TRAINING APARTMENT UPKEEP SKILLS TO REHABILITATION CLIENTS: A COMPARISON OF TASK ANALYTIC STRATEGIES

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The research was designed to validate procedures to teach apartment upkeep skills to severely handicapped clients with various categorical disabilities. Methodological features of this research included performance comparisons between general and specific task analyses, effect of an impasse correction baseline procedure, social validation of training goals, natural environment assessments and contingencies, as well as long-term follow-up. Subjects were taught to perform upkeep responses on their air conditioner-heating unit, electric range, refrigerator, and electrical appliances within the context of a multiple-probe across subjects experimental design. The results showed acquisition, long-term maintenance, and generalization of the upkeep skills to a nontraining apartment. General task analyses were recommended for assessment and specific task analyses for training. The impasse correction procedure generally did not produce acquisition.

DESCRIPTORS: community survival skills, independent living skills, assessment, task analysis, retarded adults

During the past decade, procedures to teach a variety of community living skills to handicapped persons have been developed and evaluated. Although a basic strategy for teaching these skills has been established, additional research is needed to investigate methodological issues to advance our instructional technology (Cuvo & Davis, 1983). For example, task analyses are common instructional tools; however, there is a paucity of research in which parameters of task analyses have been manipulated to study their effects on learning (Crist, Walls, & Haught, 1984).

Two formats for writing task analyses have been identified—specific and general (Brueske & Cuvo, 1985; Cuvo & Davis, 1983). Specific task analyses provide a detailed description of responses and re-

sponse sequences that constitute a behavioral chain. Such analyses may facilitate acquisition because they inherently describe successive approximations toward performance of a target skill, thereby standardizing instruction across trainers. On the other hand, this format for writing task analyses may unnecessarily penalize subjects who could perform the activity using alternate, functional responses that are not in the specific task analysis (i.e., there may be more than one behavioral process to achieve the desired task outcomes). These alternative responses would be scored as errors with the specific task analysis format, and a low percentage correct might falsely suggest that subjects could not perform essential outcome responses.

By contrast, a general task analysis incorporates only those mandatory steps that constitute essential task outcomes. It eliminates a detailed specification of the behavioral process that subjects should follow in completing the task. General task analyses may be advantageous as assessment devices. They tolerate variability in executing behavioral outcomes, and do not arbitrarily and inappropriately penalize a subject who performs those outcomes in a particular manner.

General and specific task analyses have been compared as assessment tools for one blind subject who was taught home cleaning skills (Brueske &

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Requests for reprints, copies of task analyses, or data for other tasks may be addressed to Anthony J. Cuvo, Rehabilitation Institute, Southern Illinois University, Carbondale, Illinois 62901.

Cuvo, 1985). The general task analyses were derived from the specific task analyses by eliminating behavioral process steps and keeping only mandatory outcome responses. Although the subject's performance was assessed on both sets of task analyses, she was trained on the specific task analyses. The results showed that the subject reached the acquisition criterion in fewer trials on the general compared to the specific task analyses. Although there was not a large discrepancy between performance on the two task analyses, the specific analyses may have included unnecessary process steps that slowed acquisition. This conclusion was qualified, however, because the subject engaged in an awkward and potentially stigmatizing posture when she mopped the floor. The general task analysis was not sensitive to this process behavior. This subject's performance suggests that behavioral process is not totally irrelevant and should not be sacrificed completely to successful outcome (e.g., having a clean floor). The Brueske and Cuvo (1985) study was an initial attempt with one subject to compare general and specific task analyses. One purpose of the research reported here was to extend the generality of this initial effort and compare general and specific task analyses with a larger number of subjects and tasks.

Another methodological issue that arises when using task analyses as assessment devices is how to proceed in testing when a subject does not emit a response that precludes performance of subsequent responses. The response that a subject does not emit might be designated as an impasse step because it creates a deadlock for testing certain subsequent steps in a chain. Impasse steps during testing have been treated in several ways. One common alternative is to score the impasse step and all subsequently unperformed responses as incorrect (Cuvo, Leaf, & Borakove, 1978). Another testing procedure has been for experimenters, themselves, to perform impasse steps to set the environment (i.e., discriminative stimuli) for testing to progress (Johnson & Cuvo, 1981; Wilson, Reid, Phillips, & Burgio, 1984). This would allow subjects to attempt and be scored on subsequent steps of the task analysis. Still another alternative has been to

prompt subjects if they did not emit an impasse step so they could perform it and not create a deadlock in testing (Neef, Iwata, & Page, 1978).

