A PERSONALIZED SYSTEM OF INSTRUCTION FOR TEACHING CHECKING ACCOUNT SKILLS TO ADULTS WITH MILD DISABILITIES

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This study evaluated the efficacy of a personalized system of instruction to teach checking account skills to persons with mild disabilities. Using a self-paced manual, 8 participants in two groups were taught to write checks, complete deposit slips, and reconcile monthly bank statements. Four participants were assessed for generalization from the classroom to community sites and demonstrated nearly perfect performance. A multiple probe design showed that acquisition occurred sequentially for each skill only after training using the self-paced manual. Follow-up sessions demonstrated that participants maintained the checking account skills. The results provide evidence of the effectiveness and adaptability of a personalized system of instruction for teaching complex monetary skills to persons with mild disabilities.

DESCRIPTORS: personalized system of instruction, monetary skills training, community survival skills, group training, mentally retarded adults

Keller (1968) described a personalized system of instruction (PSI) that serves as an alternative to conventional instruction. A PSI contains the following elements: (a) Students proceed at their own rates through units of course material; (b) students progress to new material only after demonstrating mastery of previous material; and (c) instructors provide repeated testing, immediate scoring, and tutoring (Keller, 1968). Although PSI has been used most often with college courses (Block & Burns, 1976), it also has been used in senior high, junior high, and elementary schools (Sherman, 1974). Because the usual medium for instruction is the printed word, PSI has not been used frequently with poor readers or for nonacademic topics (Reid, Archer, & Friedman, 1977). It has been suggested, however, that students with performance deficits may benefit most from PSI (Semb, 1975).

Although research has demonstrated the efficacy

of PSI to promote the acquisition of academic skills, response maintenance and generalization are no less important. Interspersal of previously learned responses with responses still in acquisition training has been shown to promote maintenance (Neef, Iwata, & Page, 1980). Programming common stimuli (Stokes & Baer, 1977) and using general case instructional procedures (Horner, Sprague, & Wilcox, 1982) have been effective in enhancing generalization. PSI permits the incorporation of these procedures to promote skill maintenance and generalization when creating instructional units.

PSI may have promise as a method for teaching certain skills to persons with mild disabilities, particularly those skills for which natural stimuli can be presented textually and whose natural responses are written. Complex monetary skills not only meet these stimulus and response criteria but also represent an important daily living skill. Money management skills, for example, differentiated persons with mental retardation who were or were not successful in community placement (Schalock & Harper, 1978). Past research on teaching complex money management skills, such as use of a checking account, has not included instruction on (a) writing checks to a wide variety of stores or individuals; (b) depositing combinations of coins, currency, and checks into a checking account; and (c) keeping an

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Requests for reprints and information about purchasing the training manual should be addressed to Anthony J. Cuvo, Rehabilitation Institute, Southern Illinois University at Carbondale, Carbondale, Illinois 62901-4609.

accurate record of checking accounts (Aeschleman & Gedig, 1985; LaCampagne & Cipani, 1987; McDonnell & Ferguson, 1989).

There were two primary purposes of the present study: (a) to evaluate the effectiveness of PSI to teach a complex money management skill to adults with mild disabilities and (b) to promote and evaluate maintenance and generalization of the money management skills trained in the PSI package.

METHOD

Participants

Two groups of rehabilitation clients between the ages of 18 and 23 years who were receiving independent living services at a rehabilitation facility served as participants. Two males and 2 females participated in each of the two groups. Six participants had WAIS IQs in the "borderline" range (70 to 84) of mental retardation (Heber, 1961). Kelly and Mack were diagnosed as having a personality disorder and psychoneurosis, respectively. Their Wide Range Achievement Test (WRAT) grade equivalents for math and reading ranged from 3.3 to 5.6 and 5.2 to 8.8, respectively. Raymond, who also had a diagnosis of psychoneurosis, functioned in the average range of intelligence based on a WAIS IQ and had WRAT grade equivalents of 11.5 and 10.1 for reading and math, respectively. Theresa, whose diagnosis was cerebral palsy, had a low average IQ and WRAT grade equivalents of 12.7 and 6.9 for reading and math, respectively. Participants attended a rehabilitation program in which independent living skills were trained prior to job placement. None of the participants had an immediate opportunity to earn an income, and 6 of the 8 participants had no opportunity to use a checking account. For the purposes of this investigation, the participants were divided into two groups, with Group 2 (Kim, Kelly, Tom, and James) receiving assessments of generalization.

