

A PRELIMINARY FOLLOWUP STUDY OF ELECTRONIC TRAVEL AID USERS

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INTRODUCTION

The history of electronic travel aids (ETAs) for blind travelers is not lengthy, particularly the period of commercial availability. However, during these few years there have been many modifications to the aids and to methods of instructing potential users. The C-5 Laser Cane has replaced the C-4 Laser Cane and the Sonicguide is today's name for the Binaural Sensory Aid, while the training of Orientation and Mobility Specialists has been refined and systematized with university-based ETA programs. Training methods have been improved as a result of these programs and the accumulation of experience and research in the use of the devices. Yet there remain many areas in which a paucity of accessible information exists.

For example, given the variety of ETAs and the many potential users, how does one match an aid with an individual? What factors should be considered? How is an aid integrated (or not integrated) into a user's lifestyle? In general these questions have not been answered because the primary focus of effort has been on developing useable aids and delivery of those aids to potential users—with little emphasis on the longer-term consequences.

Since 1971 the Western Blind Rehabilitation Center (WBRC) has participated in delivery of ETAs to selected veterans. During this time 26 veterans have been trained with, and issued, either a Laser Cane or Sonicguide, and a much larger number have been evaluated

for the aids.^a By early 1976 the paucity of information on the outcome of issuance of ETAs to veterans had come to be recognized as a severe limitation to continued progress in the development of an effective ETA program. This inability to provide staff members with feedback on the consequences of their clinical training program imposed the following critical limitations:

1. Without feedback information, validations of current training practices could not be made.

2. Without feedback information, the likelihood that a given training program will expand into new and promising areas of endeavor is reduced.

3. Without feedback information, the enthusiasm and forcefulness of training personnel will wane, and this will eventually limit the efficacy of the training itself.

These consequences were recognized by the Western Blind Rehabilitation Center, and the method described here for providing feedback from trained ETA user to instructor was initiated. The authors hope that this is only the first of a series of information-gathering studies. This paper presents the results of only the initial effort—the preliminary nature of this report is emphasized.

METHOD

Subjects

Of the 26 veterans who had been trained with an ETA at the WBRC by the time of this study, 18 were included in the data analysis. The remaining 8 individuals were not included because 3 of them had moved to a different geographical area and the 5 others were known not to use the ETA issued to them.^b Of the

^aEvaluation was primarily in terms of the individual's physical, mental, and psychological ability to use one of the aids, and the apparent strength of motivation. Obviously if the kind of data discussed in the preceding paragraph were available, the evaluation process could be improved.

^bVeterans known at the outset of the study to have discontinued their use of the aid were not included as Followup Study subjects. However, during the study's direct observation phase it became apparent that 10 of the 18 subjects had also either discontinued use of the aid or no longer used it as intended. This fact should be borne in mind when considering data based on the original group of subjects. Where it seemed appropriate, the authors provide data drawn only from the 8 subjects found to be still effectively using their aids at the time of the study.

It should also be noted here that, for some subjects, their aid had apparently fulfilled important rehabilitative functions while they were achieving independent mobility, after which these users no longer felt a need for the equipment. With this later insight it becomes apparent that the Preliminary Followup Study proved more fruitful than might have been the case had the authors been able to identify—and exclude at the outset—that majority of their subjects who turned out to be discontinued users of the aids.

18 subjects selected 12 had received the Sonicguide and 6 had received the Laser Cane. While these two groups are hardly matched samples they are in many respects similar. The mean age of the Sonicguide group was 48.2 years versus 46.2 years for the Laser Cane group. The mean educational levels (defined simply as number of years of formal education) were also similar with the Sonic group having a mean of 13.7 years versus 15.0 for the Laser Cane group. Mean number of years blind was 15.2 for the Sonic group and 15.1 years for the Laser Cane group.

The mean length of time the Sonicguide users had had their aid was 2.3 years (range = 1 to 4 years), while the mean for the Laser Cane users was 3.5 years (range = 2 to 5 years). All users reported traveling independently on a daily basis, although not always with an ETA.

All subjects had received ETA training at the Western Blind Rehabilitation Center. Prior Orientation and Mobility Training had occurred either at one of the three VA Blind Rehabilitation Centers or an outside agency. (Outside agencies had provided O&M training for about one out of four of the subjects.) In all cases, if remedial work on mobility skills was needed by a subject prior to ETA training, the additional training had been provided at the WBRC.

Phone, then Visit

Initial contact was made with each subject by telephone. The interviewer first explained the study to the veteran and asked him to participate. Then the interviewer asked a number of questions about prior mobility training, use of the aid, and the individual's travel patterns on the day immediately prior to the telephone call. In this way information that would be useful for the on-site visit was obtained. All veterans reached by phone expressed interest and were willing to participate.

