Effects of Simulator Training on the Acquisition and Generalization of Pedestrian Skills in Retarded Persons

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EFFECTS OF SIMULATOR TRAINING ON THE ACQUISITION
AND GENERALIZATION OF PEDESTRIAN SKILLS IN RETARDED PERSONS

by

Terry J. Page

A Thesis
Submitted to the
Faculty of The Graduate College
in partial fulfillment
of the
Degree of Master of Arts

Western Michigan University
Kalamazoo, Michigan
August 1976
ACKNOWLEDGEMENTS

My work in researching and presenting this project has been greatly aided by the knowledge and guidance of Drs. Brian A. Iwata, Richard W. Malott, and Kathleen Lockhart; all made contributions to help make this effort possible. A special thanks is extended to Dr. Iwata for his continued understanding, keen observations, and friendly prompts. His assistance has been of a most reinforcing nature, and he has earned my enduring admiration and respect.

The help of Nancy A. Neef in collecting data is gratefully acknowledged. Gerald Shook, Director of the Kalamazoo Valley Multihandicap Center (KVMC), and William H. Uhlman, Component Coordinator of the KVMC Youth Component deserve acknowledgement for their support and cooperation.

I would like to thank the Burger Chef restaurant chain for their willing contribution of materials used in this project.

The fact that I was able to accomplish this project is partly due to the invigorating, educational environment fostered by my fellow graduate students and the faculty of the Psychology Department of Western Michigan University.

Finally, I would like to thank my wife, Jeanne M. Murphy, for her patience, support, and inspiration in carrying out this project.

Terry J. Page
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Over the past several years a number of procedures based on operant principles have been developed for teaching basic self-help skills to retarded persons. Examples include toileting (Azrin, Bugle, and O'Brien, 1971; Azrin and Foxx, 1971, 1974; Mahoney, Van Wagenen, and Meyerson, 1971), dressing (Minge and Ball, 1967), mealtime behaviors (Barton, Guess, Garcia, and Baer, 1970; Henrikson and Doughty, 1967; Madsen, Madsen, and Thompson, 1974; O'Brien and Azrin, 1972; O'Brien, Bugle, and Azrin, 1972), toothbrushing (Horner and Keithit, 1975).

Due to the success of these basic programs and the movement toward de-institutionalization, there has been an increased emphasis on more advanced skills. These have included mainly workshop and other occupationally-oriented behaviors (Bateman, 1975; Green and Hoats, 1969; Mitchell and Stoffelmayr, 1973; Shroeder, 1972a, 1972b).

Only recently has research been directed at teaching retarded persons skills necessary for community adjustment or independent living. A self-paced instructional program was used to teach skills needed to enter biographical information on job application forms (Clark, Boyd, and Macrae, 1975). Subjects were trained on one item at a time, then tested for generalization upon completion of an item. Results showed that after an item had been trained, it was correctly used in the completion of job application forms. Jones and Azrin (1973) found that by offering monetary rewards, tips on job openings could be obtained. They concluded that a similar procedure could be beneficial in helping minorities, former alcoholics, and former mental patients in obtaining job placement. Leff (1974, 1975) taught trainable mentally retarded
children to dial a telephone using a procedure in which training was conducted on a simulated telephone device. Results indicated that after training, subjects exhibited independent telephoning skills.

In addition to the above-mentioned efforts, more research is needed in the area of teaching retarded persons functional community-survival skills. One result of the current movement toward community placement of retarded persons has been that some individuals are being placed in the community without having been taught prerequisite adaptive behaviors. Often, the dangers retarded persons will encounter in the community are overlooked in preparing them for placement. In a survey of caretakers of community-placed retarded persons, Nihira and Nihira (1975b) found that many caretakers were concerned about the clients' ability to move safely about the community. Further findings show that of 1,254 reported incidents of problem behavior involving community-placed retarded persons, 75% involved jeopardy to the health and/or safety of the retarded person (Nihira and Nihira, 1975a).