The first approach may underestimate subjects' operant level because responses precluded by the impasse step are scored as errors. Such a testing procedure might identify false negatives, and inappropriately include in training people who already have the outcome responses in their behavioral repertoires. The latter two techniques, in contrast, may overestimate subjects' operant level because training, either direct or indirect, may be confounded with testing. Although these three techniques have been reported in the published literature, research could not be uncovered that provided an experimental analysis of the effect of an impasse correction procedure. One technique for conducting such an experimental analysis would be to precede and follow an impasse correction baseline with true unprompted or uncorrected baselines (i.e., an A-B-A procedure). Our research incorporated this novel experimental analysis to provide a more sensitive measure of the effects of an impasse correction procedure.

The emphasis on community living for handicapped persons during the past decade has resulted in studies that have investigated procedures to teach monetary, transportation, shopping, pedestrian, cooking, and other community survival skills (Martin, Rusch, & Heal, 1982). With the exception of the Brueske and Cuvo (1985) study which focused on teaching apartment cleaning, research has not been conducted to validate procedures to train apartment upkeep and maintenance skills to handicapped persons. Such skills are essential to assist disabled persons to live independently in community settings. To help meet that need, a telephone survey of all major rental property owners in the city where this study was conducted ascertained apartment upkeep behaviors that landlords expected or permitted their tenants to perform. Additionally, a 12-month retrospective analysis of the records of two federally subsidized apartment buildings for disabled people in two states indicated greater neglect in apartments for disabled people. These tenants tended to neglect

and damage, apparently because of skill deficits, their refrigerator, stove, heater/air conditioner, drains, floor, walls, and electrical system. The rental property owners contacted expected their tenants to perform basic upkeep on these fixtures and report needed upkeep that was beyond their ability to restore.

The lack of basic apartment upkeep by the disabled persons cited above has resulted in excessive costs to tenants and the management company. The mean monthly property restoration costs across 101 apartment units where this study was conducted was \$2,500, with a range of \$1,800–\$6,000 per month. Fewer than 20% of the apartments passed inspection each month without fines, which ranged up to \$800 per tenant. We designed our research, therefore, to (a) socially validate a set of training goals, as described previously, (b) validate procedures to teach apartment upkeep skills, (c) address the two task analytic assessment issues cited earlier, (d) use natural environment assessments and contingencies, and (e) perform a long-term follow-up of subject performance.

METHOD

Subjects

Participants were six clients of a rehabilitation facility—three males and three females. At the time of the study two participants (Brian and Bradley) lived at the housing project where this study was conducted. They were referred for participation by housing management because they had failed their first two monthly apartment inspections, had been fined, and were under consideration for eviction. These tenants did not improve their apartment upkeep performance after several instructional demonstrations by housing project management. Three others (James, Anne, and Marilee), on the waiting list for entry into the apartment complex, moved there after training. One subject (Carley) moved to another apartment in the same town. All participants received independent living training at their rehabilitation facility which included actual or simulated instruction on the training tasks prior to this experiment. Nevertheless, their low base-

lines in the community suggested a lack of generalization from the rehabilitation facility.

Participants had various categorical disabilities and were considered severely disabled by the Illinois Department of Rehabilitation Services (I.D.O.R.S.). Each participant's age, disability, and Full Scale WAIS IQ reported in their I.D.O.R.S. file were: James (26, mentally retarded, IQ 63); Marilee (19, borderline mental retardation; minimum right arm dysfunction, IQ 77); Bradley (23, minimal brain damage, depressive neurosis, borderline psychosis, history of hospitalization for behavior problems, IQ 81); Brian (20, spastic cerebral palsy with left hemiparesis, auditory recall deficit, IQ 91); Carley (33, borderline retardation, IQ 77); and Anne (19, mild retardation, IQ 69).

Setting and Materials

The study took place in a federally subsidized, eight-story apartment building located in a small midwestern city. This facility housed 41 physically and 60 mentally handicapped persons. A fully furnished one-bedroom apartment occupied by the experimenter was used for training. The 2- and 4-week generalization/maintenance setting for Bob and Bradley was their own apartment, and for those who did not yet live in the building it was an apartment located on a different floor than the training apartment. For participants who still lived in the housing project, the 19- and 22-month follow-up setting was their own apartment. An orientation to the training apartment took place prior to baseline to show participants the location of appliances, fixtures, and materials. The latter, placed under the kitchen sink where they normally were found, included: steel wool soap pads, two pairs of rubber gloves, two cloth scrub pads, several rags, one pail, one bottle of liquid spray cleaner, two cans of oven cleaner, two screw drivers, one butter knife, and one meat cleaver. These appropriate and inappropriate materials were made available during testing and training.

