Thirty Year Review of Safety Skill Instruction for Persons with Intellectual Disabilities

Linda C. Mechling
University of North Carolina Wilmington

Abstract: This review synthesizes the empirical literature (1976–2006) focusing on teaching personal safety skills to persons with intellectual disabilities. Thirty-six investigations were identified which provided information on six areas of instruction: (a) pedestrian/street crossing safety; (b) home accident prevention; (c) application of first aid (including identification and reporting of illnesses); (d) response to lures or advancements of strangers; (e) fire safety; and (f) emergency use of telephones. Implications for instruction and future research are discussed based on the results of the review.

Deinstitutionalization and desegregation in the early 1960’s initiated the need to prepare persons with disabilities to function in less supervised and sheltered environments (Marchetti, McCartney, Drain, Hooper, & Dix (1983). Today focus continues on providing inclusive opportunities for persons with disabilities, requiring instruction of skills in preparation of integration into communities. By nature of their disabilities, persons may lack judgment and skills to recognize, avoid, or escape dangerous situations and the communication skills to report situations or crimes against them (Mazzucchelli, 2001; Wilson, Seaman, & Nettelbeck, 1996). They may also be more dependent on others for physical and psychological needs and support across environments (Matson, 1984; Taber, Alberto, Hughes, & Seltzer, 2002). This dependence and lack of skills often cause them to be compliant and passive towards others, which may leave them susceptible to victimization (Matson).

Moving from supervised to semi-independent or independent living arrangements and from sheltered to competitive work environments require planning and programming for attainment of increased independence. An increase in independence results in decreased dependency on others. Less supervision and support from adults and transitioning from protected environments may lead to an increased exposure to risk and unsafe situations. Wilson and Brewer (1992) report a significantly higher risk of criminal victimization, including personal and property offenses, among persons with intellectual disabilities and that this risk increases for those living alone or with someone else with a disability. Yet, in spite of these difficult concerns, reasonable risk is a necessary part of normal life (MacEachron & Janicki, 1983). The right to experience normal risk taking is necessary for human growth and the development of human dignity (MacEachron & Janicki), therefore, there is a need to provide opportunities for increased independence and to teach skills that minimize risk.

Personal safety skill instruction is considered by many as being as important as teaching communication, motor, and social skills to persons with disabilities (Collins, Wolery, & Gast, 1991). Safety goals are being included for students receiving transition planning services through their Individualized Education Program (IEP) while teachers seek ways to teach strategies and skills to increase personal safety through awareness of safe and unsafe situations and understanding how to take appropriate actions in dangerous situations (Collins et al.).

The focus of this review is the synthesis of research available on teaching personal safety.
skills to persons with disabilities. Clees and Gast (1994) defined social safety skills as verbal or nonverbal behaviors which may be primarily preventative or reactionary. Preventative measures serve to avoid potentially dangerous situations before they occur while reactionary measures allow escape from or termination of presently occurring situations. This review included studies that focus on either preventative or reactionary personal safety skills.

**Method**

The period of review extended over 30 years (1976-2006). Although a review of this extent risks inclusion of methods that are outdated, it also helps to assure the inclusion of effective strategies that may not have been conducted in recent years. An electronic search of ERIC included the keywords: safety skills, safety, safety instruction, fire safety, pedestrian skills, street crossing, telephone skills, first aid, accident prevention, lures of strangers, crime prevention, child abduction, and molestation. An ancestral search was then conducted of the table of contents of the following journals: American Journal of Mental Retardation, Behavior Modification, Exceptionality, Education and Training in Developmental Disabilities, Exceptional Children, Focus on Autism and Other Developmental Disabilities, Focus on Exceptional Children, Journal of Applied Behavior Analysis, Journal of the Association for Persons with Severe Disabilities, Journal of Autism and Developmental Disabilities, Journal of Developmental and Physical Disabilities, Journal of Early Intervention, Journal of Special Education, Journal of Special Education Technology, Mental Retardation, Remedial and Special Education, Research and Practice for Persons with Severe Disabilities, Topics in Early Childhood Special Education, followed by a manual search of all reference lists of identified articles. In order to be included in the review, studies met the following criteria:

1. Use of experimental design
2. Publication in peer-reviewed journal
3. Evaluation of safety skill instruction
4. Participants were diagnosed with an intellectual disability
5. Article published in English

**Results**

Thirty six studies (Table 1) and two literature reviews were identified. Both literature reviews focused on abduction prevention. The review by Bevill and Gast (1998) narrowed its focus to young children, the lures of strangers, and sexual abuse while the Miltenberger and Olsen (1996) review included research with children without disabilities and adults with intellectual disabilities. While some of the 36 studies evaluated multiple skills, each addressed at least one of the following personal safety skills: (a) pedestrian/street crossing safety (7); (b) home accident prevention (6); (c) application of first aid (including identification and reporting of illnesses (7); (d) response to lures or advancements of strangers (6); (e) fire safety (6); and (f) emergency use of telephones (5).