Thus, teaching retarded persons skills to deal with potentially hazardous situations would greatly reduce the probability of serious injury, a major obstacle to successful placement. One potentially dangerous situation often encountered by community-placed retarded persons is attempting to cross busy city streets. Any pedestrian exposed to city traffic conditions must be able to demonstrate appropriate street-crossing skills. Data from 1971 show that pedestrians were involved in 18% of all fatal automobile accidents (O'Brien, 1972). Of these accidents, 21% occurred at intersections, and 43% took place while pedestrians were crossing streets at some point other than an intersection.
Thus, street crossing was involved in 64% of all pedestrian deaths, or 11.5% of all traffic-related fatalities.

This study was undertaken to examine the effects of teaching street-crossing skills to retarded persons in a classroom setting. Training undertaken in a classroom would seemingly present fewer problems than training at city intersections. Factors in the natural environment such as weather, the need for additional staff, and inherent dangers would not have to be considered. Thus, a method for teaching street-crossing skills in a classroom, which generalizes to natural environment conditions, would appear to be an ideal procedure and of widespread practical importance.

The major aim of this study was to examine the effects of training, using a model of simulated city conditions. A task analysis similar to one done by Resnick, Wang, and Kaplan (1973) was applied to street-crossing behavior and yielded five specific skills. The plan was to train these skills sequentially on the model, and then test for generalization to the natural environment after training on each skill. A secondary aim was to examine generalization occurring to untrained skills.
Method

Subjects

Six male students enrolled at the Kalamazoo Valley Multihandicap Center (KVMC), a program for the physically handicapped and mentally impaired, served as subjects. All were ambulatory, with ages ranging from 16 to 25 years (mean = 20.4 years), and IQ scores ranging from 55 to 85 (mean = 60.6). The students spent half of each school day receiving instruction in several academic areas, and the other half in a pre-vocational workshop. Each of the students had demonstrated proficiency in basic self-help skills. Although all had previously crossed city streets in the company of parents, guardians, or teachers, none had exhibited systematic street-crossing behaviors independently.

Setting and Apparatus

Classroom. Training sessions, review sessions, and classroom probes were conducted in a KVMC classroom located in downtown Kalamazoo. A model, simulating four square city blocks, constructed on a 32 x 40 inch (81.3 x 101.6 cm) posterboard was placed on a table situated against one wall of the room. Streets, cardboard houses, cars, trees, and people were either drawn on or glued to the board in appropriate places.

A six inch (15.2 cm) tall model pedestrian light with the words "WALK" and "DON'T WALK" printed on opposite sides, and two, three inch (7.62 cm) tall stop signs were constructed of heavy cardboard and colored construction paper. They could be placed at any intersection on the model or removed altogether.
A model traffic light measuring 2.5 x 1.5 x 1.5 inches (6.4 x 3.8 x 3.8 cm) was constructed of heavy cardboard, colored construction paper, and see-through plastic. The traffic light was suspended from a 6 inch (15.2 cm) tall metal pole attached to the city model. On all four sides of the traffic light, one of the three colors (red, green, or amber) was colored darker than the other two and covered with see-through plastic, to indicate that it was "lighted".

A 2.8 inch (7 cm) doll made of hard rubber was used as the object to be manipulated by the subjects.

City environment. Street generalization probes were conducted at three city intersections. All were within three blocks of the KVMC classroom. A pedestrian light which alternated "WALK" and "DON'T WALK" conditions and a tri-colored traffic light were located at one intersection. A tri-colored traffic light was located at a second, and a stop sign was located at the third intersection.

Procedure

Task sequence and response measurement. A component analysis of pedestrian behavior yielded five major skills. The first was intersection recognition, and consisted of crossing streets only at intersections and never in mid-block. The second was pedestrian light skills, and included behaviors appropriate at intersections equipped with pedestrian lights. The third consisted of skills used at intersections having tri-colored traffic lights. The fourth applied to intersections at which a stop sign faced cars travelling across the pedestrian's path. The fifth skill was for intersections at which a stop sign faced cars
travelling in the same direction as the pedestrian.

