A Mobility Skills Training Program for Adults With Developmental Disabilities

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Twenty-nine adults with developmental disabilities were trained by an occupational therapist to use city buses for leisure outings to local shopping malls. Program evaluation was based on the number of times each program participant used his or her mobility skills to make an independent leisure outing. These data were collected for 1 year after each person left the program and were analyzed with the use of multiple regression procedures. The results revealed that the participants maintained their mobility skills for 1 year. Older women who shared common leisure interests as well as persons who were afforded more intensive individualized training were especially likely to use the city bus for leisure outings after the treatment program ended. This study demonstrates the long-term effectiveness of occupational therapy when specific treatment goals are matched with individualized training sequences for persons with developmental disabilities.

M obility training has long been recognized as a critical component of treatment programs to increase community integration among persons with developmental disabilities (Nirje, 1969; President's Committee on Mental Retardation, 1972; Wolfensberger, 1972). Lack of transportation skills can limit placements in community-based residences (Hauber et al., 1984). It can also limit opportunities for participation in programs of supported employment (Wehman, 1988).

Travel independence has been identified as an important prerequisite skill for a variety of community-based leisure activities, such as using a supermarket (Gaulke, Nietupski, & Certo, 1985), going to a restaurant or movie theater (Salzberg & Langford, 1981), and planning recreational outings alone or with others (Wehman & Schleien, 1981). In addition, a lack of mobility skills can jeopardize the personal health and safety of persons with developmental disabilities who reside in less structured community-based settings (Nihira & Nihira, 1975).

Previous research also demonstrates that independent travel skills can be appropriately taught. Persons with developmental disabilities have been successfully trained to cross streets safely (Marchetti, McCartney, Drain, Hooper, & Dix, 1983; Vogelsberg & Rusch, 1979) and to use public transportation safely (Certo, Schwartz, & Brown, 1977; Sowers, Rusch, & Hudson, 1979). Recovery skills (e.g., what to do if one misses the bus) have also been successfully mastered by persons with developmental disabilities (Welch, Nietupski, & Hamre-Nietupski, 1985).

Several authors have described curricula for mobility training (e.g., Cortazzo & Sansone, 1969; Laus, 1977; Lupel, 1975). The general procedures involved applied behavioral analysis (Bijou, 1966; Kazdin, 1975; Snell, 1987). Specific training techniques included task analysis of required travel skills in the community; role-playing and modeling of the target behavior; forward or backward chaining of the lesson steps; and intermittent, positive reinforcement with corrective feedback (see, for example, Gruber, Reeser, & Reid, 1979). Although some studies have advocated in vivo instruction within the natural environment, Neef, Iwata, and Page (1978) demonstrated that programs using simulated settings for mobility training can be effective.

Previous mobility training programs, however, presented several limitations. First, the programs emphasized vocational activities (e.g., riding the bus to and from work), not leisure activities. Second, no study trained persons over the age of 24 years, thus the appropriateness of the recommended training procedures for older adults with developmental disabilities is largely unknown. Third, maintenance data, if reported at all, are generally limited to 1 or 2 months. This limits the practicality of the studies.

In the present study, we report the results of a recently completed occupational therapy program to teach...
mobility skills to adults with developmental disabilities. Although the training procedures were similar to those used in previous studies, the present study differed as follows: (a) it involved the teaching of independent travel skills for leisure purposes, (b) it included adults between 24 and 65 years of age, and (c) it involved the collection of maintenance data for 1 year.

Method

Program Participants

Twenty-nine adults (9 men and 20 women) with developmental disabilities voluntarily participated in the mobility training program, all of whom lived in a community-based residential facility. At the time of the study, the mean length of time that the participants had lived at the facility was 10 years.

