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SOCIAL VALIDATION AND TRAINING OF EMERGENCY FIRE SAFETY SKILLS FOR POTENTIAL INJURY PREVENTION AND LIFE SAVING

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A multifaceted behavioral program designed to teach emergency fire escape procedures to children was evaluated in a multiple-baseline design. Five children were trained to respond correctly to nine home emergency fire situations under simulated conditions. The situations and responses focused upon in training were identified by a social validation procedure involving consultation with several safety agencies, including the direct input of firefighters. Training, carried out in simulated bedrooms at school, resulted in significant improvements in both overt behavior and self-report of fire safety skills. The gains were maintained at a post-check assessment 2 weeks after training had been terminated. The results are discussed in relation both to the importance of social validation of targets and outcomes and the implications for further research in assessing and developing emergency response skills.

DESCRIPTORS: fire safety skills, self-reinforcement, maintenance, social validation, behavioral community psychology

Behavioral programs have improved a variety of community-related behaviors, including pedestrian safety skills (Yeaton & Bailey, 1978), shopping behavior (Barnard, Christophersen, & Wolf, 1977), telephone dialing (Leff, 1974), appropriate use of money (Cuvo, Veitch, Trace, & Konke, 1978), and fashionable dressing (Nutter & Reid, 1978). However, relatively little attention has been devoted to emergency safety skills. Although several studies have focused on the prevention of accidents that often lead to emergencies (Komaki, Barwick, & Scott, 1978; Parsons, 1976; Sulzer-Azaroff, 1978; Sulzer-Azaroff & deSantamaria, 1980), responses to actual emergency situations, such as fires, have been neglected.

The development of safety skills in response to all forms of emergency situations represents potentially important sources of training for interventions by behavior analysts within community settings. The need to promote safety skills in the presence of fire is acute given its devastating effects. An estimated 12,000 deaths and 300,000 injuries result from fire annually in the United States (National Fire Protection Agency, 1975*c*). Fires break out in over 500,000 homes every year (Hartford Insurance Group, undated *a*), about one fire every 57 sec (International Association of Fire Chiefs and Dictograph Security Systems, undated). Because a person may have only one to two minutes to escape a home fire, fire escape skills are critical. Because children have been cited as both significant contributors to (NFPA, 1975*c*) and frequent victims of fire (Burger King, 1979), they constitute a prime target for intervention.

The area of fire safety has attracted the attention of several agencies and organizations (e.g., NFPA and American Telephone & Telegraph) and has served as the focus of several

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educational projects and a few empirical studies (e.g., Jones, 1980; Jones & Kazdin, 1980; Risley & Cuvo, 1980). To date, training has been designed only to teach children emergency dialing skills (e.g., how to identify emergencies and to phone for assistance) rather than to teach the skills required for immediate safety in an emergency.

Children often do have some training in the importance of safely exiting from fires, through fire drills at school. However, loss of life is more frequently associated with fires in home at night (Dray, 1976; NFPA, 1974; U.S. Department of Commerce, 1978), and the skills and decisions that are required to escape safely are more complex than one would expect. The purpose of the present research was: (a) to train children to respond appropriately in simulations of fire emergencies arising at home at night, (b) to assess maintenance of appropriate responding, and (c) to socially validate the emergency procedure.

METHOD

Overview

Training was evaluated by a multiple-baseline design across subjects. Five children were assessed twice daily over both baseline and intervention phases in four different emergency fire situations. Each situation required a particular sequence of responses designed to ensure escape with neither loss of life nor injury. Participants were required to meet criterion levels of correct responding for the entire sequence of behaviors in a given situation before progressing to the next situation.

Participants

Five black third-grade children (three boys and two girls) who ranged in age from 8- to 9-yr-old (mean = 9.2 yr) and were within normal to low normal levels of intelligence (mean IQ = 89, range = 69-105 on the Otis-Lennon Mental Ability Test) participated in the study. These children showed near zero levels of performance on an initial fire safety skills screening assessment (see Assessment below) and had parent, child, and teacher consent for participation. The children lived in a section of the city that, as reported by the Pittsburgh Fire Department, ranked 12th of 43 neighborhoods (72nd percentile) in terms of the number of fire alarms.