**Pedestrian/Street Crossing Safety**

While the inability to safely move around one’s community can hinder independence, a single error while crossing a street can have crucial consequences (Matson, 1980a). Community pedestrian movement and street crossing were addressed in eight identified studies. Among the skills taught were: proper sidewalk behavior (ie. walk on right side, do not bump into pedestrians) (Matson); recognition of intersections (Matson); crossing streets with stop signs (look in both directions; use of crosswalks) (Horner, Jones, & Williams, 1985; Vogelsburg & Rusch, 1979); crossing streets with traffic lights (Horner et al.; Page, Iwata, & Neef, 1976); and crossing uncontrolled streets (Branham, Collins, Schuster, & Kleinert, 1999; Horner et al.) and parking lots (Spears, Rusch, York, & Lilly, 1981).

Three of the studies conducted all sessions with community streets (Horner et al. (1985; Spears et al., 1981; Vogelsburg & Rusch, 1979). Two of the studies (Matson, 1980a; Page et al., 1976) used only simulated instruction, and three studies (Branham et al., 1999; Collins, Stinson, & Land, 1993; Marchetti et al., 1983) used both simulation and community instruction. Results of the Collins et al. study indicated that teaching first in simulation did not facilitate or inhibit later instruction within the community. Branham et al.
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</table>
| Branham, Collins, Schuster, & Kleinert (1999) | n = 3  
CA = 14–20yrs  
Moderate ID | Pedestrian | Classroom + CBI, Video Model + CBI, Classroom + Video Model + CBI | Multiple probe across behaviors | All formats effective. Classroom + CBI more efficient | Novel settings | No report |
| Christensen, Lignugaris/Kraft & Fiechtl (1996) | n = 6  
CA = preschool  
Mild ID  
Moderate ID | First Aid, seek adult assistance | Simulation, school bathroom | Multiple probe across 3 pairs of students | Students learned to seek help through direct instruction & observational learning | 2 of 3 pairs generalized home & school playground after 2 wks. Generalization reported for real injuries - 2 students | 8 wk generalization to follow-up |
| Christensen, Marchand-Martella, Martella, Fiechtl, & Christensen (1993) | n = 4  
CA = preschool Developmental delays | First Aid, seek adult assistance | Simulation, social modeling, kitchen area of classroom | Multiple baseline across students | Rapid increase in performance using social modeling | Generalization to playground & children’s homes | 100% maintenance after 1 month |
| Collins, Griffen (1996) | n = 3  
CA = 8–11yrs  
Moderate ID | Response to lures of strangers | CTD using multiple exemplars in vivo | Multiple probe across participants | Mixed results | 1 participant consistently generalized | Maintained 2 wks |
| Collins, Schuster, & Nelson (1992) | n = 4  
CA = 16–20yrs  
Moderate ID | Response to lures of strangers | CTD using multiple exemplars in vivo | Multiple probe across participants | Students learned target words and some incidental and observational words | Words on actual products | Maintained 2 wks |
| Collins, Stinson, & Land (1993) | n = 4  
CA = 15–19yrs  
Moderate ID | Pediatric, Pay phone | In vivo vs Simulation + In vivo | Adapted multiple probe across participants | No significant difference across two conditions | Community streets & pay phones | Maintained 1 month |
| Feldman & Gase (1999) | n = 10  
CA = 23–37yrs  
Mild ID | Home accident prevention | Self-instruction with audiovisual child care manuals | Multiple baseline across participants | Parents performed child-care, home safety skills using checklist task analysis | Performance measured at parents’ homes | No report |
| Foxx, McMorrow, Storey, & Rogers (1984) | n = 6  
CA = 24–26yrs  
Mild, Moderate ID | Response to sexual advancements | Adapted board game and verbal response | Multiple baseline across groups | Each group achieved gains in 6 social skill areas | Some use of skills across peer “confederate” | No report |
| Gast, Collins, Wolery, & Jones (1993) | n = 4  
CA = preschool Developmental delays | Response to lures of strangers | CTD, multiple examples, simulated preschool setting | Multiple probe across subjects | Acquisition in simulation | Failure to generalize until training in vivo | Maintained 2–4 wks after in vivo training |
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<tr>
<td>Gast, &amp; Winterling (1992)</td>
<td>n = 4 CA = 17–21yrs Moderate ID</td>
<td>First aid</td>
<td>Simulated injuries using costume make-up</td>
<td>Multiple probe across behaviors replicated across participants</td>
<td>All students reached criteria</td>
<td>Peers without disabilities</td>
<td>Mixed results across injuries 8–12 wks</td>