The participants all had conditions diagnosed as a primary disability due to mild or moderate retardation. Grossman's (1985) classification criteria were used for this diagnosis. The participants exhibited full-scale IQ scores, which ranged from 48 to 73 points. The average IQ score was 62 points (SD = 5.66). We used the Wechsler Adult Intelligence Scales (Wechsler, 1955) with 28 participants and the Stanford-Binet Intelligence Scale (Terman & Merrill, 1960) protocol with 1 participant. Each participant's adaptive behavior was evaluated with the Adaptive Behavior Scales (Nihira, Foster, Shellhaas, & Leland, 1969) and was found to be significantly below average. Various secondary disabilities due to athetoid cerebral palsy, brain damage, Down syndrome, gross motor dysfunction, hearing impairments, schizophrenia, or severe seizure involvement were also identified.

Program Description

An occupational therapist developed a habilitation training program to teach normalized community living skills. Individualized training was prescribed as needed within the following competency domains: (a) cognitive skills (e.g., money skills, calculator use), (b) social skills (e.g., interpersonal communication, behavior management skills), and (c) leisure skills (e.g., frequenting local restaurants or movie theaters). Mobility training was part of the leisure skills domain.

Setting and Materials. Two shopping malls were selected as settings for mobility training. The malls were chosen due to their geographical proximity to the participants' residences and their accessibility by city bus. One mall, located in the central part of the city, could be reached in about 15 to 20 min without transferring buses. The second mall was located in a more suburban, semirural area on the outskirts of town. It could be reached in about 35 to 40 min with one transfer of buses.

The materials used in the mobility training program were current bus schedules, sufficient money for round-trip bus fare and one telephone call, and a telephone number to call in an emergency. A van was used for simulated instruction of bus travel skills. The van was made into a mock bus, with correct destination signs on top and a fare box inside.

Task Analysis and Assessment. Bus riding skills, including both travel skills and social skills, were analyzed. Fourteen skills were required for safe, independent travel in the community.

Figure 1 shows the Likert rating scale used for the evaluation of mastery of the 14 required skills. Zero points were awarded if the skill was not performed at all; 3 points were awarded if the skill was performed correctly on three consecutive occasions. The total possible score was 42 points. To demonstrate criterion performance, we required each participant to perform sufficient skills correctly to receive a score of 80% or above (i.e., 34 of 42 possible points). This criterion level of 80% mastery was viewed as sufficient evidence of appropriate skill acquisition.

Mobility Training Procedures

Mobility training was provided in small groups of 4 to 5 persons. These groups consisted of persons who lived together, interacted socially, and shared common leisure pursuits. Each group received training three to five times per week (M = 2.68 sessions per week, SD = 1.50).

Three training phases were used. We used the task analysis sequence for each phase as a forward chain to teach the route to the mall. The phases themselves were repeated, and the task analysis chain was reversed for the return trip. Each phase lasted for two to three sessions, depending on the participants' progress. Each session lasted either 60 min (i.e., for the bus/no transfer condition) or 90 min (i.e., for the bus/with transfer condition). Training was provided year-round and averaged 6.58 weeks (SD = 4.19).

Phase 1: Van Simulation. This phase provided realistic training of target skills in the community with multiple opportunities for immediate, repetitive practice. The occupational therapist drove the van along the designated bus route and simulated conditions within the natural environment (e.g., casual conversation with the bus driver was not permitted). Practice at recognizing and responding to environmental landmarks was especially emphasized (e.g., knowing when to push the buzzer and exit the bus). These skills proved to take the longest to master appropriately.

Phase 2: Supervised Bus Riding. This phase provided opportunities to practice skills learned on the van within the natural environment. The therapist accompanied the program participants during their travel to and from the mall and sat next to them on the bus. Appropriate behaviors were shaped with intermittent positive reinforcement (e.g., verbal praise) and corrective feedback, as
needed. Some participants also provided positive reinforcement by modeling appropriate bus riding behaviors for their peers.