Setting and Apparatus

Training focused upon fire skills that children would need when in their bedrooms at night. Each was seen individually for both training and assessment in one of two simulated "bedrooms" located in the gymnasium of the children's school. The equipment included a child's bed, a throw rug, a chair, an article of clothing (shirt) and a 91.4 cm × 105.7 cm (36 in. × 42 in.) E-Z tilt window mounted on a 76.2 cm (30-in.) table. Mats were placed on the floor to avoid injuries while children were rolling out of the bed, crawling, and climbing out the window.

Social Validation of the Behaviors

The appropriate method of responding to fire emergency situations was established in the following manner. First, published materials describing ways of escaping from a burning house were examined (Bete, Inc., 1978, 1979; Bryson, 1980; Burger King, 1977; Hartford Insurance Group, undated *a, b;* International Association of Fire Chiefs and Dictograph Security, undated; International Association of Fire Chiefs and the General Electric Company, undated; NFPA, 1973, 1974, 1975*a,* 1975*b;* Pennsylvania Department of Health, 1974; U.S. Consumer Product Safety Commission, undated; U.S. Department of Housing and Urban Development, 1977) and information about fire safety skills was obtained from local and national fire agencies and officials (i.e., AT & T, NFPA, and Pittsburgh Fire Department). Second, 42 hypothetical fire emergency situations in which children might find themselves were devised, and suggested responses were derived from the previously obtained information. These

42 situations were then presented to 14 city firefighters at a local station house. A short description of the circumstances surrounding the fire emergency (e.g., when and where the event was taking place) was given, and the firefighters were asked to evaluate individually whether the response for each situation was correct or incorrect. For each response marked as incorrect, the firefighters were requested to describe briefly what they believed to be the correct response. Following the initial administration, those items that were judged as correct by 64% or more of the firefighters were retained. Using the responses recommended by the firefighters, those items not attaining criterion were revised and administered to 11 firefighters. Items achieving a criterion of 73% approval were retained. Criterion was still not reached on three items, which were then revised and presented to 10 firefighters, who agreed that the responses to these situations were correct. Third, responses to the questionnaire were used to provide sequences of responses that would lead to safety in each of nine different situations in which children would be likely to find themselves in an actual fire. These responses served as targets for training. The nine different fire emergency situations differed in the cues that dictated the steps that the child needed to take to avoid injury (see Table 1).

The 6-yr.-old and three 7-yr.-old children were observed informally to evaluate their ability to respond appropriately without training as well as to discover the effectiveness of the assessment instructions. One of these children was taught the correct responses to the first situation to assess the suitability of the training procedure. Subsequently, modifications were made in the instructions to increase the ease with which children could understand them.

Table 1

Nine different fire emergency situations which differ according to the setting events or cues and the appropriate correct responses that are required for safe exit.

In each situation the child is in his or her bedroom when the fire begins. The following descriptions specify the different configuration of cues associated with the fire and the bedroom, or the effects of the fire on the child that dictate the correct emergency escape behaviors.
1. The child is coughing and his or her eyes are burning as a result of the fire; the child cannot leave through the window without help.
2. The child is coughing and his or her eyes are burning as a result of the fire but he or she can leave through the window without help.
3. The door is hot as a result of the fire; the child can leave through the window without help.
4. The door is hot as a result of the fire; the child cannot leave through the window without help.
5. The child is not coughing and his or her eyes are not burning; the door is cool but hot air is rushing into the room as a result of the fire; the child can leave through the window without help.
6. The child is not coughing and his or her eyes are not burning; the door is cool but hot air is rushing in as a result of the fire; the child cannot leave through the window without help.
7. The child is not coughing and his or her eyes are not burning; the door is cool and hot air is not rushing in; the child starts coughing and his or her eyes begin burning while he or she is standing with the bedroom door open; no smoke or fire is blocking the child's path out of the house.
8. The child is not coughing and his or her eyes are not burning; the door is cool and hot air is not rushing in; the child starts coughing and his or her eyes begin burning while he or she is standing with the bedroom door open; there is fire in the child's path outside of the room; the child returns to the bedroom window, which can be crawled out of.
9. The child is not coughing and his or her eyes are not burning; the door is cool and no hot air is rushing in; the child starts coughing and his or her eyes begin burning while he or she is standing with the bedroom door open; there is fire in the child's path outside of the room; the child returns to the bedroom window, which cannot be crawled out of.