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<td>Haney, &amp; Jones (1982)</td>
<td>n = 4 CA = 12–16yrs Moderate to Severe ID</td>
<td>Fire Safety</td>
<td>Bedrooms at home, Blow dryer for heat, heating pad on door, picture of smoke, house fire alarm</td>
<td>Multiple baseline across participants</td>
<td>All students learned to exit home</td>
<td>Performance measured from 2nd bedroom</td>
<td>Maintained 10–50 days</td>
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<td>Haseltine, &amp; Miltenberger (1990)</td>
<td>n = 8 CA = 22–45yrs Mild ID</td>
<td>Safe response to situations of abduction &amp; sexual abuse</td>
<td>Curriculum using modeling, rehearsal, feedback, &amp; praise</td>
<td>Modified multiple baseline across subjects</td>
<td>Effective for 7 of 8 students</td>
<td>None reported</td>
<td>Maintenance of skills for 7 of 8 subjects, 6 months</td>
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<td>Horner, Jones, &amp; Williams (1985)</td>
<td>n = 3 CA = 12–53yrs Moderate to Severe ID</td>
<td>Pedestrian</td>
<td>Community streets</td>
<td>Multiple baseline across participants</td>
<td>General case programming effective in teaching crossing of trained &amp; non-trained streets</td>
<td>Generalization to non-trained streets</td>
<td>No report</td>
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<tr>
<td>Jones, &amp; Collins (1997)</td>
<td>n = 3 CA = 31–45yrs Moderate ID</td>
<td>Safety facts</td>
<td>Non-target feedback statements, classroom instruction</td>
<td>Multiple probe across behaviors, replicated across participants</td>
<td>Verbal acquisition 83–100% of facts</td>
<td>No report</td>
<td>No report</td>
</tr>
<tr>
<td>Jones, Kazdin, &amp; Haney (1981)</td>
<td>n = 5 CA = 8–9yrs Mild ID, no disability</td>
<td>Fire safety</td>
<td>Simulated bedroom at school</td>
<td>Multiple baseline across participants</td>
<td>“significant improvements” in overt behaviors and self-report of safety skills</td>
<td>No report</td>
<td>Maintained 2 wks</td>
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<tr>
<td>Jones, &amp; Thornton (1987)</td>
<td>n = 4 CA = 30–55yrs Mild, Moderate ID</td>
<td>Fire safety</td>
<td>Tape recordings of alarms, blow dryer for heat, picture of fires, taught in apartment of participants</td>
<td>Multiple baseline across participants</td>
<td>“High level” of mastery of skills across daytime and nighttime scenarios</td>
<td>No report</td>
<td>Maintained 5–8 months</td>
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<tr>
<td>Jones, Van Hasselt, &amp; Sisson (1984)</td>
<td>n = 4 CA = 17–19yrs Blind Mild ID, n = 1</td>
<td>Fire safety</td>
<td>Fire drill in residential dormitory, tape recordings of fire alarms &amp; crackling fires, blow dryer for heat</td>
<td>Multiple baseline across participants</td>
<td>“Significant improvements in fire safety response for 3 of 4 participants</td>
<td>No report</td>
<td>Maintained 3 months for 2 students</td>
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<tr>
<td>Jones, Sisson, &amp; Van Hasselt (1984)</td>
<td>n = 8 CA = 10–19yrs Blind</td>
<td>Fire safety</td>
<td>Tape recording of school fire alarm, exit from 3rd floor of dormitory</td>
<td>Multiple baseline across participants</td>
<td>All participants mastered sequence for exiting building</td>
<td>Generalization to night time fire drill</td>
<td>No report</td>
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| Marchand-Martella, & Martella (1990) | n = 4  
CA = 7–11yrs  
EBD | First aid | Ketchup, red pen marks on puppets | Multiple baseline across behaviors, replicated across participants | Completion of skills with puppets | Self-injuries, injuries of others, across natural home environments | Maintained 66 wks |
| Marchand-Martella, Martella, Christensen, Agran, & Young (1992) | n = 20  
CA = 6–12yrs  
Mild, Moderate ID, EBD | First aid | Manufactured simulated injuries, puppets | Multiple baseline across participants | Acquisition and performance of skills on self and puppets | Nontrained injuries of self and others | No report |
| Marchetti, McCartney, Drain, Hooper, & Dix (1983) | n = 20  
CA = 6–12yrs  
Mild, Moderate ID | Pedestrian | Classroom scaled Model vs in vivo | Multiple baseline across behaviors | In vivo more effective | Novel settings | No report |
| Matson (1980a) | n = 20  
CA = 21–55yrs  
Moderate ID | Pedestrian | Discussion, model, role play in classroom | Multiple baseline across subjects | Discussion & modeling not effective until role playing introduced | No generalization to actual emergency situations | Maintained 7 months |
| Matson (1980b) | n = 20  
CA = 25–37yrs  
Mild ID | Fire safety | Discussion, model, role play in classroom | Multiple baseline across behaviors | Increase in protective behaviors | None reported | Maintained 4 wks |