Phase 3: Unsupervised bus riding. This phase provided opportunities to fade out the positive reinforcement occasioned by the presence of the occupational therapist. During this phase, the therapist initially followed the group of program participants at a distance by boarding the same bus but sitting alone. After one or two successful trips, the therapist would follow the bus by van and observe the participants getting on and off the bus. Finally, a facility staff member would directly observe behaviors on the bus, unbeknownst to the participants. Inappropriate behavior was corrected verbally or through role-playing after it occurred. Repeated observation of inappropriate behavior would necessitate returning to Phase 2 training procedures. When all persons in the group attained criterion performance, the training ended.

Data Collection and Analysis
Independent leisure outings began when each person in the group successfully completed training, was awarded a certificate of graduation, and had his or her mobility status at the facility upgraded appropriately. Leisure out-

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**Figure 1.** Task analysis of independent and safe bus travel skills.
A small group of program participants might decide to dine out at a restaurant, to attend a movie, or to shop at one of the mall stores. Facility staff occasionally prompted leisure outings when the novelty of trips to the mall began to wear off for some program participants.

The dependent variable studied was frequency of independent bus travel for leisure outings. This variable was used to evaluate the maintenance of mobility skills. A facility staff member recorded the number of leisure trips by bus for each program participant. This study reports data collected for 1 year after each person left the program.

Independent variables were information about the characteristics of the 29 program participants themselves as well as their individualized training program. Personal characteristics were age at the end of treatment, sex, full-scale IQ score, former residential placement, and years residing at the facility. These data were collected from case records at the facility. Treatment characteristics were previous mobility training; length, frequency, and difficulty of the training regimen, and season of treatment exit. These data were collected from the therapist’s treatment logs.

Table 1 defines each of the 5 personal and 5 treatment characteristics in measurable terms. These 10 characteristics describe, in effect, the parameters of the mobility training program, namely, who participated (personal characteristics) and what was done (treatment characteristics).

A multiple-regression analysis was conducted to test the hypothesis that the five personal and five treatment characteristics (i.e., the independent variables) would predict changes in the frequency of bus travel for leisure outings (i.e., the dependent variable). The data were submitted to standard microcomputer software packages (Minitab, Inc., 1986).

Results

The 29 program participants had only limited opportunities for leisure and recreation before they completed the mobility training program. Their leisure activities were usually confined to recreation on facility grounds (e.g., watching TV or movies), visits to their family homes, or large group outings in the community (e.g., off-grounds trips for bowling or swimming or visits to local art fairs). During the 2 months preceding referral for mobility training, no participant had ever traveled independently by bus for a leisure outing.

Each of the 29 participants made approximately 10 independent bus trips for leisure outings in the first 12 months after his or her exit from the mobility training program. The average number of outings was 9.83 (SD = 4.43). This frequency amounted to almost monthly outings per person for 1 year. The number of leisure outings ranged from 3 to 20 outings per person. The participant with only three outings was hospitalized for several months during the period of data collection, which restricted his opportunity to make leisure trips to the malls.

Table 2 shows a summary of the linear regression results. The regression equation for the total group of 29 persons was as follows: Leisure outings = 1.80 + 0.14 (age at exit) + 1.77 (previous training) + 5.26 (sex) - 0.12 (full-scale IQ) - 1.82 (former residence) + 0.05 (years at facility) + 0.35 (length of training) + 1.06 (frequency of training) + 0.36 (difficulty of training) + 0.38