Task Analyses and Validation

For each of four apartment upkeep and maintenance activities, appropriate tasks were selected.

Table 1
Refrigerator Task Analysis

1. Open refrigerator door.
2. Open the freezer door.
3. Determine whether or not the freezer requires defrosting ($\frac{1}{2}$ " of ice or not). *If less than $\frac{1}{2}$ " of frost is present close freezer and refrigerator door. If $\frac{1}{2}$ " or more frost is present go on to Step 4.
4. Turn temperature control dial to "off" position.
- *5. Remove food from freezer compartment.
- *6. Remove food from freezer tray.
- *7. Set freezer to winter position.
- *8. Optional: Remove food from refrigerator shelves.
- *9. Secure refrigerator door open.
- *10. Secure freezer door open (unless Step 13 is performed).
11. Remove frost from freezer.
- *12. Let the frost in the freezer melt into the freezer tray on its own or
- *13. Place a pan of hot water in the freezer to speed melting.
- *14. After all the frost has melted, wipe down the freezer, drying any water that is present.
- *15. Remove freezer tray.
16. Empty the freezer tray of any water that may have been collected.
- *17. Wipe dry the freezer tray.
- *18. Set freezer tray to summer position.
19. Return freezer tray back to correct position.
- *20. Replace food into freezer tray.
- *21. Replace food into freezer.
- *22. Replace food on refrigerator shelves.
23. Return temperature control dial to the number 3-4 position.
24. Shut freezer door.
25. Shut refrigerator door.
- *26. Allow to cool back down (1-2 hours before re-use).

Note. Process steps are designated by an asterisk.

Each of these tasks was analyzed and its content validated using expert information (Cuvo, 1979). Appliance manuals, home maintenance texts, housing project housekeeping and maintenance personnel, behavior analysts, and handicapped persons were either consulted or observed performing the tasks in the process of developing specific task analyses. These analyses had integrated into their response chains training process steps to shape the target behaviors correctly and safely. Using feedback provided by housekeeping and maintenance staff, only the performance outcomes that were mandatory for performing the tasks at an acceptable level were selected from the specific task analyses to form the general task analyses. Table 1 shows the analysis for the refrigerator task. All 26

steps constituted the specific task analysis, and those 10 steps without an asterisk the general task analysis.

Dependent Variables

During training, each response of the specific task analysis was scored as performed with either No-Help or the error correction procedure required to occasion the correct response. Participants were required to perform 100% of the steps of the specific task analysis with No-Help on two consecutive training trials prior to being assessed on both task analyses. The acquisition criterion for each task was performing 100% of the general task analysis steps correctly with No-Help for one test trial. When participants met this test criterion they would have performed three consecutive trials with No-Help, two during training and one during testing. If participants fell below this test criterion they were recycled for additional training.

In addition to measuring performance during the experiment, there were naturally occurring assessments and contingencies. Housing management conducted periodic apartment inspections prior and subsequent to training, and provided feedback to tenants regarding their compliance with cleanliness and safety standards. Apartments were evaluated on all aspects trained in this experiment as well as others. Participants could either pass their apartment check on all items evaluated or fail on specific items and be required to remediate deficiencies. If tenants did not rectify their deficiencies within an allotted time, the building maintenance staff would do the work and tenants were fined to compensate for expenses. This dependent measure was obtained prior to instruction for Brian and Bradley who already lived in the housing project, and for five of the six participants who lived there after training. Additionally, apartment units were assessed periodically by City Housing Code and U.S. Department of Housing and Urban Development (H.U.D.) inspectors.

Acquisition Training

Participants proceeded through the entire task analysis each session in a forward order. One minute was allocated to initiate each response to permit

preparatory behavior (e.g., gathering materials). Participants had the opportunity to perform each step of the task analysis initially without prompting. If participants did not respond or responded incorrectly, error correction procedures ordered in the following sequence were administered as needed: (a) *verbal instruction*—the trainer told the participant what to do; (b) *modeling*—the trainer demonstrated the response; (c) *verbal instruction plus modeling*—the trainer verbally described the response while demonstrating it; (d) *physical guidance*—the trainer physically guided participants through the response. After response correction, participants continued through the subsequent steps of the specific task analysis with No-Help unless another error or nonresponse occurred.