Setting

All conditions of the investigation for Group 1 were conducted at the participants' rehabilitation facility in a classroom containing a table and chairs. In addition to classroom training and testing, for

Group 2 there were 13 pre- and postgeneralization probes, 10 in natural environments (grocery store—two probes; bank—three probes; discount store—one probe; rehabilitation facility—two probes; utility companies—two probes) and three in a simulated apartment at the training facility.

Materials

Materials included three types each of blank checks and deposit slips from local banks. The types of checks and deposit slips were selected using general case programming guidelines (Horner *et al.*, 1982). Two types of ledgers from local banks, bank statement/reconciliation worksheet forms, calculators, pencils, and a PSI workbook also were used for training.

PSI Workbook

The workbook was divided into a preface and three instructional units. The preface stated the usefulness of checking accounts, discussed commonly used checking materials, and stated facts concerning checking accounts. The preface required no written responses from participants.

Following the preface were three instructional units that taught different types of checking account transactions. In Unit 1, participants were taught to write checks in response to four different stimuli: (a) to receive cash, (b) to pay bills, (c) to pay for purchases, and (d) to pay individuals. In Unit 2, participants were taught to make deposits into their checking accounts in response to five different stimuli: (a) coins, (b) currency, (c) checks, (d) combinations of the above, and (e) combinations of the above and receipt of cash after the transaction. In Unit 3, participants were taught to reconcile checking account statements in response to six different stimuli: (a) no outstanding checks or deposits, (b) outstanding checks, (c) outstanding deposits, (d) outstanding checks and deposits, (e) a computational error in the ledger, and (f) unsolvable issues that required participants to contact the bank. Each of these stimuli had a corresponding task analysis, whose content validity was established by bank tellers.

Each of the three workbook units began with step-by-step written instructions and visual models.

Table 1
Task Analysis Steps for Completing Deposit Slips for Five Depositing Variations

	Coin	Currency	Check(s)	Cash back	Combina- tion steps
1. Endorse	NA	NA	X	O	O
2. Fill in name	O	O	O	O	O
3. Fill in account number	O	O	O	O	O
4. Fill in day, month, and year	X	X	X	X	X
5. Fill in currency	NA	X	NA	O	O
6. Fill in coin	X	NA	NA	NA	O
7. Fill in check number and amount	NA	NA	X	O	O
8. Fill in total	X	X	X	X	X
9. Subtract cash received	NA	NA	NA	X	O
10. Fill in net deposit	X	X	X	X	X
11. Record date in checkbook ledger	X	X	X	X	X
12. Describe in ledger	X	X	X	X	X
13. Record amount under deposit	X	X	X	X	X
14. Record amount under balance	O	O	O	O	O
15. Add amount to balance	X	X	X	X	X

Note. X = mandatory steps; O = optional steps; NA = not applicable.

For example, in Unit 1, the printed instructions for each step for writing a check (e.g., "Write month, day and year on the check," "Fill in 'Pay to the order of '") was accompanied by a photocopy of a check completed with the correct response.

The workbook also contained problems requiring the skills trained in that unit as well as skills trained in previous units. All problems consisted of written instructions (e.g., "Write a check to receive cash from Kroger") and visual representations of natural discriminative stimuli (e.g., copies of actual bills, currency, coins, and checks) for checking account practices (i.e., write a check, complete a deposit slip, reconcile a monthly bank statement).

In Unit 1, there were 54 check-writing practice problems with the four check-writing stimuli interspersed. Approximately every fourth trial, the same type of checking problem recurred (e.g., writing checks to bill notices). Problems varied with respect to relevant stimulus dimensions (e.g., amount of bill, payee) to sharpen discriminations and to promote generalization across payees and dollar amounts. In Unit 2, there were 30 deposit-slip practice problems that varied with respect to the five stimuli cited above. Interspersed with the deposit-slip problems were 30 check-writing problems to simulate the inflow and outflow of income.