Table 1

<table>
<thead>
<tr>
<th>Category</th>
<th>Variable</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal characteristics</td>
<td>Age at exit</td>
<td>Chronological age at treatment exit; calculated to the nearest year</td>
</tr>
<tr>
<td></td>
<td>Sex</td>
<td>Men coded as 0; women, as 1</td>
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<tr>
<td></td>
<td>Full-scale IQ</td>
<td>Measured level of intellectual functioning at the time of treatment</td>
</tr>
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<td></td>
<td>Former residence</td>
<td>Family home coded as 0; institutional setting, as 1</td>
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<tr>
<td></td>
<td>Years at facility</td>
<td>Time living at the facility prior to treatment, calculated to the nearest year</td>
</tr>
<tr>
<td>Treatment characteristics</td>
<td>Previous training</td>
<td>Previous mobility training for bus travel coded as 0; no previous training, as 1</td>
</tr>
<tr>
<td></td>
<td>Length of training</td>
<td>Time spent in active mobility training, calculated to the nearest week</td>
</tr>
<tr>
<td></td>
<td>Frequency of training</td>
<td>Average number of mobility training sessions per week</td>
</tr>
<tr>
<td></td>
<td>Difficulty of training</td>
<td>Mobility training with no bus transfer coded as 0; training with bus transfer, as 1</td>
</tr>
<tr>
<td></td>
<td>Season of exit</td>
<td>Treatment exit during winter months coded as 0; exit during non-winter months, as 1</td>
</tr>
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Table 2

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>SD</th>
<th>t ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sex</td>
<td>5.26</td>
<td>2.56</td>
<td>2.05</td>
</tr>
<tr>
<td>2. Age at exit</td>
<td>0.14</td>
<td>0.11</td>
<td>1.26</td>
</tr>
<tr>
<td>3. Previous training</td>
<td>1.77</td>
<td>1.96</td>
<td>0.90</td>
</tr>
<tr>
<td>4. Frequency of training</td>
<td>1.06</td>
<td>1.48</td>
<td>0.72</td>
</tr>
<tr>
<td>5. Length of training</td>
<td>0.35</td>
<td>0.51</td>
<td>0.69</td>
</tr>
<tr>
<td>6. Full-scale IQ</td>
<td>-0.12</td>
<td>0.19</td>
<td>-0.64</td>
</tr>
<tr>
<td>7. Former residence</td>
<td>-1.82</td>
<td>2.56</td>
<td>-0.71</td>
</tr>
<tr>
<td>8. Season of exit</td>
<td>0.38</td>
<td>2.00</td>
<td>0.19</td>
</tr>
<tr>
<td>9. Difficulty of training</td>
<td>0.36</td>
<td>2.00</td>
<td>0.18</td>
</tr>
<tr>
<td>10. Years at facility</td>
<td>0.05</td>
<td>0.31</td>
<td>0.17</td>
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Table 2 also shows that the variable of sex dominated the linear regression results (sex-variable f ratio = 2.05). In fact, the 20 women made almost twice as many leisure outings as the 9 men. The average number of outings for women was 11.30 (SD = 3.95); for men, 6.56 (SD = 3.75).

Stepwise regression procedures were used to analyze the data separately for the male and female program participants. The variable of former residence, exerted a moderate negative influence, thus indicating that persons who exhibited comparatively higher cognitive functioning and those who formerly resided in institutions were less likely to make frequent independent bus trips to the local mall. The three remaining independent variables—season of exit, difficulty of training, and years at the facility—had little or no influence on observed changes in the frequency of leisure outings, given the influence of the other variables.

Two of the variables, full-scale IQ and former residence, exerted a strong positive influence on changes in the dependent variable. This indicated that women and older persons were likely to make frequent independent bus trips for leisure outings. Similarly, a positive but moderate influence was observed for the variables of previous training, length of training, and frequency of training. This indicated that the persons who had been previously trained to ride the city bus to and from work as well as persons who were provided longer, more frequent mobility training were likely to maintain their mobility skills up to 1 year after leaving the program.

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Discussion

This study described an occupational therapy program for 29 adults with developmental disabilities. Before receiving mobility training, these persons depended on facility staff for transportation to leisure outings. After treatment, they were able to provide for their own recreation by traveling independently by city bus and from local shopping malls. Learned mobility skills were generally maintained for 1 year after the program ended.

This study extends previous research findings on mobility training programs. Earlier reports used behavioral analysis techniques to train adolescents and young adults to ride city buses to and from their place of employment. The present study illustrates that these same techniques are appropriate with older populations and can be effectively used to train mobility skills for leisure (i.e., nonvocational) purposes.