Procedure

Task sequence and definitions. The responses to the nine different situations consisted of a total of 115 steps and 28 different responses. Details of each of the nine emergency fire situations and the self-report fire safety measures can be obtained from the first author. Four of these situations were selected (prior to the initiation of training) for the purpose of assessment since these four represented all but one of the necessary responses and required less time for administration. These four situations required 52 steps, including 27 different responses.

The discriminations and responses required of a child across all nine situations are illustrated in Figure 1. The flow chart shows that, in each of the situations, children should roll or slide to the edge of the bed upon first learning that there is a fire and then roll out and get into a crawl position. During this time children must decide whether they are coughing and their eyes are burning. If so, the child should not exit through the bedroom door, but should decide whether it is safe to exit through the window without help. If not, the child must take the rug and crawl to the door, cover the crack under the door, crawl to the article of clothing (e.g., shirt), take the shirt and crawl to the window, open the window, wave the shirt out the window, and call for help. Operational definitions of the required responses were specified for each of the nine situations. Definitions for the four test situations are illustrated in Table 2.

Assessment

In addition to direct behavioral observation, a self-report questionnaire was administered during the first session of baseline and the last session of training to measure knowledge of emergency responses. Both overt behavior and self-report measures were administered 2 wk after training as well.

Overt behavior. Actual performance of emergency fire skills was measured once per session. Children were individually presented with the four randomly ordered test situations by one of three undergraduate experimenters. During the intervention phase, this testing occurred after the training sessions. The experimenter described the testing procedure, reviewed the location of objects in the room (i.e., bed, pillow, chair, shirt, rug, window, bedroom door, and outside door) and checked (through questioning) to see that the children understood. For each test situation the experimenter described the situation, made certain that the children knew whether they could leave through the window, had them lie down, and then said "show me everything you would do." If children hesitated for longer than 5 sec at any time in the session, they were asked if they were finished and, if not, were encouraged to continue. For all situations, verbal cues were given to describe the events as they would occur in an actual fire.

Correct responses to situational cues were each given one point. Within each test situation, a large number of responses could be scored (see Table 2), and, across all situations, a total of 52 correct responses was possible. Each situation was scored separately because training proceeded for one situation at a time. Mastery of one situation served as the impetus to train a subsequent situation until all nine situations were mastered (see Training). The scoring could have been achieved by merely counting the number of correct responses. However, for the particular emergency fire skills taught, the sequence of behaviors as well as the specific behaviors was crucial. A given response (e.g., opening the door 1-2 in.), if performed out of sequence (e.g., not preceded by feeling the door), could prove fatal. Thus, for a response to be considered correct, it had to be executed correctly and in the correct place in the particular situational sequence.

The scoring system was slightly more complex than indicated here. A scoring system was devised in which the occurrence of the response and the occurrence of the response in the correct sequence could be distinguished. For each situation the child received a sequence score and an occurrence score. The *sequence score* depended