A repetitive sequence of similar depositing problems was presented every ninth trial. In Unit 3, there were 18 reconciliation problems that varied with respect to the six stimuli. Interspersed with these reconciliation problems were nine check-writing and nine depositing problems. After every two reconciliation problems there was one check-writing problem and one deposit-slip problem. A repetitive sequence of similar reconciliation problems was presented every sixth trial.

Problems for both training and testing checking account skills were developed using general case programming guidelines (Horner et al., 1982). Table 1 shows stimulus and response variations with respect to making a deposit into a checking account. The table also shows task analysis steps that are mandatory, optional, and not applicable for depositing coins, currency, and checks, receiving cash, and engaging in combinations of these transactions.

Assessment

The dependent measures for Groups 1 and 2 were tests of checking account problems taught in the three instructional units. The same 11 problems were used for all test administrations for Group 1. For Group 2, eight different checking tests composed of 12 problems each were randomly selected for administration across participants. Each varia-

tion of check-writing and deposit-slip problems trained was sampled for testing. For reconciliation problems, two of the six types were sampled for Group 1 and three for Group 2.

Testing occurred (a) once before training was conducted; (b) once each when the acquisition criterion was attained for writing checks, completing deposit slips, and reconciling monthly bank statements; and (c) at 4- and 10-week follow-ups for Group 1 and at 4- and 8-week follow-ups for Group 2. The primary dependent variables were the percentages of test problems performed correctly from each of the three instructional units. A problem was scored as correct only if all steps of the task analysis were completed with no errors.

Classroom testing. The timing of each test administration was individually determined by participants' progress through their PSI workbook. Participants were told to assume they were living independently in their own apartment and recently had opened their own personal checking account. They were instructed to work independently at their own pace. No additional prompts or performance feedback was given during testing.

Generalization probes. Thirteen generalization probes were administered to assess checking account skills in more natural environments for Group 2 participants only. Eight of these probes pertained to writing checks (i.e., two for each of the four types of check-writing stimuli). Two additional probes assessed all types of depositing stimuli. These 10 probes were conducted in natural environments.

The final three generalization probes, conducted in a simulated apartment at the rehabilitation facility, evaluated reconciling monthly bank statements. They consisted of stimuli with (a) outstanding checks and deposits, (b) a math error in the ledger, and (c) an unsolvable problem for which participants must contact the bank.

Interscorer Agreement

All checking account responses resulted in permanent products. Interscorer agreement was calculated from data collected by the experimenter and a secondary scorer (a graduate student in behavior analysis) who independently evaluated participants' performance by comparing the permanent

products with an answer sheet. Interscorer agreement was computed by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100%. Interscorer agreement checks were conducted for 50% and 33% of all test trials across all experimental conditions and participants for Groups 1 and 2, respectively. Mean agreement scores for test trials were, for writing checks, 99% (range, 80% to 100%); for completing deposit slips, 97% (range, 84% to 100%); and for reconciling monthly bank statements, 95% (range, 70% to 100%).

PSI Training

Group training occurred in a regularly scheduled checking account class that included nonexperimental participants. Entry and exit from the instructional program were based on individual performance. Training sessions, 50 min in duration, were conducted 2 or 3 days per week.

Participants worked individually in their groups and progressed through the three units at their own pace. The experimenter circulated in a clockwise fashion around the room observing each participant perform one problem and providing feedback on all problems completed since the previous observation. Descriptive praise was given for correct responses. Errors were corrected in two ways. First, when the experimenter observed a participant perform a problem incorrectly, four prompting levels, sequenced from least to most intrusive, were used (i.e., nonspecific verbal instructions, specific verbal instructions, a pointing prompt plus specific verbal instructions, and modeling plus specific verbal instructions). Modeling and specific verbal instructions were continued until participants performed the task analysis step correctly. After a correct response, the participant was given the opportunity to respond independently on the next step of the task analysis. For problems the experimenter did not directly observe, errors were corrected only with specific verbal instructions.