| Mazzucchelli, (2001) | n = 20  
CA = 31–37yrs  
Mild ID | Protective behaviors | Discussion, model, role play at center using "Feel Safe" program in a group format | Multiple baseline across behaviors | 2 × 2 repeated measures ANOVA | None reported | No report |
| O’Reilly, & Cuvo (1989) | n = 1  
CA = 44yrs  
TBI, Anoxic  
encephalopathy | Self-treatment of cold symptoms | Simulated photographic scenarios | Multiple baseline across 4 classifications of colds | Acquisition of treatment of different cold types | None reported | Decrease in performance at 1 month until retraining |
| O’Reilly, Green, & Brauning-McMorrow (1990) | n = 4  
CA = 18–20yrs  
TBI | Home accident prevention | Written checklist & task analysis | Variation of multiple probe across rooms & participants | Checklist effective in increasing response to most hazards. Task analysis resulted in remediation of skills not acquired through checklist | Some generalization to untaught hazards | Most skills maintained 1-month |
| Page, Iwata, & Neef (1976) | n = 5  
CA = 16–25yrs  
Mild, Moderate ID | Pedestrian | Scaled model | Multiple baseline across behaviors and participants | Scaled model effective in teaching street crossing in natural environment | Community streets | Maintained 2–6 wks |
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<tr>
<td>Risley, &amp; Cuvo (1980)</td>
<td>n = 3</td>
<td>Emergency telephone calls</td>
<td>Photo scenarios, picture phone directory, in classroom</td>
<td>Multiple baseline across behaviors and participants</td>
<td>Acquisition of dialing and giving information</td>
<td>Generalization to untaught numbers</td>
<td>Maintained 1–2 wks</td>
</tr>
<tr>
<td>Smith, &amp; Meyers (1979)</td>
<td>n = 60</td>
<td>Emergency telephone calls</td>
<td>Disconnected phones, cards with phone numbers</td>
<td>Newman-Keuls test for comparison of means</td>
<td>Significant increases for all participants</td>
<td>None reported</td>
<td>No report</td>
</tr>
<tr>
<td>Spears, Ruch, York, &amp; Lilly (1981)</td>
<td>n = 1</td>
<td>Pedestrian</td>
<td>Parking lot of residential facility</td>
<td>Multiple baseline and reversal design across behaviors</td>
<td>Independent behavior attributed to pacing prompts</td>
<td>None reported</td>
<td>No report</td>
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<tr>
<td>Spooner, Stem, &amp; Test (1989)</td>
<td>n = 3</td>
<td>First Aid, Emergency phone calls</td>
<td>Simulated injuries (i.e. betadine), inoperable telephones</td>
<td>Multiple baseline across behaviors</td>
<td>Acquisition of all tasks</td>
<td>None reported</td>
<td>Maintained 6–12 wks</td>
</tr>
<tr>
<td>Taber, Alberto, Hughes, &amp; seltzer (2002)</td>
<td>n = 14</td>
<td>Emergency cell phone calls</td>
<td>Cell phone use in classroom role play</td>
<td>Multiple probe across groups</td>
<td>Acquisition of cell phone use: dialing number from index card &amp; give information</td>
<td>Generalization to community settings &amp; phone numbers</td>
<td>No report</td>
</tr>
<tr>
<td>Vogelsburg, &amp; Rusch (1979)</td>
<td>n = 3</td>
<td>Pedestrian</td>
<td>Community intersections</td>
<td>Multiple baseline across subjects with a partial sequential reversal</td>
<td>Instructional feedback effective in teaching approach &amp; walk behaviors. Repeated practice required to teach “looking” behavior</td>
<td>Generalization to untrained intersections</td>
<td>No report</td>
</tr>
<tr>
<td>Watson, Bain, &amp; Houghton (1992)</td>
<td>n = 7</td>
<td>Response to lures of strangers</td>
<td>Classroom, school playground</td>
<td>Modified multiple probe interrupted time series across groups</td>
<td>Improvement for 6 of 7 students</td>
<td>Generalization to novel situations &amp; abductors for 6 of 7 students</td>
<td>Maintained 14 days for 6 of 7 students</td>
</tr>
<tr>
<td>Winterling, Gast, Wokery, &amp; Farmer (1992)</td>
<td>n = 3</td>
<td>Handling broken materials (plates, glasses)</td>
<td>Simulated plastic materials, glass materials</td>
<td>Multiple probe across participants, replicated across tasks</td>
<td>Treatment package effective in teaching safe handling of materials</td>
<td>None reported</td>
<td>Maintained 1 wk. Mixed data 1 month</td>
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found differences only in efficiency data (favoring classroom simulation plus community-based instruction over videotape modeling used with community-based instruction and videotape modeling used with simulation and community-based instruction). In contrast, Marchetti et al. found significant differences in favor of community training over a classroom simulation using a small scaled model of streets and moving dolls through intersections.