Consequences for correct responses consisted of verbal praise during training. Praise was provided on a CRF schedule during the first session, an FR 3 during the second session, and only after the whole task was completed if a third training session was necessary. No negative consequences were used for errors; however, if a response was omitted that either posed a threat of physical injury to participants or was potentially damaging to appliances, the trainer interrupted, explained the negative effects of participants' behavior, and redirected them to try another response.

Generalization and Maintenance

Experimenter-administered follow-up tests occurred approximately 2 weeks, 4 weeks, and 19 months after participants completed training for those persons still living at the housing project and willing to cooperate with the assessment. If follow-up performance fell below the original acquisition level, training was reinstated until subjects had one session with 100% of the specific task analysis steps performed correctly with No-Help. In addition to these performance checks, naturally occurring follow-up assessments were conducted by various inspectors for 22 months past training as stated earlier.

Maintenance/generalization training was conducted under the same conditions as acquisition training with the exception that two less intensive prompts were added: (a) *Confirmation*—if partic-

ipants verbalized the correct response, the trainer confirmed its accuracy and allowed subjects to perform it with No-Help, and (b) *Nonspecific*—if participants failed to respond within 1 minute the trainer said, "What's next?" If these less intensive prompts did not occasion correct responding, the error correction sequence employed in acquisition training was used.

Interobserver Agreement

Trained observers recorded responses concurrently with the trainer on 31% of all test and 40% of all training sessions. Interobserver agreement was calculated on a response-by-response basis for overall agreement, occurrence agreement, and nonoccurrence agreement by dividing the number of agreements by the number of agreements plus disagreements multiplied by 100%. For testing, agreement was scored when both observers credited the general and specific task analyses responses as either occurring or not occurring correctly. For training, agreement was scored when both observers credited either No-Help or the same error correction procedure for a specific task analysis response. When summed across all tasks and participants, overall agreement averaged 99% (range 88%–100%), occurrence agreement 98% (range 88%–100%), and nonoccurrence agreement 99% (range 96%–100%).

Experimental Design

A multiple-probe across participants design (Horner & Baer, 1978) was used to minimize the frequency of testing and mitigate the negative effects (e.g., complaints) displayed by pilot subjects (Cuvo, 1979).

Participants were tested at least twice, including in the generalization apartment, to provide an initial baseline. All baseline test responses were unprompted and no consequences or feedback were provided. Pilot work showed that if certain steps of the task analyses were not performed correctly during testing, participants would not have the opportunity to emit later steps in the response chain (i.e., an impasse was created). A second baseline measure was instituted, therefore, that involved the experimenter performing impasse steps for partic-

ipants while they stepped out of the room. Subsequently, participants were allowed to continue the assessment and perform responses they did not have the opportunity to emit previously because of the impasse. Next, there was a return to the original baseline condition which permitted an assessment of whether or not learning occurred during the impasse correction baseline.

Air Conditioner and Heating Unit Procedures

Three tasks were trained for this activity: air conditioner operation, heater operation, and air filter upkeep. The general task analysis had 10 steps; the specific task analysis had two additional steps that were part of the air filter maintenance task. Prior to testing and training sessions, an air filter varying in amount of dust was placed in the air conditioner/heating unit to simulate naturally occurring dust buildup. The air flow and thermostat controls for the air conditioner/heating units were arbitrarily set at either inappropriate or appropriate settings according to hypothetical weather conditions. Hypothetical weather conditions and artificially dirty air filters simulated the range of natural stimulus conditions that would not occur during training.

During each test session, participants were presented two hypothetical weather situations and asked to set air conditioner/heating unit controls appropriately. The trainer then asked participants to locate the air filter and clean it if needed. If participants did not perform the first response in the chain for cleaning the air filter (i.e., remove the front panel of the heater/air conditioner), they did not have the opportunity to demonstrate their skills on later responses; therefore, the impasse baseline procedure was used at this point of the task analysis. Adjusting temperature controls in the air conditioner/heating unit task analyses did not have an impasse procedure. During training, tasks were sequenced as follows: air conditioner, heating unit, and air filter.

