential for the beneficial effects of choice to be influenced by teacher selection of preferred tasks and reinforcers. Additional studies should address this

← Figure 1. Results of the reversal analyses measuring the influence of choice and no-choice conditions on the amount of problem behavior exhibited by 3 students with severe handicaps. The data points reflect the percentage of intervals with any problem behavior, and the shaded portions of the graphs for Mary and George depict those intervals with aggressive responding.

Table 3
 Relative Proportion of Therapist Presentation and Child Selection of Tasks and Reinforcers

Child	Condition	Tasks						Reinforcers				
		Pennies	Buttons	Puzzle	Cookie	Juice	Stuffed animals	Crackers	Candy	Soda	Juice	Potato sticks
Mary	Choice	.29	.59	.12	.50	.20	.30					
	No choice	.25	.50	.50	.67	.33						
	Choice	.40	.40	.20	.42	.13	.45					
George	No choice	.41	.45	.14	.26	.35	.0			.39	.0	
	Choice	.60	.27	.13	.83	.0	.07			.10	.0	
	No choice	.50	.46	.04	.36	.29	.0			.35	.0	
Lori	Choice	.17	.33	.50	.60	.05	.11			.03	.21	
	No choice	.41	.24	.35	.65	.16	.19					
	Choice	.38	.27	.35	.33	.33	.34					
Lori	No choice	.32	.27	.41	.78	.12	.10					
	Choice	.31	.34	.35	.35	.28	.37					
	No choice	.36	.21	.43	.69	.21	.10					

issue by implementing a yoking procedure in which equivalent proportions of tasks and reinforcers are presented in the no-choice and choice conditions.

Another possible explanation for the results is that the opportunity to choose tasks as well as reinforcers may have been a reinforcer in itself. This hypothesis is supported by a study conducted by Brigham and Sherman (1973) in which children of normal development responded at higher rates during a condition in which they were allowed to choose their reinforcers, as opposed to a condition in which the experimenter selected the reinforcers. Because the reinforcers were the same in both conditions, the authors suggested that the opportunity to choose may have been as important as the reinforcers provided. Along these lines, Monty, Geller, Savage, and Perlmutter (1979) found that college students exhibited improved performance in a learning task when they were offered an attractive choice compared to a condition in which they were offered an unattractive choice. These authors suggested that the positive effects of choice-making opportunities may be attributed to the extent to which a subject perceives control in the situation.

To control for possible sequence effects in this investigation, the order of choice and no-choice conditions was counterbalanced across children. However, it is noteworthy that George's aggression increased in the second no-choice condition. This effect was also reported anecdotally by teachers from classrooms in which choice-making opportunities were introduced and then taken away (Dyer, Williams, Santarcangelo, & Luce, 1987). Given these observations, it is important to investigate the potentially deleterious effects of withholding opportunities for control (i.e., choice) after a period in which choice-making opportunities are provided.

The children who participated in this study appeared to have preference for specific tangible reinforcers (George and Lori) or tasks (Mary). It is important to determine whether similar results would be found by students who were motivated primarily by social reinforcement. In addition, there is a need for controlled studies examining the effect of choice making on problem behavior in natural settings. In this regard, pilot data collected by the

authors suggest that choice-making strategies can be integrated into a variety of everyday activities (Dunlap, Dunlap, Clarke, & Robbins, 1990; Garling, Carroll, Luce, & Dyer, 1987) and that these options can effectively reduce levels of problem behavior.

In summary, this study suggests that choice-making options provide a simple strategy that can be used to reduce serious problems exhibited by students with severe handicaps. The fact that these results contribute to a growing body of literature that stresses the importance of increasing personal autonomy for persons with severe handicaps indicates that this is an important area of future investigation.

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