Home Accident Prevention

Measures against home accidents and injuries was the focus of five identified studies with results indicating that person with disabilities can learn to both prevent and handle accidents within the home by following precautionary measures. Written checklists of task analysis were effective in increasing appropriate prevention of potential in-home hazards in the bathroom, kitchen, living room and bedroom in the study by O’Reilly, Green, and Braumling-Mcmorrow (1990). Task analysis included information on such skills as: proper positioning of electric space heaters, use of hair dryers in the bathroom, disposal of outdated medications, and bathtub safety. In a second study, Jones and Collins (1997) presented safety facts (the popcorn popper is hot and could burn you) as non-target information in instructive feedback statements during microwave cooking. Although students were required to answer questions and state safety facts, measures of safe performance of the facts were not included in the study.

In two similar studies, Collins and Stinson (1994–1995) taught students to read product warning labels (i.e. liquid bleach) while Collins and Griffen (1996) taught students to read labels and respond safely by putting unsafe products on a shelf or handing them to an adult.

Using self-instructional, audiovisual child-care manuals, Feldman and Case (1999) taught parents with intellectual disabilities to prevent their children from being victims to home accidents by proper storage and handling of matererials (i.e. glass, electrical appliances, and sharp objects). The only reactive study was conducted by Winterling, Gast, Wolery, and Farmer (1992) who taught students with disabilities to remove and discard broken materials (plates, glasses) from a sink, countertop, and floor using simulated (plastic) and glass materials.

First Aid

Research has also supported the ability of persons with disabilities to learn and apply minor first aid procedures. O’Reilly and Cuvo (1989) evaluated written task analysis and picture cues depicting cold symptoms (i.e. runny nose) to teach identification, monitoring, reporting, and self-administration of medications for symptoms of illness.

Students have also been taught to: administer first aid for choking (Spooner, Stem, & Test, 1989); treat minor burns (Marchand-Martella & Martella, 1990); treat minor wounds (i.e. wash, dry, apply bandages) (Marchand-Martella et al., 1990; Marchand-Martella, Martella, Christensen, Agran, & Young, 1992; Matson, 1980b; Spooner et al.); and apply first aid to an insect bite (Gast & Winterling, 1992). Studies by Christensen, Liguaginis/Kraft, and Fiechtl (1996) and Christensen, Marchand-Martella, Martella, Fiechtl, and Christensen (1993) found that even preschool children were able to learn to report simulated injuries to an adult through direct instruction and observational learning.