Electric Range Procedures

The three tasks trained were upkeep of the overhead fan, stove, and oven. The general task anal-

ysis included 22 steps; the specific task analysis had 26 additional steps for all three tasks. Prior to testing or training sessions the electric range was soiled to simulate approximately 2 weeks of normal use. During testing, participants were asked to perform either one or two of the tasks rather than all three. This minimized participant dropout because of deleterious effects of baseline testing without prompts or consequences on a somewhat aversive task. If participants did not perform Step 4 in the specific task analysis for stove upkeep (i.e., remove all four burners by gently pulling them away from their respective outlets) during testing, the impasse baseline procedure was instituted.

Refrigerator Procedures

This activity involved cleaning and defrosting a manual electric refrigerator. The general task analysis had 10 steps; the specific task analysis had 16 additional steps. Prior to testing and training sessions, the refrigerator was soiled with food particles, and the freezer compartment was packed with ice shavings to simulate 2- to 4-weeks of frost buildup. If participants did not perform Step 11 in the specific task analysis (i.e., remove frost from freezer) during testing, the impasse baseline procedure was instituted.

Electrical Appliances Procedures

This activity involved the operation and upkeep of a circuit box and electrical appliances (e.g., lamp, television, air conditioner). The general and specific task analyses were identical for this task because the behavioral process was important to ensure participant safety. The task analysis for restoring power safely to a lamp involved 15 steps, and to the television and air conditioner 11 each. Participants were required to determine whether or not there was a power failure, and if so, to restore power to the apartment or appliance affected. Power problems could have had their origin in: (a) an appliance or lamp, (b) circuit box, (c) appliance and circuit box, or (d) the housing project electrical system.

Prior to the participant entering the apartment for testing or training the experimenter created a malfunction in the lamp, television, or air condi-

Figure 1. Percentage of general and specific task analysis steps performed correctly with No-Help for the experimental conditions of the refrigerator task. The arrows indicate testing in the generalization settings during baseline. All follow-up testing was conducted in the generalization settings.

tioner by pulling the electrical plug from the outlet, using a defective light bulb, turning off the circuit breaker, tripping the main breaker for the entire apartment (which was not accessible to tenants), or any combination of these. The experimenter initially would ask participants to activate an appliance (e.g., "turn on the lamp"). After discovering that the appliance was not working, participants were asked to "try to make it work again." During training participants were taught to complete maintenance request slips and submit them to the housing management for power failures or any other malfunction that they could not restore.

RESULTS

Participants were trained to perform upkeep on eight tasks that were part of four apartment maintenance activities. Figure 1 presents data for the refrigerator maintenance task that are representative of data for the other seven tasks. Figure 1 includes results for the impasse correction baseline. All participants' performance improved during this condition, suggesting they had the skill to perform responses precluded by the impasse step during the original baseline condition. Data returned to their original baseline level during the second true baseline for some tasks and participants but not for

TABLE 2.
GROUP TESTING AND TRAINING DATA FOR TASKS TAUGHT

Task	True Baseline			Impasse Correction		True Baseline		Training		Maintenance & Generalization Testing			
	$\bar{X}$ /range	$\bar{X}$ /range	$\bar{X}$ /range	Baseline $\bar{X}$ /range		$\bar{X}$ / range		$\bar{X}$ /range	# of trials to criterion	2 wk	4wk	10 mo	
Fan	$\bar{X} = 12\%$ $R = 0-30\%$	$N=3$	$\bar{X} = 16\%$ $R = 0-33\%$ G S	$N=3$	NA	$N=3$	NA	$\bar{X} = 2$ $R = 0$	$N=3$	$\bar{X} = 100\%$ $R = 0$ G	$\bar{X} = 100\%$ $R = 0$ G	$\bar{X} = 100\%$ $R = 0$ G	$N=2$
Stove	$\bar{X} = 3\%$ $R = 0-8\%$	$N=3$	$\bar{X} = 4\%$ $R = 0-12\%$ G S	$N=3$	$\bar{X} = 23\%$ $R = 16-33\%$ G S	$N=3$	$\bar{X} = 2\%$ $R = 0-8\%$ G S	$\bar{X} = 2.6$ $R = 2-3$	$N=3$	$\bar{X} = 100\%$ $R = 0$ G	$\bar{X} = 100\%$ $R = 0$ G	$\bar{X} = 100\%$ $R = 0$ S	$N=2$
Refrigerator	$\bar{X} = 32\%$ $R = 30-40\%$	$N=4$	$\bar{X} = 23\%$ $R = 16-28\%$ G S	$N=4$	$\bar{X} = 68\%$ $R = 60-80\%$ G S	$N=4$	$\bar{X} = 38\%$ $R = 30-50\%$ G S	$\bar{X} = 2.25$ $R = 2-3$	$N=4$	$\bar{X} = 100\%$ $R = 0$ G	$\bar{X} = 100\%$ $R = 0$ G	$\bar{X} = 100\%$ $R = 0$ G	$N=3$
Electric	NA	$N=5$	$\bar{X} = 1\%$ $R = 0-2\%$ G S	$N=0$	NA	$N=0$	NA	NA	$N=5$	NA	NA	NA	$N=2$