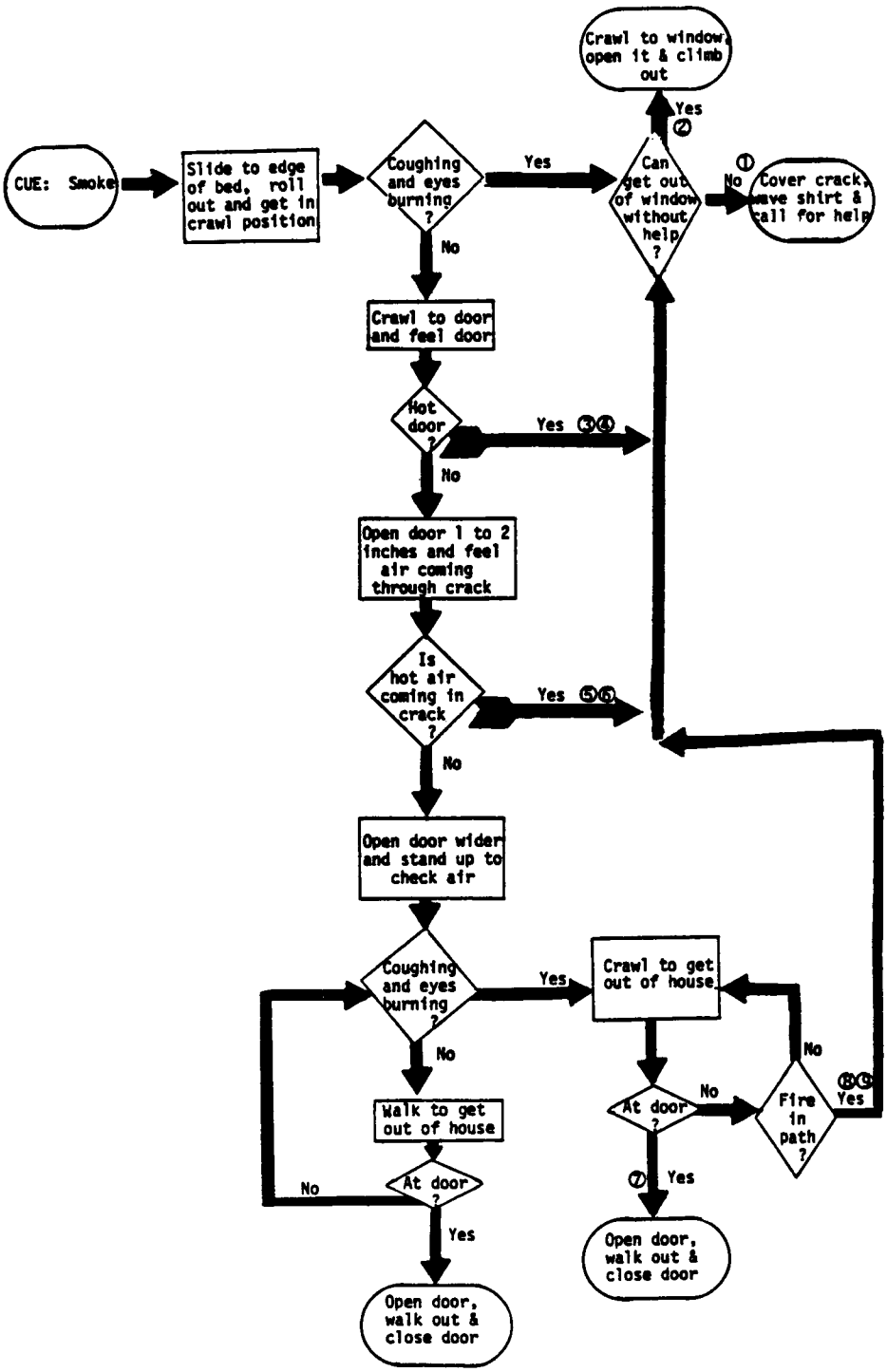

Fig. 1. A flow chart analysis of emergency escape skills in the home and at night. Diamonds represent the decision points; rectangles represent the responses; ovals represent the termination points; and encircled numbers represent the nine situations.