Procedures have included: (a) model and practice on self (Gast & Winterling, 1992.; Spooner et al. 1989); (b) practice on puppets (Marchand-Martella & Martella, 1990); and (c) model and practice on the instructor (Spooner et al.). Simulated materials were used in each of the studies treating minor cuts, burns, and insect bites. These ranged from using: ketchup (Marchand-Martella & Martella, 1990) and betadine (Spooner et al.) to simulate blood; costume makeup (Gast et al.), and manufactured simulated injuries used in first aid training (Christensen et al., 1993; 1996; Marchand-Martella et al., 1992).

Two studies evaluated students’ abilities to generalize first aid skills to actual injuries to follow-up procedures. Christensen et al. (1996) reported that two of six preschoolers were able to perform some of the first aid procedures (i.e. covering cut and locating a parent) while Marchand-Martella and Martella (1990) report that three of four partici-
pants were reported by their parents to have bandaged real-life injuries of siblings and treating self-injuries.

**Abduction/Lures of Strangers/Sexual Abuse**

Due to their disabilities, children and adults may lack social skills, intellectual ability, and judgment, making it easier to coerce them into dangerous situations (Matson, 1984). Persons with disabilities may have poorer interpersonal competence (i.e. response to someone asking for money) which may impede their ability to decide appropriate behaviors and leave them vulnerable (Wilson et al., 1996).

The ability to “Just say ‘no’ and walk away” in response to confrontation, behaviors, or persons that pose harm to persons with disabilities is a strategy that has effectively been taught to persons with disabilities (Collins, Hall, Rankin, & Branson, 1999). Research focus has been on the instruction of these protective skills to both adults (Collins, Schuster, & Nelson, 1992; Haseltine & Miltenberger, 1990; Mazzucchelli, 2001) and young children (Gast, Collins, Wolery, & Jones, 1993; Watson, Bain, & Houghton, 1992). When teaching protective behaviors to adults, procedures have included: a) curriculums which follow a model of discussion, modeling, and role playing (Haseltine, & Miltenberger, 1990; Mazzucchelli, 2001); b) use of a specially designed card deck and the table game *Sorry* to teach social/sexual behaviors including appropriate response to strangers’ advancements (Foxx, McMorrow, Storey, & Rogers, 1984); and c) constant time delay with multiple teaching exemplars taught in vivo (Collins et al., 1992). Procedures used with children also included use of constant time delay with multiple exemplars of strangers, lures, and sites (Gast et al.) and use of guided questions, slide pictures of known/unknown persons, and role playing (Watson et al.). Both studies taught children to say, “No”, “walk” away, and “tell” a familiar adult.

Although results of the studies are encouraging, mixed results for generalization of behaviors to untaught settings is concerning. Self-protective behaviors against potentially harmful behaviors of others should be safely used across a range of settings that may be experienced by both adults and young children with disabilities.

**Fire Safety**

Development of safety skills in response to potential fires received research attention during the 1980s. Although such fire emergencies are rare, the devastating effects when they do occur present the need for teaching both prevention and reaction to these emergency situations. Due to their cognitive delays, some persons with intellectual disabilities may experience increased risk of being victims of home fires (Jones & Thornton, 1987). Measures for preventing fires were addressed under the previously reviewed studies of “home accident prevention”. Studies reporting fires are reviewed under “emergency telephone skills”. In this section, recognition of fires and teaching emergency evacuation skills are presented. These skills have all been taught in simulated environments including: classrooms (Jones, Kazdin, & Haney, 1981; Matson, 1980b); dormitory rooms (Jones, Van Hasselt, & Sisson, 1984; Jones, Sisson, & Hasselt, 1984), family homes (Haney & Jones, 1982); and participants’ apartments (Jones & Thornton, 1987). In each study reviewed, instructors primarily used discussion, modeling, and behavioral rehearsal to teach a series of steps in a task analysis for: crawling, checking doorknobs for heat, opening windows, and exiting buildings. Simulations varied, but included: tape recording of house fire alarms, heating pads to heat doorknobs, blow dryers to blow hot air into a room, and pictures of fire and smoke (Haney & Jones; Jones & Thornton).

Although it is understood that generalization to real home fires will hopefully be nonexistent, none of the reviewed studies taught fire safety or measured generalization using small, yet contained, fires. Additionally, no studies evaluated extinguishing common kitchen fires or use of a fire extinguisher.