Figure 1 represents an analysis of street-crossing behaviors in flow chart form. The target behavior was for subjects to exhibit street-crossing behaviors based on this model. That is, once having reached an intersection, a pedestrian attends to those stimulus conditions which are in effect (pedestrian light, traffic light, etc.) and exhibits behaviors appropriate to those conditions.

Specific components of each of the five skills are presented in Table 1 under the heading "CORRECT RESPONSE". These component behaviors were also the operational definitions employed during training sessions, and classroom and street probes. Also presented in Table 1 are the operational definitions of incorrect responses used in training sessions, and classroom and street probes.

Training. Training consisted of teaching the five street-crossing skills in order, beginning with intersection skills. Training sessions were conducted with one experimenter and one subject seated at the table upon which the model was placed. Subjects manipulated a doll, following instructions from the experimenter.

A trial was initiated when the experimenter instructed the subject to move the doll from its present location on the model to one pointed out by the experimenter. For example, when intersection skills were taught, after placing the doll in mid-block, the experimenter instructed the subject to walk the doll to a store on the opposite side of the street. In this case, a correct response was recorded only if the subject moved the doll to a corner before crossing the street. An incorrect response would be recorded if the subject had the doll cross
Figure 1: Task analysis of street-crossing skills.
START.

AT INTERSECTION?

YES

PEDESTRIAN LIGHT?

NO

TRAFFIC LIGHT?

NO

STOP SIGN?

NO

LOOK LEFT AND RIGHT FOR TRAFFIC.

YES

ATTEND TO PROPER SIDE OF LIGHT.

LOOK LEFT AND RIGHT FOR TRAFFIC.

IS LIGHT "WALK"?

YES

START ACROSS THE STREET.

NO

DOES LIGHT SAY "WALK"?

NO

LOOK LEFT AND RIGHT FOR TRAFFIC.

YES

LOOK LEFT AND RIGHT FOR TRAFFIC.

IS LIGHT GREEN?

YES

STOP

IS THERE TRAFFIC?

NO

STOP SIGN?

YES

FOR CARS GOING ACROSS PATH

YES

IS THERE TRAFFIC?

YES

IS THERE TRAFFIC?

NO

DO NOT STOP UNTIL ALL THE WAY ACROSS.

END.

FIGURE 1

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Table 1: Correct and incorrect response definitions for the five areas of street crossing.
<table>
<thead>
<tr>
<th>Situation</th>
<th>Correct Response</th>
<th>Incorrect Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Intersection</td>
<td>1.1 Subject (S) goes to intersection to cross street.</td>
<td>S crosses street anywhere not at intersection.</td>
</tr>
<tr>
<td>2. Pedestrian</td>
<td>2.1 S stops upon arrival at intersection.</td>
<td>S crosses street without first stopping at intersection.</td>
</tr>
<tr>
<td>light 2.2</td>
<td>S starts across street within 5 sec. of light changing to WALK condition.</td>
<td>1) S starts across street before light has changed to WALK condition, or 2) S does not start across street within 5 sec. of light changing to WALK condition.</td>
</tr>
<tr>
<td>2.3</td>
<td>S turns head at least 45° to left and right at least once while in the street.</td>
<td>S fails to turn head at least 45° to left and right at least once while in the street.</td>
</tr>
<tr>
<td>2.4</td>
<td>S does not stop walking until completely across the street.</td>
<td>S stops before getting completely across the street.</td>
</tr>
<tr>
<td>3. Traffic light</td>
<td>3.1 Same as 2.1.</td>
<td>Same as 2.1.</td>
</tr>
<tr>
<td>3.2</td>
<td>S starts across street within 5 sec. of light changing to green condition.</td>
<td>1) S starts across street before light has changed to green condition, or 2) S does not cross street within 5 sec. of light changing to green condition.</td>
</tr>
<tr>
<td>3.3</td>
<td>Same as 2.3.</td>
<td>Same as 2.3.</td>
</tr>
<tr>
<td>3.4</td>
<td>Same as 2.4.</td>
<td>Same as 2.4.</td>
</tr>
<tr>
<td>TABLE 1</td>
<td>(continued)</td>
<td></td>
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<td>---------</td>
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<td>-------------</td>
</tr>
<tr>
<td>4. Stop sign (for cars going across the pedestrian's path)</td>
<td>4.1 S stops upon arrival at intersection and turns head at least 45° to left and right at least once.</td>
<td>1) S crosses street without first stopping at intersection, or 2) does not start across within 5 sec. of intersection being clear of traffic.</td>
</tr>
<tr>
<td></td>
<td>4.2 S starts across street within 5 sec. of intersection being clear of traffic.</td>
<td>1) S starts across street while cars going across his path are in the intersection, or 2) S does not start across street within 5 sec. of intersection being clear of traffic.</td>
</tr>
<tr>
<td></td>
<td>4.3 Same as 2.3.</td>
<td>Same as 2.3.</td>
</tr>
<tr>
<td></td>
<td>4.4 Same as 2.4</td>
<td>Same as 2.4.</td>
</tr>
<tr>
<td>5. Stop sign (facing cars going in same direction as pedestrian)</td>
<td>5.1 Same as 4.1.</td>
<td>Same as 4.1.</td>
</tr>
<tr>
<td></td>
<td>5.2 S starts across street within 5 sec. of street being clear of moving cars for at least one block in both directions.</td>
<td>1) S starts across street before street is clear of traffic for one block in both directions, or 2) S does not start across within 5 sec. of street being clear of traffic for one block in both directions.</td>
</tr>
<tr>
<td></td>
<td>5.3 Same as 2.3.</td>
<td>Same as 2.3.</td>
</tr>
<tr>
<td></td>
<td>5.4 Same as 2.4.</td>
<td>Same as 2.4.</td>
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</table>
the street at some point other than a corner.