Mobility training was evaluated longitudinally, both while the participants received training and after training ended. This proved to be an effective strategy. Evaluation data provided the occupational therapist with useful information regarding which training techniques were most effective with different program participants. For example, this information was used not only to modify training approaches as needed for individual participants, but also to demonstrate the appropriateness of the training to state agency supervisors of the program. In fact, these evaluation data were used to rebut state agency claims that direct training of mobility skills was an inefficient use of the therapist’s time.

The results also showed the influence of personal and treatment characteristics on the maintenance of mobility skills. These results suggest several strategies that can be used to increase long-term effectiveness of mobility training. First, it appears to be important that program participants share common leisure interests, habits, and pursuits. Older women who lived together and interacted socially before the beginning of treatment were likely to become frequent independent bus travelers. The fact that their personal friendships were naturally occurring and reinforced daily probably influenced their motivation to initiate leisure outings. This social factor, in turn, may have contributed to the program’s demonstrated effectiveness over time.

Second, the data suggest that more-intensive training is better than less-intensive training. Three treatment variables were identified as important factors—previous training, length of training, and frequency of training. These variables generally describe the intensity of each person’s individualized training program.

State program administrators initially argued that less-intensive training was sufficient. However, this study’s findings confirm previous reports in the literature regarding the need for repetitive practice and overlearning of target mobility skills among persons with develop-
mental disabilities. The study results are also consistent with earlier recommendations to provide for direct training of maintenance skills prior to ending treatment.

The participants traveled by bus in a small group and provided mutual reinforcement of appropriate skills (e.g., modeling appropriate behavior when transferring buses). This continuing reinforcement by peers also appears to have contributed to the success of the training program.

Third, the study findings illustrate the importance of a careful evaluation of antecedent histories before provision of individualized mobility training or other occupational therapy. Participants who formerly resided at home with their families as well as women who had spent less time residing at the facility were more likely to become frequent independent bus travelers than were participants who formerly lived in segregated institutional settings. This suggests that it is important to consider information about where program participants have lived and the restrictiveness of these former residences when planning mobility training programs.

Occupational therapy can be individualized to accommodate personal circumstances and prior training experiences. For example, training could be intensified to offset a negative prior experience, or a supportive family member could be asked to provide reinforcement of particular training objectives. It seems especially important that occupational therapists prescribe training not on the basis of what a person with developmental disabilities can do at present, but rather, in anticipation of the skills that the person will need to perform after training ends.

Two limitations of the study should be noted. The sample size was somewhat small, especially for the subgroup analyses of the performance of men and women. This may have contributed to conflicting findings regarding the direction of effect (i.e., positive or negative) for the difficulty of training variable. Future research should perhaps involve an expanded sample size with counterbalanced sex ratios. Personal or treatment characteristics other than the ones considered in this study could also be evaluated.

In addition, this study did not identify specific criteria with which the therapist can individualize treatments. We accept that more intensive treatment is better, but we have additional questions regarding when and by how much treatment intensity should be increased. Similarly, although this study found that the family home environment was important, the findings did not identify critical family factors that should be evaluated. These issues regarding the causes of individual differences in responsiveness to occupational therapy are important and should be considered in future efforts to replicate the study.

In conclusion, this study illustrated the effectiveness of the use of occupational therapy to match specific treatment goals (i.e., leisure independence) with individualized training objectives (i.e., mobility skills). This is, in general, a stepwise strategy whereby persons with developmental disabilities are screened prior to program referral for required entry skills and then are assessed repeatedly to evaluate individual responsiveness to applied treatments. In this way, screening, assessment, and treatment strategies are prescriptively linked. This approach appears to have the potential to increase the effectiveness of occupational therapy over time. Effective therapy, in turn, will contribute toward providing persons with developmental disabilities a broad range of habilitation support to ensure their personal independence and corollary community integration to the fullest extent possible.

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References