Note. G = general task analysis; S = specific task analysis; NA = not applicable; N = number of participants

TABLE 2.
GROUP TESTING AND TRAINING DATA FOR TASKS TAUGHT

Task	True Baseline			Impasse Correction			True Baseline			Training			Maintenance & Generalization Testing			
	$\bar{x}$ /range	$\bar{x}$ /range	N	Baseline $\bar{x}$ /range	Baseline $\bar{x}$ /range	N	$\bar{x}$ /range	$\bar{x}$ /range	N	$\bar{x}$ /range	# of trials to criterion	N	2 wk	4 wk	10 mo	N
Air Conditioner	NA	$\bar{X}=38\%$ $R=33-66\%$	N=4	NA	NA	N=0	NA	NA	N=0	NA	$\bar{X}=3.25$ $R=3-4$	N=4	G	NA	G	NA
	G															
Heater	NA	$\bar{X}=44\%$ $R=33-100\%$	N=4	NA	NA	N=0	NA	NA	N=0	NA	$\bar{X}=1.5$ $R=1-3$	N=4	G	NA	G	NA
	G															
Filter	$\bar{X}=0\%$ $R=0$	$\bar{X}=0\%$ $R=0$	N=4	$\bar{X}=25\%$ $R=0-57\%$	$\bar{X}=1\%$ $R=0-28\%$	N=4	$\bar{X}=19\%$ $R=0-44\%$	$\bar{X}=1\%$ $R=0-22\%$	N=4	$\bar{X}=3.5$ $R=3-5$	$\bar{X}=3.5$ $R=3-5$	N=4	G	$\bar{X}=100\%$ $R=0$	$\bar{X}=100\%$ $R=0$	$\bar{X}=100\%$ $R=0$
	G															
Oven	$\bar{X}=50\%$ $R=0$	$\bar{X}=50-75\%$ $R=69\%$	N=3	$\bar{X}=75\%$ $R=0$	$\bar{X}=75\%$ $R=0$	N=1	$\bar{X}=30\%$ $R=0$	$\bar{X}=75\%$ $R=0$	N=3	$\bar{X}=3.5$ $R=3-5$	$\bar{X}=3.5$ $R=3-5$	N=2	G	$\bar{X}=100\%$ $R=0$	$\bar{X}=100\%$ $R=0$	$\bar{X}=100\%$ $R=0$
	G															

Note. G=general task analysis; S=specific task analysis; NA=not applicable; N=number of participants

^a Brian did not meet the training criterion for oven.

others. Learning, as a result of the impasse correction procedure, is suggested by the increased scores in the second true baseline compared to the original baseline for Carley on both task analyses and for James on the specific task analysis. In contrast, Brian and Marilee did not increase their performance in the second true baseline after impasse correction.

Figure 1 also permits a comparison of performance under the general and specific task analysis assessment conditions. During baseline, participants' performance was slightly better under the general task analysis format. After training on the specific task analysis, three of the four participants reached the acquisition criterion in only two training trials; James required three trials. If the specific task analysis had been used as the assessment tool, the number of trials to reach the acquisition criterion would have been: Carley, 3; James, 4; Brian, would not meet criterion; and, Marilee, 2. These data show that if the more process laden specific task analysis, which had 16 additional steps, had been used as the assessment tool, subjects' progress would have been delayed despite their performing to criterion on the general task analysis.

Finally, the data in Figure 1 show evidence of response maintenance. Follow-ups conducted by the experimenter at 2-week, 4-week, and 19-month intervals revealed levels of performance comparable to those found immediately after training for all subjects.