When training on a skill with four components (e.g., pedestrian light skills), a trial involved emission of all four components. For a trial to be considered correct, all four components had to be correct.

While manipulating the doll, subjects were required to verbalize what the doll was doing to get to the designated location. For example, a subject being trained on intersection skills would, after receiving instruction, grasp the doll, walk the doll to a corner, and say, "He's going to a corner to cross."

Correct responses were consequated with social reinforcement in the form of descriptive praise. Incorrect responses were followed by explicit feedback as to why the response was inappropriate. The subject was then asked to respond to the instruction a second time. Following an incorrect response on a remedial trial, the experimenter modeled the correct series of responses for the entire component, and the subject was asked to try again. Each subsequent incorrect response was followed by the experimenter modeling the correct response. Correct responses made on remedial trials were reinforced, and the next trial was then initiated.

Training sessions consisted of 10 trials, not counting remedial trials. During any given training session, only one of the five skills of street crossing was taught. Criteria for mastery of a skill were two consecutive training sessions of at least 90% correct responses. Whenever a subject reached criteria for a skill, a review session was
review sessions. The purpose of review sessions was to provide practice on all previously learned skills. Subjects were required to demonstrate continued mastery by responding to the stimulus conditions of the previously learned skills. All conditions were identical to those of training sessions. Review sessions consisted of 10-12 trials, two to three for each previously learned skill.

classroom probes. Probes were conducted on the model to assess the degree of generalization occurring to untrained skills. Trials and instructions were identical to those of training sessions, as were definitions of correct and incorrect responses. Subjects were instructed to verbalize what the doll was doing, as during training sessions. The correction procedure used in training sessions for incorrect responses was not in effect, and correct responses were not reinforced. Subjects were required to respond once to each of the stimulus conditions for all five skills. Thus, each classroom probe consisted of one response to each of 17 items.

street probes. Probes were conducted at city intersections under actual traffic conditions to assess the degree to which skills being taught generalized to the natural environment. Probe trials were initiated in mid-block when testing for intersection skills, and approximately 30 feet (9.1 m) from a corner when testing the remaining four skills. Trials were initiated upon instruction from the experimenter to go to a specific location, e.g., to a store on the opposite side of the street. For pedestrian and traffic light conditions, instructions were timed so that subjects would reach the intersection during
the "DON'T WALK" or "RED" condition. Subjects were asked to verbalize their actions when following the experimenter's instructions. Correct and incorrect responses were recorded but no consequation was delivered for either. Subjects were required to respond once each to all of the stimulus conditions of the five skills (17 items).