Table 2

Situational Cues and Correct Responses to Four of the Emergency Fire Situations

Situations	*Responding Requirements*
Situation 1—The experimenter told the children that they were coughing and their eyes were burning and that they could not leave through the window if they needed to.	Correct responding required the children to: (a) slide to the edge of the bed, (b) roll out of bed, (c) get in a crawl position, (d) crawl and get the rug, (e) push the rug in the crack, (f) crawl to the shirt, (g) crawl to the window, (h) open the window, and (i) yell and signal for help.
Situation 2—The experimenter told the children that they were not coughing and that their eyes were not burning. The children could leave through the window if they needed to. When the children touched the door, they were told that it was hot.	Correct responding required the children to: (a) slide to the edge of the bed, (b) roll out of bed, (c) get in a crawl position, (d) crawl to the door, (e) feel the door, (f) return to a crawl position, (g) crawl to the window, (h) open the window, (i) crawl out, and (j) climb to the ground.
Situation 3—The experimenter again told the children that they were not coughing and their eyes were not burning and that the children could again leave through the window if needed. However, when the children touched the door, they were told that it was not hot. When the children opened the door, they were told that there was hot air rushing in.	Correct responding required the children to: (a) slide to the edge of the bed, (b) roll out of bed, (c) get in a crawl position, (d) crawl to the door, (e) feel the door, (f) return to a crawl position, (g) open the door 1 to 2 in., (h) close the door immediately, (i) return to a crawl position, (j) crawl to the window, (k) open the window, (l) crawl out, and (m) climb to the ground.
Situation 4—The experimenter again told the children that they were not coughing and their eyes were not burning, but told them, this time, that they could not leave through the window if needed. When the children touched the door, they were told that there was no hot air rushing in. When the children were standing up outside the room, they were told that they were coughing and their eyes were burning. When they went 5 ft. toward the outside door, they were told that there was fire in their path.	Correct responding required the children to: (a) slide to the edge of the bed, (b) roll out of bed, (c) get in a crawl position, (d) crawl to the door, (e) feel the door, (f) return to a crawl position, (g) open the door 1 to 2 in., (h) open the door further, (i) stand up, (j) get back in a crawl position, (k) crawl outside the bedroom door, (l) crawl 5 ft. toward the outside door, (m) crawl back to the bedroom door, (n) crawl into the room, (o) crawl and get the rug, (p) push the rug in the crack, (q) crawl to the shirt, (r) crawl to the window, (s) open the window, and (t) yell and signal for help.

upon the child's correct performance of the response in the correct place in the sequence. One point was given for each response that was preceded and followed by correct behaviors (except for the first and last response in a sequence). The *occurrence score* depended upon performance of a correct response, whether or not it was in the correct sequence. One point was scored when the child performed the correct response, independently of the responses that preceded and followed it. The sequence scoring method provided the more stringent measure of mastery of emergency fire skills and was used to evaluate the effects of training. Both scoring systems are important to note because the success of training depends on monitoring successive approximations of the terminal goal. Responses early in training often are correct but out of sequence. These responses serve as the basis for shaping correct responses in the correct sequence of a larger chain.

Self-report. The questionnaire included 23 items that were derived directly from those situations identified as important through the social validation procedures. During the administration of the questionnaire, the experimenter asked children whether certain responses to emergency fire situations should be performed, and children were required to judge whether the responses were correct.

Reliability of assessment. Three undergraduate psychology majors, who served as observers, were trained over a 2-wk period. Modeling, role-playing, corrective feedback, social reinforcement, and actual practice (both with each other and five pilot subjects) were employed to facilitate mastery of the target responses. An average interobserver reliability of 100% on correct responses in sequence was obtained over three testing sessions prior to the beginning of the study, calculated as noted below. All raters were naive both to the order in which children were taught and to the order in which situations were trained.

On 22 occasions throughout the study, reliability checks were taken. Interobserver agreement was calculated for occurrences of responses in the correct sequence. Agreement was determined by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100. Reliability checks during the study yielded a mean of 99% agreement.

Post-check Assessment

The inception of summer vacation followed shortly after training. However, four of the five children participated in a summer school program and one child lived near the school, so all five were available for assessment 15 days after the last day of training. Changes in the administrative personnel (e.g., transfer of the principal) and difficulties in scheduling summer assessment and in obtaining assessors precluded additional or longer post-checks. Each child was seen individually in the simulated setting and administered the behavioral and then the self-report measure in the manner described earlier.

Training

All training was conducted in the simulated bedroom setting with one teacher instructing each child individually. During the initial training session, children were each given a picture of a house in which an individual was sleeping in a bedroom while a fire was starting in the kitchen. They were taught to monitor their behavior and to take a star (self-reward) and put it "on their house" each time they performed a task correctly three (or four) times in a row. When the children had enough stars to fill the house, they had completed all of the sequences to be learned and received a large prize.