**Emergency Telephone Skills**

In addition to learning to use a telephone (Horner, Williams, & Steeley, 1987; Smith & Meyers, 1979; Test, Spooner, Keul, & Grossi, 1990), making emergency telephone calls to obtain assistance is considered an important
skill for integrating persons with disabilities into community settings (Risley & Cuvo, 1980). Students have been taught to use home telephones to dial 911 and give relevant information (Risley & Cuvo; Spooner et al., 1989); dial the operator and report a fire (Smith & Meyers, 1979); use public pay phones to call home when lost in the community (Collins et al., 1993), and to use a cell phone to call for assistance when lost (Taber et al., 2002).

Skills have been taught in simulation using pictorial scenarios (room on fire) (Risley & Cuvo, 1980); mock cardboard boxes as phone booths (Collins et al., 1993); and disconnected telephones (Smith & Meyers, 1979; Spooner et al., 1989). Additional aids have been used in the form of a modified phone directory with picture cues (Risley & Cuvo) and index cards with printed phone numbers (Smith & Meyers; Taber et al. 2002).

None of the current studies evaluated use of pre-programmed or picture phones nor was valuable information obtained through follow-up sessions to determine if students could use the skills during an actually emergency situation to give information to obtain help.

Discussion and Recommendations for Future Research and Practice

All 36 identified studies reported some degree of success in teaching personal safety skills to persons with mild to severe disabilities. A number of instructional strategies (most relying on simulation) were identified. Although results of the studies are positive, a number of issues remain that need to be addressed in future research and practice. These issues primarily address: procedures for teaching personal safety skills; measures of generalization to novel situations; and maintenance of critical skills over time. Examination of each of these issues is provided below.

Instructional Procedures

In order to be functional, safety skills must be performed consistently at high criteria levels or result in personal injury or even death (Collins, 1992). Two re-occurring issues found in this review of the literature were where and how to safely teach these skills while providing examples which closely resemble actual situations in which they will be needed. Results of this review were consistent with those of Miltenberger and Olsen (1996) and Bevill and Gast (1998) which found behavioral skills training (BST) using verbal and visual instruction, modeling, rehearsal, praise, and feedback to be effective in teaching safety related skills. The key component appears to be inclusion of behavioral performance of skills. Matson (1980b) found that discussion alone was not effective in teaching fire safety skills and that student performance showed minimal improvement until role playing was added. Although completed with children without disabilities, Peterson (1984) found similar results: reading manuals and discussing correct behaviors were not effective until explicit behavioral training was included in teaching home safety skills such as answering the door, treating a cut, reaction to a fire, and safely preparing a snack. Care should therefore be taken to follow recommended practices that students with disabilities actually perform or physically practice the skills they will be required to use. Instructors should also take care to match strategies to the intellectual abilities of students. A limitation with role playing is the ability to conceptualize what is “pretended”. Matson (1980b) found that when persons with moderate disabilities were asked to “role play” fire escape scenarios a typical response was, “there is no fire”.

Simulations. There seems to be no argument that conducting instruction in natural environments where persons will be residing and using safety skills, needs to be included whenever feasible when teaching safety skills. Limited funds and scheduling issues are among the constraints that may prohibit programs from conducting the majority of instructional sessions within community-based settings. Limited teaching trials are also a concern when teaching in natural environments. Teaching skills such as riding a bus or ordering at a fast food restaurant prohibit much needed repetition when instruction is limited to one teaching trial (unless more than one trip is made a day, more than one meal is ordered, or the person orders for someone else). Further, issues arise when teaching safety skills such as first aid when an injury rarely happens in real life. It is not feasible to wait for a natural event or injury to occur.
before beginning instruction (Christensen et al., 1996). Simulated instruction is one alternative for providing teaching examples when care is taken to provide multiple examples which replicate functional contexts in which they will be used (Horner, McDonell, & Bellamy, 1986).

Simulations increase opportunities for training trials and increase the number of trials that can be presented during one session. The difficulty identified in the reviewed studies is providing realistic teaching examples that will promote generalization to real life situations. While the majority of the reviewed studies support use of simulations, some studies reported limited results when attempting to simulate real life scenarios. For example, Matson (1980a) provided classroom instruction using a scale model of intersections with small dolls representing “pedestrians” that were moved by students. Results indicate that inclusion of simulated street crossing on the hospital grounds were more effective than the scaled model when generalization was measured in community settings. Marchetti et al. (1983) likewise found community training more effective than a scale model when teaching pedestrian skills. Collins et al. (1993) found little effects of simulated classroom instruction presented prior to in vivo instruction when compared to in vivo instruction alone. Gast et al. (1993) reported that students failed to generalize safe responses to the lures of strangers until taught in vivo.