The experimenter and subject walked to locations where street probes were conducted. Subjects wore blinder glasses when crossing streets proceeding to and from probe sites to prevent them from attending to the stimulus conditions controlling the experimenter's crossing.

As a precautionary measure, a safety monitor was always present during street probes. The safety monitor, who also served as a reliability observer, was responsible for preventing injury to the subjects. The monitor was positioned at corners subjects would be crossing and, if necessary, prevented subjects from walking into oncoming traffic.

Follow-up checks. Following completion of training on the fifth skill, post checks were conducted to assess the degree of maintenance of the five skills learned. Each follow-up check consisted of one classroom probe and one street probe. A minimum of three follow-up checks was obtained for each subject. Subjects who scored 13 or less correct responses out of the 17 possible were required to participate in one review session.

Experimental Design

The experimental design was a multiple baseline design across subjects. Baseline data in the form of classroom and street probes were collected on all subjects, a minimum of four times each, and
until responding was stable. When the first subject met criteria on intersection skills and advanced to pedestrian light skills, the second subject was started on intersection skills. When the second subject advanced to pedestrian light skills, the third was started on intersection skills, and so on. Baseline probes continued for all subjects not yet receiving training.

Reliability Measures

Reliability checks were made by either one of the experimenters or a graduate student naive to the experimental conditions. Following data collection, experimenter and observer records were compared. Agreements were scored when both scored a response as correct and when both scored a response as incorrect. Reliabilities were computed in the following manner:

\[
\text{reliability} = \frac{\text{number of agreements}}{\text{number of agreements} + \text{disagreements}} \times 100
\]

Checks were made at least twice during each training phase. The independent observer sat at the table with the experimenter and the subject. Experimenter and observer sat across the table from each other in such a way that precluded them seeing each other's data sheets. Checks on classroom probes were conducted in the same manner as during training sessions. On street probes the safety monitor served as reliability observer.

Reliability checks on training sessions yielded a mean of 98% agreement across all subjects. Observations taken on 32% of all classroom probes yielded a mean agreement of 97.6% across all subjects. For
checks made on 85% of all street probes, the mean agreement across all subjects was 95.7%. Mean reliability percentages for individuals during street probes were 96.7, 96.1, 95.8, 94.4, and 93.5% for Subjects 1 through 5 respectively.
Results

Figure 2 shows classroom and street probe data in multiple baseline form. Data from baseline probes, probes following training sessions, and follow-up probes are presented for each subject. Each data point represents the number of correct responses out of a possible 17 for each probe.

During baseline all subjects scored few correct responses during classroom and street probes. Mean number of correct responses for classroom probes were 4.3, 5.0, 4.0, 4.2, and 4.1 for Subjects 1 through 5 respectively. Mean number of correct responses for street probes were 5.8, 5.5, 8.1, 4.2, and 5.0 for all subjects respectively. Subject 3 emitted 11 correct responses on the first street prove and 15 on the second. His baseline responding then stabilized, averaging 5.3 correct responses for the final three probes. Subjects could score four correct responses on probes by crossing streets without stopping until completely across because this was a component of four of the five skills tested.

Scores on classroom and street probes improved as subjects were exposed to training conditions. Mean correct responses during classroom probes were now 13.0, 9.5, 11.7, 10.3, and 14.0 for all subjects respectively. Mean correct responses for street probes were 12.4, 11.0, 10.4, 7.7, and 13.7 for all subjects respectively. Subjects 1 and 5 correctly performed each just-trained skill on all classroom and street probes. Subjects 2, 3, and 4 correctly performed each just-trained skill on classroom probes, but skills did not always
Figure 2: Number of correct responses out of 17 possible for classroom and street probes during baseline, training, and follow-up conditions.
generalize to city traffic conditions after initial training. For Subject 2, additional training was required on pedestrian light skills before appropriate behavior was emitted in the natural environment. For Subject 3, appropriate pedestrian light skills were demonstrated on the second street probe for that condition, after additional training had been undertaken. Subject 4 met criteria on intersection skills, was tested for generalization three times, and the behavior skill had not generalized to city traffic conditions. Training was then begun on pedestrian light skills. Appropriate intersection skills generalized to city traffic conditions during follow-up street probes with Subject 4.