Training included instruction concerning both verbal and behavioral responses. Children were asked to answer the following questions after the initial, verbal lesson: (a) Question: "What is the most important thing to do during a fire?" Response: "Get out." (b) Question: "Should you stop for a toy, pet, phone call, or clothes?" Response: "No." and (c) Question: "Should you ever put a fire out by yourself?" Response: "No." In subsequent lessons, training focused

upon several specific behaviors, including: (a) how to slide to the edge of the bed, roll out, and get in a crawl position; (b) how to cover the crack under the door and wait at the window for help when they were coughing, their eyes were burning, and they could not leave through the window; (c) how to leave through the window when they were coughing, their eyes were burning and, they could leave through the window; (d) how and when to check the door (when they were not coughing and their eyes were not burning); (e) how to exit through the window when the door was hot and the window was close to the ground; (f) how to cover the crack and wait at the window when the door was hot and they could not leave through the window; (g) how and when to open the door; (h) how to go out or wait at the window when there was hot air rushing in the door; (i) how to try to walk or crawl to the outside door when there was not any hot air rushing in the bedroom door; (j) how to go back to the bedroom window and either leave through the window or wait at the window if fire and/or smoke blocked their exit to the outside door; and (k) how to stop moving and roll on the ground when their clothes were on fire, close the front door behind them when leaving the house, and meet their family upon exiting the house.

New skills were taught via instruction, shaping, modeling, feedback and external and self-reinforcement. For incorrect responses, children were praised for any portion of the response that was performed correctly, given feedback as to the correct method of responding, given a "—" for the trial, and provided with another opportunity to perform the response. For correct responses, children were praised and were given a "+" for the trial. Children were required to obtain three consecutive correct performances of the trained response or sequence of responses before proceeding to a review of all trained sequences. Training proceeded sequentially across all nine situations.

Each session after the first began with a review lesson. During the next lesson, a new response was added, and the subsequent lesson again reviewed all learned responses. Any time children missed two trials (on either a new or a review session) prior to reaching criterion, they received further instruction (consisting of modeling and explanation) prior to further trials. The pattern of alternation between new and review lessons was followed throughout each session. Each session ended with a verbal review of all skills learned and an explanation that the child was not going to receive reinforcement during testing. Sessions ranged from 13 to 35 min (mean = 23 min). Once children reached criterion, they received a brief 5- to 10-min review on all previously trained situations.

Adherence to Training

Training involved 13 distinct steps that the trainer was to perform when teaching each sequence of emergency fire skills: (a) providing a verbal review and (b) an overt practice review of the appropriate responses of previous sessions, (c) modeling the correct responses, (d) delivering feedback for incorrect and both (e) feedback and (f) praise for correct performance, (g) reviewing the new material that was taught, (h) noting to children that they were to be assessed by another person, (i) allowing children to self-reward following criterion performance by handing them the box of stars, (j) allowing children to select and (k) place the star on the token earning card ("house"), (l) marking children's responses and (m) giving appropriate cues for the desired responses.

To evaluate whether the training procedures were generally adhered to, an independent rater observed six teaching sessions across three children in training. The observer recorded whether the appropriate training step was or was not executed correctly. Across the six sessions, a mean of 12.33 (94.8%) of the 13 steps was performed correctly (range = 11-13 steps). These data suggest that the trainer generally adhered closely to the training procedures.

Social Validation of Outcome

Social validation of the primary measure of training was assessed in the following manner. A mean level of correct responding was obtained across all children for the first three sessions of baseline and the last three sessions of training. To socially validate the impact of training (Wolf, 1978), the levels of overt performance associated with baseline and training phases were evaluated. For each of the four situations, 13 firefighters from three local fire departments were asked to rate the extent to which a child who performed at these levels would: (a) reach safety, (b) get burned severely, (c) be overcome by smoke, (d) be burned to death, and (e) panic. These dimensions were rated on a 5-point scale (1 = very likely, 5 = very unlikely). The scale included two responses that indicated that the consequences (e.g., death) were *likely* (points 1 and 2) and two that indicated that they were *unlikely* (points 4 and 5). The middle point represented an even chance that the consequences would occur. The purpose was to determine whether the differences in behaviors before and after training were reflected in important consequences for the children in emergency situations.