To progress from one workbook unit to the next, participants were required to perform 100% of the steps of the task analysis independently on three consecutive trials for each type of problem trained in the unit. For example, to move from Unit 1 to

Table 2
Training Trials to Criterion for the PSI Units for Groups 1 and 2

PSI Unit	Group 1		Group 2	
	<i>M</i>	Range	<i>M</i>	Range
Writing checks	4.5	3–7	4.7	3–7
Completing deposit slips	3.1	3–5	3.6	3–6
Reconciling statements	3.1	3–5	3.6	3–6

Unit 2, participants had to meet criterion for the four check-writing stimuli. The same training procedures and criterion were used for remedial training, which was provided if participants made an error on more than one problem from an instructional unit on a test trial. Training was provided only on the problem types performed incorrectly.

Experimental Design

A multiple probe design across the three instructional units (writing checks, completing deposit slips, and reconciling monthly bank statements) was used to evaluate experimental control. The design was initially implemented for 4 participants in Group 1, then replicated for 4 participants in Group 2.

RESULTS

Testing Data

Figures 1 and 2 show individual participant data for Groups 1 and 2, respectively, with the percentage of checks written correctly, deposits, and reconciliations displayed separately. During baseline, scores ranged from 0% to 100% ($M = 56\%$, Group 1; $M = 0\%$, Group 2). Two participants in Group 1 had personal checking accounts and scored high during baseline (Theresa, 75%; Raymond, 100%). They were included in this experiment because they needed instruction on completing deposit slips and reconciling monthly bank statements, as shown in Figure 1.

After PSI, the mean percentage of correctly written checks increased to 94% (range, 75% to 100%). On the next two testing trials, the percentage of correctly written checks increased and stabilized at 100% for all participants in both experiments. On

the two follow-up tests, Group 1 participants averaged 100% and Group 2 participants averaged 94%.

The middle panels of each figure show the mean percentage of deposit slips completed correctly. During baseline, the means were 30% (range, 0% to 60%) and 0% in Groups 1 and 2, respectively. After PSI, the mean percentage of correctly completed deposit slips increased to 100% for all participants. At the 4-week follow-up for Groups 1 and 2 and at the 8-week follow-up for Group 2, participants scored 100%. For the 10-week follow-up for Group 1, participants averaged 95% (range, 80% to 100%).

The bottom panels of the figures show the mean percentage of monthly bank statements reconciled correctly. During baseline, the mean was 0% for all participants. Following PSI, the mean increased to 100% and remained there at both follow-ups.

Generalization Probes

The data in Figure 2 demonstrate that all participants generalized their skills from the classroom to community sites. The mean generalization setting baseline score for writing checks, completing deposit slips, and reconciling monthly bank statements was 0%. The posttraining generalization scores for filling out deposit slips and reconciling monthly bank statements were 100%; the score was 97% for writing checks.

Training Data

The mean number of training sessions needed to meet the acquisition criterion for each of the three instructional units is presented in Table 2. The low means and restricted ranges show rapid acquisition for all participants in both experiments.

Figure 1. Percentage of problems solved correctly for three types of checking account transactions before and after personalized system of instruction for the 4 participants of Group 1.

Figure 2. Percentage of problems solved correctly for three types of checking account transactions in both the training and generalization settings before and after personalized system of instruction for the 4 participants of Group 2.

DISCUSSION

This was the first known empirical evaluation of PSI to teach a complex monetary skill to persons with mild disabilities. Using PSI, participants demonstrated rapid acquisition of writing checks, completing deposit slips, and reconciling monthly bank statements. After training, participants performed these skills with 100% accuracy. Seven of the 8 participants maintained these skills at the 4-week follow-up, and all but 2 participants maintained 100% accuracy at either an 8- or a 10-week follow-up; however, both recouped these skills after brief remedial training. Furthermore, Group 2 participants generalized their skills from the classroom to the community (bank, discount store, grocery store, post office, offices) where they wrote checks and completed deposit slips. Additionally, they reconciled bank statements in a simulated apartment.

This study suggests that PSI can be effective for teaching persons with mild disabilities. It is particularly recommended for skills whose natural stimuli can be presented textually and whose natural responses are written. The PSI format permits the incorporation of strategies to promote skill maintenance (e.g., interspersal training) and generalization (e.g., programming common natural stimuli, general case programming). Additionally, the open entry and exit feature of PSI permits participants who enter a service program to be included immediately in an ongoing instructional group. Furthermore, because progress through the units is individually determined, PSI accommodates participants who learn at different rates. PSI permits participants to attain the same performance levels without overlearning or underlearning, as may be the case with group instruction.

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