Follow-up generalization probes indicated that appropriate behaviors were still emitted after training had been discontinued. Mean correct response for follow-up classroom probes were 16.5, 17.0, 16.0, 17.0, and 17.0 for all subjects respectively. Mean correct responses on follow-up street probes were 15.5, 16.0, 16.3, 17.0, and 15.5 for all subjects respectively. Subject 2 scored 13 correct, and Subject 4 scored 11 correct on their first follow-up street probes. These subjects were then given one review session, followed by a classroom and a street probe. Subsequent to this, three follow-up classroom and street probes were conducted for each subject. Only data from the final three probes were used in computing mean scores for these subjects.
Discussion

The overall effectiveness of the program used to teach pedestrian skills is demonstrated by the multiple baseline design. Baselines conducted across subjects showed that all five performed poorly according to criteria established for this study. It was only after receiving training that subjects exhibited appropriate skills on either classroom or street probes.

The results show that pedestrian skills can be efficiently taught to retarded persons in a classroom setting. All five subjects, taught the five skills in sequential order, and progressing through the program at their own rate, demonstrated appropriate independent pedestrian skills upon completion of training. This program is the first successful attempt at teaching adaptive community skills in a classroom removed from the natural environment. Although Leff (1974, 1975) and Clark et al. (1975) successfully trained adaptive behaviors, generalization to community situations was not built into their training programs.

The results show that subjects often emitted correct responses during baseline probes. Typically, these responses were during trials in which subjects correctly continued across a street without stopping. Because this response was a component of four of the five skills tested, subjects who crossed street without stopping scored at least four correct responses on probe tests. All subjects consistently did this, accounting for many of the correct responses during baseline probes.
A major asset of the training program was that during the training phase, generalization occurred to untrained items. This is reflected in the results of classroom and street probes, during which subjects often correctly performed skills which were yet to be trained. The five skills were similar, and training one often facilitated later training on another. For example, after a subject is trained on pedestrian light skills, it is reasonable to expect improved performance on traffic light skills. The major discriminative stimuli (the different colored lights) are different for each condition, but appropriate behaviors are similar for both conditions. At both intersections the correct response is to stop upon reaching the corner. Once the critical stimuli (the lights) are appropriate, correct response are turning one's head $45^\circ$ to the left and right, and not stopping until completely across the street. To some extent, both stop sign conditions are similar to the pedestrian light and traffic light conditions. The first response varies slightly in that after stopping subjects must look to the left and right. Once they start to cross, subjects must then look left and right, and not stop until completely across the street. Therefore, after pedestrian light skills have been taught, most of the other skills are in the subjects' repertoires as well.

Another important aspect of this program is that the skills learned were successfully maintained after training was completed. This is demonstrated by performance on both classroom and street probes during follow-up checks. With all five subjects, appropriate street-crossing skills were exhibited two to three weeks after training had been discontinued.
This program was effective in teaching skills which generalized to the natural environment because of an emphasis on the transfer of stimulus control of behavior. For some subjects, however, stimulus control of behavior by appropriate discriminative stimuli in the training environment did not insure control by appropriate stimuli in the natural environment. Transfer was facilitated by having subjects verbally describe their actions during training trials, and on subsequent probe tests. This presumably enhanced the degree of similarity between training conditions and the natural environment. A parenthetical example of this is the failure by Subject 4 to exhibit appropriate intersection skills on street probes. He would cross in mid-block while verbalizing that he was going to a corner to cross. On the first follow-up street probe after the follow-up review session, he started to cross in mid-block, stopped, and said, "This isn't a corner.", and then proceeded to a corner to cross. On the three subsequent follow-up street probes, he displayed correct intersection skills.