RESULTS

Overt Performance

The effects of training on the percentage of correct responses performed in sequence are presented in Figure 2. Prior to training, children performed the correct emergency behaviors at relatively low levels (mean = 4.5%). During training, the mean increased substantially to 74.4% across all the children. Baseline and training levels of performance for the individuals are consistent with the overall means for the entire group. Data obtained during post-check assessment revealed that the responses were maintained at their training levels for all five children, as reflected in both individual and overall group performance (mean = 100% correct responding).

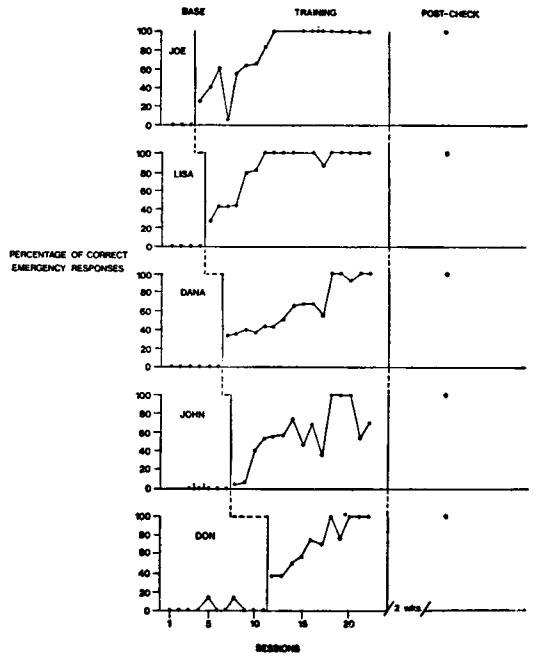

Fig. 2. Correct emergency escape responses performed in sequence. Baseline—no intervention was implemented. Training—implementation of the training program. Post-Check—Assessment 2 wk after training had been terminated (Missing data points for one child, John, resulted from his starting late. Extra sessions were included during baseline assessment to provide several data points for this phase.)

Performance of each child changed when and only when training was introduced. Statistical evaluation by means of R_n test (Revusky, 1967) corroborated the reliability of the changes. Significant improvements over baseline performance were evident at the points at which training was introduced, $R_n(5) = 5$, two-tailed $p = .02$.

Self-Report

To assess knowledge of correct responses, children completed the questionnaire at the beginning of baseline, at the end of treatment, and at a 2-wk post-check. The means for the five children at the three assessment periods were 76.5%, 90.4%, and 88.7%, respectively. Correlated t tests indicated that the children improved significantly from the beginning of the

baseline to the end of training, $t(4) = 5.52, p < .01$. Further, each of the five subjects showed a higher score after training. From the end of training to the post-check, there was a very slight, although not statistically significant, decline in correct answers to the questionnaire, $p > .50$. Overall, the results indicated that knowledge of how to respond correctly to emergency fire situations also increased over the course of the study. Unlike the behavioral data, it is not possible to attribute these changes exclusively to the intervention techniques independently of the effects of repeated testing.

Social Validation of Outcome

Firefighters were consulted to evaluate whether the changes in the children's performance after training were significant along several important dimensions, including the likelihood of the children reaching safety, getting burned severely, being overcome by smoke, being burned to death, or panicking in the emergency situations. To summarize the results, the two most serious and life-threatening consequences that children could suffer, the likelihood that the children would be severely burned or would be burned to death, are elaborated here. The 5-point scale was divided according to whether these consequences were rated as likely or unlikely. Neutral ratings were dropped.