An important consideration when designing instructional programs may be the features of stimuli and how readily they can be simulated. Instructors may find representation of realistic injuries, using artificial blisters or authentic blood, (Marchand-Martell & Martella, 1990) to be more realistic than attempts to create a dangerous household fire or a busy intersection. Ethical issues must also be considered when conducting safety research. Fear tactics or threatening personal harm are unacceptable and will not pass a review board when planning for students to respond to situations such as child abduction. Setting actual fires or crossing busy intersections may pose danger beyond the scope of ethical research, yet how do teachers teach the natural consequences of potentially dangerous scenarios (Collins, 1992)? Collins suggests reading of newspaper articles or watching television to witness aversive consequences. Video technology is another possible means for providing realistic examples of difficult to represent stimuli. Video technology includes video modeling—watching others perform a skill and completing the skill later and video prompting—watching a video segment and immediately performing a physical response before advancing to the next segment. A number of skills have been taught to students with disabilities using video instruction (Mechling, 2005), and video technology has been used to teach students without disabilities to respond safely to potential abductors (Caroll-Rowan & Miltenberger, 1994; Poche, Yoder, & Miltenberger, 1988), yet Branham et al. (1999) was the only identified study which included videotapes to teach safety skills to students with disabilities. Video technology appears to address the need for: repeated practice; sufficient teaching trials; over learning of skills; and presenting dangerous or emergency scenarios that occur infrequently (Cless & Gast, 1994; Mazzucchelli, 2001). Collins, Wolery, and Gast (1992) further identify individualization as an important component when teaching safety skills to students with disabilities. Video instruction can provide examples to meet the specific safety skill needs of each student (i.e. video tape of the student’s kitchen at home). Use of video technology shows promise in providing real-life examples of dangerous or difficult to simulate examples, yet remains a relatively unexplored area when teaching safety skills to persons with disabilities.

Measures of Generalization and Maintenance

In general, while studies evaluating safety skills do not support the use of simulation over community-based instruction, difficulties of providing instruction solely in community settings is recognized. In order to be functional, safety skills must be generalized across settings and situations where they will be required, therefore programs need to at least evaluate generalization in natural settings even if the majority of instruction has occurred in simulation (Bevil & Gast, 1998; Gast et al., 1993; Hasselton & Miltenberger, 1990). Evaluation of actual emergency situations (i.e.
treatment of a burn) may take several months to occur, but appears necessary when measuring the effectiveness of procedures to teach preventative or reactionary skills to real life events. Following procedures of Marchand-Martella and Martella (1990) researchers and practitioners may need to rely on follow-up reports from parents of participants to assess performance when real injuries occur.

Given the critical nature of the skills being taught and the ability to use them over an extended period of time, the importance of maintenance measures is apparent. A difficulty addressed in the literature is how to maintain skills that are seldom needed or practiced. Collins (1992) suggests that this issue is similar to renewing a first aid certificate or conducting fire drills and that retraining or follow-up is needed. Spooner et al. (1989) recommend retraining at periodic intervals similar to refresher CPR courses for persons without disabilities. Winterling et al. (1992) further recommend that persons in the student’s natural environment should be made aware of his/her competencies in performing safety skills so that they can reinforce use and provide additional training.

Summary

Results show that persons with disabilities have the ability to learn to react to and prevent potential emergencies when presented with systematic, behavioral approaches to instruction. A number of preferred instructional strategies were identified in addition to future challenges to researchers and practitioners. Increased independence and the freedom to make decisions about one’s own life come with additional risks. It is important that persons with disabilities learn to recognize, prevent, and react to potential emergencies and unsafe situations in order to promote human dignity through the right to experience risk.

It is of interest to note that of the 36 studies identified, only two were conducted after the year 2000. The thrust in the area of safety skill research appears to have occurred in the 80’s (38.9% of identified studies) and 90’s (47.2% of identified studies). Perhaps, due to technology advancements and increased availability of assistive technology in recent years, special education and related fields should revisit this line of research as it relates to new and innovative technologies. Evaluation of technologies for: tracking and locating persons and destinations; wireless communication; alerting devices; and virtual environments for simulation, offer new opportunities to teach and provide safety information to persons with disabilities.

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