The transfer of stimulus control to the natural environment was further enhanced by other aspects of the training program. A model was used which closely approximated city traffic conditions; the model included city buildings, streets, sidewalks with people on them, trees, and automobiles on the streets. Appropriate behaviors were brought under control of stimuli on the model which closely approximated relevant stimuli in the natural environment. The pedestrian light, the traffic light, and the stop sign were constructed and positioned on the model to achieve maximal similarity to their counterparts in the natural setting. The basic skills were taught to be performed according to the
flow chart presented in Fig. 1. Street-crossing decisions in the natural environment were made under the control of appropriate stimuli, based on the flow chart analysis of which stimuli were in effect in any given situation.

It should be noted that this program was implemented with high level retarded persons, and could conceivably not be as effective with lower functioning individuals. It appears that a prerequisite may be well developed language skills which serve a mediating function, facilitating the transfer of control across settings.

The length of time required to complete the program varied across subjects. The range was 14 to 29 sessions (mean = 21.2). Training sessions varied in length — a conservative estimate is that the mean was 15 minutes. Therefore, training time in hours was 3.5 to 7.25 hours (mean = 5.3 hours). Conceivably, training could have been concentrated and completed sooner. Thus, high level retarded persons could be expected to complete the program in as little as five hours of concentrated training.

It was necessary for the safety monitor to physically prevent subjects from entering a street only four times. On approximately five occasions, the monitor stepped into the street and stopped on-coming traffic to prevent an accident. Throughout all of the street probes no subject was ever in serious danger of being hit by an automobile.

The procedure used here to teach pedestrian skills appears to be a viable model for teaching other community-survival skills. Bus riding, purchasing, banking, and restaurant skills are some of the
adaptive behaviors which could conceivably be taught in a classroom using a model which approximates conditions in the natural environment. There are obvious advantages to teaching such skills in a classroom setting. Inclement weather does not disrupt training. Student and staff time is not lost getting to and from locations in the natural environment. Fewer staff are needed for training because one staff member can individually train many students without ever leaving the classroom building. Finally, embarrassment and, in this case, dangers inherent in the natural setting can be avoided.

Another important aspect of this program is its simplicity. The basic components are elementary enough that a specialist is not needed to teach them. The program could seemingly be taught by residence managers of community-placed retarded persons. Managers having knowledge of reinforcement principles could use the procedure to teach residents who demonstrate a lack of pedestrian skills.

The program also appears practical for teaching skills such as pedestrian behaviors to normal elementary and preschool children. Based on figures from traffic accidents and deaths (O'Brien, 1972), there appears to be a need to teach more people appropriate pedestrian skills. All of the advantages of classroom training would apply. Also, the transfer of stimulus control to the natural environment would presumably be facilitated because normal individuals typically exhibit more generalization across settings than do retarded persons. Because of the higher functioning level of normal children, the length of training time could probably be reduced.

An important consideration of this study is that it may be
providing a technological tool for teaching a skill which is not always welcomed by parents or guardians of retarded persons. After being taught pedestrian skills, there may be an increased probability that retarded persons will attempt to independently cross busy streets, whereas they might not have done so before. Obviously this increases the risk of serious injury or death. It is possible that parents of retarded persons may wish to avoid this risk, and they should be aware of the dangers. Parents of subjects in this study were informed of the general goals of the study and warned of the possible dangers. All parents signed forms indicating their permission for their children to be used as subjects.

In spite of the possible dangers, pedestrian skills seem to be desirable for retarded persons (as well as everyone else) to have in their behavioral repertoires, particularly if community placement is desired. Pedestrian skills are adaptive in that they enable retarded persons to more effectively interact with their total environment, thereby increasing the opportunities for further skill acquisition. Retarded persons capable of emitting appropriate pedestrian skills are less dependent on supervision by parents or guardians, and therefore approximate more closely persons in the mainstream of society. Pedestrian skills are functional in that they facilitate access to a wider range of available reinforcers in the community, e.g., movies, libraries, stores, etc.

In conclusion, the program examined in this study appears to be of widespread practical importance. It demonstrates a successful technique for teaching a functionally important, adaptive community skill
in a classroom setting. Classroom training of this and other community-survival skills appears to be the optimal training setting, given the behavior of interest generalizes to the natural environment and is maintained there after training has been discontinued.
REFERENCES


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