Performance on all eight tasks for the four apartment upkeep activities is summarized across the rows in Table 2. Table 2 shows experimenter-collected testing data for the true and impasse baselines, and the 2-week, 4-week, and 19-month maintenance/generalization checks. Group means and ranges for percent correct on steps of the general (G) and specific (S) task analyses are presented in each cell of the table for each test trial and each task. Within each cell the mean is presented above the range. A general task analysis was not used for three of the tasks; therefore, Table 2 shows NA (not applicable) for the task analyses for air conditioner, heater, and electric. The number of participants (N) for each test trial is indicated in each cell.

As can be seen in Table 2, the impasse correction procedure was used for four of the eight tasks. For three of these four tasks all participants made errors on the impasse step; however, only one of the three participants required the impasse correction procedure for the oven task. That participant's true baseline performance is shown in parentheses in the row designated oven. Average performance during the impasse correction baseline improved for all four tasks; however, Table 2 shows that performances returned to their original baseline level in the second true baseline for three of these tasks. Only for the oven task did average participant behavior improve in the second true baseline.

General as well as specific task analyses were used for five of the eight tasks (i.e., filter, oven, range, stove, and refrigerator). Table 2 shows means and ranges entered in the general (G) and specific (S) task analysis segments of the cells for these five tasks. A comparison of the mean performances for general and specific task analyses within each cell shows inconsistent differences across all true baseline trials for the five tasks. Performance on the general task analysis was not consistently superior to that of its specific task analysis counterpart. For the four tasks for which an impasse correction baseline was used, the mean percent correct on the general task analysis exceeded that on the specific task analysis. The final three columns of data in Table 2 also show high levels of skill maintenance on all tasks. For most maintenance checks all subjects performed at a 100% level for all tasks.

The fourth column of data in Table 2 presents means and ranges of training trials to criterion for general and specific task analyses. These data show rapid acquisition with little difference between task analysis formats.

The apartment management, H.U.D., and City Housing Code enforcement officers inspected the apartment units periodically. Pass/fail data, shown in Table 3, are available for 22 months past original training. Brian and Bradley, who lived in the apartment building prior to training, had failed two consecutive inspections, had fines assessed because apartment management had incurred expenses to restore their apartments, and were threatened with eviction. After training, three additional

Table 3
Subject Performance on Apartment Inspections

Subjects	Baseline		Natural		Follow-up							
	management inspection Jan. 1983	management inspection Feb. 1983	Training March-May 1983	H.U.D. Inspection Mar. 1983	2-week experimenter follow-up June 1983	4-week experimenter follow-up June 1983	4-month apartment management inspection Sept. 1983	7-month apartment management inspection Dec. 1983	14-month apartment management inspection July 1984	17-month city housing code inspection Oct. 1984	19-month experimenter follow-up Dec. 1984	22-month apartment management inspection Mar. 1985
Brian	Fail	Fail	Passed all but oven	Random inspection of 20 (of 101)	Passed all but oven	Passed all but oven	Pass	Pass	Pass	Conditional pass*	Passed all but oven	Pass
Bradley	Fail	Fail	Pass	Apartment units	Pass	Pass	Pass	Pass	Moved	Moved	Moved	Moved
Carley	NR	NR	Pass	Building passed	Pass	Pass	NR	NR	NR	NR	NR	NR
Marilee	NR	NR	Pass		Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass
James	NR	NR	Pass		Pass	Pass	NR	Pass	Pass	Pass	Pass	Pass
Anne	NR	NR	Pass		Pass	Pass	Pass	Pass	Pass	Pass	Refused to participate	Pass

Note. NR = Nonresident.
* Conditional pass—Brian passed all tasks except the range which he remediated within 10 days.

participants moved into the apartment building and received inspections. Table 3 shows that participants had excellent performance throughout the 22-month follow-up. Brian's severe visual disability made it difficult for him to discriminate dark dirt particles in a black oven. This disability, therefore, negatively affected his performance on the specific task analysis assessments administered by the experimenter, as well as the inspection conducted by the City Housing Code Inspector. These data from several independent inspectors, each using their own assessment procedures and performance criteria, provide an independent and normative appraisal of all subjects' skill maintenance.

DISCUSSION

The results demonstrate the effectiveness of the instructional program for promoting operation and upkeep of apartment appliances and fixtures by handicapped adults. Participants acquired those skills, generalized them to similar apartment settings, and maintained those skills over an extended time. It was particularly noteworthy that participants passed inspections conducted by several independent agencies as well as the experimenter up to 22 months beyond training. Apartment management and governmental agencies did not use formal assessment devices and performance criteria. Instead, their evaluation was more subjective and it appeared that their performance criteria were less stringent than those used in this research. Participants may have been overtrained for their natural environment.