Chi-square analyses were performed on each consequence in each situation. In all four situations, firefighters indicated that children were much more likely to be burned severely during baseline than training level performance, $\chi^2 (1) = 18.00, p < .001, \chi^2 (1) = 8.30, p < .01$; $\chi^2 (1) = 7.35, p < .01$; and $\chi^2 (1) = 4.58, p < .05$, respectively. Similarly, the firefighters indicated that children were much more likely to be burned to death in each situation given baseline levels rather than training levels of responding, $\chi^2 (1) = 16.72, p < .001$; $\chi^2 (1) = 6.03, p < .02$; $\chi^2 (1) = 4.44, p < .05$; and $\chi^2 (1) = 2.79, p < .10$, nonsignificant, respectively. Thus, performance after training was judged by firefighters to have implications for important consequences in emergency fire situations.

Chi-square analyses were also performed on firefighters' ratings of the extent to which children were likely to reach safety, to be overcome by smoke and to panic. The results are consistent with those reported here for being burned severely and being burned to death. In all four situations, each chi-square test was significant for these dimensions, indicating that children were more likely to suffer the deleterious consequence of the fire and less likely to reach safety before training than after training. One exception was for Situation 4. Firefighters rated post-training performance to be less likely to be associated with being overcome by smoke than baseline performance but this difference did not attain conventional levels of confidence, $\chi^2 (1) = 3.2, p < .10$.

DISCUSSION

The results indicated that a multifaceted behavioral training package including instructions, shaping, modeling, rehearsal, feedback, and external and self-reinforcement was effective in training children how to exit in several simulated emergency fire situations. The skills were developed to high levels of mastery and were maintained 2 wk after training. Baseline data revealed that children were grossly unable to respond properly to the different fire emergency situations likely to be encountered at home at night but improved markedly with training. Childrens' performance levels at the end of training were judged by firefighters to be less likely to result in their being severely burned, overcome by smoke, burned to death, or panicky and more likely to result in their reaching safety than their performance levels during baseline.

A few features of the investigation may be worth highlighting. First, social validation guided both the selection of target behaviors and the evaluation of outcome (Wolf, 1978). Social validation procedures revealed that the

requisite behaviors for safe exiting during a fire were complex and varied as a function of specific cues of the emergency situation. Without the initial validation procedure, it is unlikely that the diverse sequences of responses required in training would have been identified. In addition, social validation was used to evaluate the effects of training specific behaviors in terms of life-threatening or potentially life-threatening consequences. Similar procedures may contribute to the validation of other important community survival skills.

Second, the training procedures did not require extensive training time. The mean number of instructional sessions required to reach criterion on the emergency sequences was nine (range 7-12). Thus, slightly under 5 days (of two 20-min sessions per day) were required for training the emergency exiting skills. The relatively small amount of time required to train these highly important skills appears to be well worth the effort. Third, a self-reinforcement component was included in the study so children could participate actively in training. This may be of relevance because of children's preferences for contingencies in which they play a role (Brigham & Stoerzinger, 1976) as well as potential implications for maintenance (Jones & Evans, 1980).

Although a final goal was application of skills in the community setting, fire exiting skills in the home and in actual emergency situations were not directly assessed. Training and assessment were conducted under relatively standardized conditions in which the cues that would be common to most children's bedrooms could be presented (e.g., door, bed). The complexity of the requisite response sequences, revealed through the initial social validation process to identify the correct behaviors, argued for standardization of training sessions and assessment conditions. Repeated probes to assess escape behavior in each child's home environment did not seem feasible without initial assurances that training could be successful under the simulated conditions at school. Attempts are presently being carried out to facilitate the acquisition, maintenance, and generalization of these skills in the home in hopes of better preventing injury and loss of life. Of course, ultimate assessment under actual emergency conditions raises obvious ethical problems. But simulated fire conditions in the home, perhaps in response to smoke alarms or cues provided by parents should improve the assessment methodology over that used in the present investigation.

The present research suggests that safety skills can be trained among children. Responses in emergency situations represent an important area for applied research. In the case of fire emergency skills and presumably other emergency skills as well, community agencies are readily available to assist in identification of target behaviors, high risk persons, situations, and locations. Agencies are likely to be receptive to empirically based and training-oriented programs. Additional research that focuses on emergency training can bring the assessment, intervention, and evaluation technology of behavior analysis to a socially important set of problems.

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