Instructors should attempt to train their clients to the criteria in the community environment; however, that task is complicated when there are no explicit assessment devices and performance criteria. Brian and Bradley, who were in danger of being evicted from the apartment building, had their fines waived, and they were restored to good standing. The rehabilitation facility that provided subjects for this experiment has adopted this training program for all clients who demonstrate apartment upkeep skill deficits. Clients receive training in their own apartment within the first week of residence.

The comparison of general and specific task analyses yielded results generally comparable to those reported by Brueske and Cuvo (1985). Although performance tended to be somewhat better (i.e., higher baseline and marginally more rapid acquisition) on some tasks with a general rather than a specific task analysis, that was not the case uniformly. How finely one breaks down a task analysis or the number of process steps that should be incorporated may be influenced by factors such as (a) subjects' operant level on the target behavior, (b) the degree of response variability that will be tolerated, (c) subjects' general level of adaptive functioning, and (d) the complexity of the behavior to be taught. Baseline performance on specific task analyses might be higher than on general task analyses if the former contain a number of steps already in subjects' repertoires, but essential outcome steps are not in their repertoires. On the other hand, performance might be higher on general task analyses if subjects could achieve mandatory outcome steps using an alternative response than that adopted for the specific task analysis. Of course, when using a percentage correct dependent variable, as is common in task analysis assessment, scores are greatly affected by the number of steps in the response chain.

The implications of this and the Brueske and Cuvo (1985) research are that specific task analyses might be appropriate training tools. Process steps not only may help shape the target behavior, but also provide more explicit discriminative stimuli for teachers to use during training. Although this rationale may be valid for instruction, it does not appear to be as valid for testing. Assessment task analyses, on the other hand, should include only those mandatory steps that are essential to accomplish a task. If process is arbitrary, subjects should have the opportunity to meet the objectives using alternative but acceptable responses. If process is important (e.g., for safety) those responses should be included in the general task analysis.

The impasse procedure raises another issue with respect to task analysis assessment. Earlier steps of a task analysis may produce discriminative stimuli for later responses (Thvedt, Zane, & Walls, 1984). There was evidence that learning during the im-

passe correction baseline occurred for some participants on some tasks; however, this effect was not uniform across subjects or tasks. This outcome suggests that a corrected environment, without participants observing the experimenter perform the impasse step, did not consistently serve as or produce a discriminative stimulus for the next response.

Another methodological issue raised by this study concerns the problem of repeated baseline testing. Complaints about repeated testing without feedback during baseline and repeated training trials on apparently aversive household upkeep tasks occurred. Three of seven pilot subjects dropped out from further participation because they objected to repeated testing and training trials. These pitfalls of repeated measurement associated with the multiple baseline design have been cited previously (Cuvo, 1979). Only one participant dropped out during the actual experiment, and then only during follow-up for the electrical appliances tasks. Additionally, Anne refused to cooperate for the 19-month follow-up conducted by the experimenter. The reduction in complaints during the experiment compared to pilot work seems largely attributable to the fewer test trials required by the multiple probe design (Horner & Baer, 1978). The reduction of complaints and improvement in performance also was facilitated by informing participants that the target behaviors were critical for maintaining their community independence and keeping their apartment.

The cost-effectiveness of this research can be assessed in several ways. The total cost of materials for all four training activities was approximately \$50.00. A total of 31 hours and 33 minutes was required for participants to acquire, generalize, and maintain all skills trained. The average training time per subject for each activity was: 62 minutes for air conditioner/heating unit; 80 minutes for electric range; 158 minutes for refrigerator; and 198 minutes for electrical appliances. If a trainer was paid \$5.00 per hour to conduct this instruction, the labor cost would have been approximately \$158.00. The total cost, therefore, to teach these four apartment upkeep activities to six handicapped people was an estimated \$208.00. The most important benefits to housing management

were the reduced upkeep costs and lower tenant turnover rates after training.

Future research should address whether simulated training in rehabilitation facilities could promote generalization to community apartments. Additional research should determine whether group training has the potential of being more efficient than individual instruction. Systematic replications should also be undertaken to compare general and specific task analyses and consider their differential utility as assessment and training tools.

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