On-site visits in the veterans' homes were made within a few weeks of the initial telephone contact by one of the authors (Nancy Darling). The visits served to provide objective, comparable information about the veterans' mobility and ETA skills. In particular the on-site visits provided a means of observing and assessing the veterans' mobility skills within the actual home environments. In each case, direct observations were made in an area immediately surrounding the veteran's residence, and where appropriate, observations were also conducted at the veteran's place of employment.

FINDINGS

Travel Patterns

All subjects had stated that they traveled “independently.” However, observations indicated wide variation in what constituted independent travel. Two subjects, for example, appeared to have travel patterns dependent upon other persons (as in a car-pool) rather than relying only upon their own travel skills. Others appeared to have travel patterns solely dependent upon their own travel skills. All subjects appeared to be capable of relying upon themselves, if required to in travel situations, by employing a long cane, an ETA, or a dog guide.

The majority of both groups (7 of the 11 Sonicguide subjects responding to the question and 3 of 5 Laser Cane subjects responding) indicated their amount of travel had increased since receiving ETA training. The remainder indicated their amount of travel was about the same. None indicated a decreased amount of travel.

Table 1 presents the data on the kinds of areas the subjects reported traveling in, while Table 2 presents the subjects’ reasons for traveling. Ten in the Sonicguide group and 6 in the Laser Cane group responded to these questions. Although the total number of subjects is small, the data may provide a useful hint of several differences between the two groups: it suggests that Laser Cane users are more likely to use their ETA indoors than are Sonicguide users, while the latter are more likely to report using the ETA in residential and/or urban areas.

The Sonicguide users appeared to be more likely to begin traveling in new areas than did members of the Laser Cane group. Some in the Sonicguide group also reported fatigue or distraction while none in the Laser Cane group did.

TABLE 1—Areas Reported Traveled in by 10 Sonicguide Users and 6 Laser Cane Users^a

Area	Sonicguide		Laser Cane	
	Number	Percent	Number	Percent
Residential	8	80%	3	50%
Light business	6	60%	3	50%
Urban	5	50%	1	17%
Public transportation	5	50%	3	50%
Indoor	3	30%	4	67%
Other (School campus, home yard)	3	30%	1	17%
Rural	1	10%	1	17%

^aOnly five veterans actually used their Sonicguides and three actually used their Laser Canes at the time they answered this inquiry.

TABLE 2—Reasons Reported for Traveling by 10 Sonicguide Users and 6 Laser Cane Users^a

Reason	Sonicguide		Laser Cane	
	Number	Percent	Number	Percent
Exercise	6	60%	3	50%
Job/School	5	50%	4	67%
Errands	5	50%	3	50%
Other	7	70%	3	50%

^aOnly five veterans actually used their Sonicguides and three actually used their Laser Canes at the time they answered this inquiry.

Family Opinion of ETA

During the followup visit family members were asked to describe their opinions of the ETA by placing it within a category of positive, indifferent, or negative. Family members of Sonicguide users usually rated their feelings as positive (7 to 9 responding) with one indifferent and one negative. Only 1 of 4 responding family members of Laser Cane users stated a positive opinion, while 2 were indifferent and 1 was negative. These responses may be the result of factors independent of the ETA, such as perceived need to defend the user. One comment made by some family members to justify their negative feelings was that the ETA made the user “too independent.”

Mechanical Functioning

Of 11 responding Sonicguide users 4 reported having had mechanical problems with their aid, while all Laser Cane users reported some malfunction. (Mechanical problems were defined as repairs being necessary for proper ETA functionings.) To assess the relative rate of malfunctions over time, the total number of months all aids had been in the hands of the subjects was divided by the total number of malfunctions reported. From this calculation the malfunction rate for the Sonicguide appears to be once per 5-year period, and for the Laser Cane about once per 6-month period.

Use of the ETA Observed

Sonicguide Subjects

During observations of the ETA users it appeared that only 5 of the Sonicguide subjects were using the aid effectively (e.g., responding to its signals). The remaining 7 individuals had either returned their aid to the Veterans Administration, or did not demonstrate an ability to use the aid, which probably indicated a lack of practice

(and hence a disuse of the aid). Of those who had returned the Sonicguide, several noted that the aid had been effective but because of a change in location or lifestyle the aid was no longer useful to them. For example, a travel area was no longer one in which use of the aid seemed appropriate or helpful.

Laser Cane Subjects

Of the 6 Laser Cane users observed, it appeared that only 3 were using the aid effectively at the time of the followup. The remaining 3 could not demonstrate effective use of the aid.

Data From Telephone Interviews

Both groups reported traveling similar amounts of time (per day) with their aids. The 5 Sonicguide users' reports averaged 31 minutes travel time per day and the 3 Laser Cane reports averaged 37 minutes. The average distance traveled was, however, slightly longer for the 3 Laser Cane users, whose travel averaged 7.5 city blocks. The Sonicguide users' travel averaged 5.5 city blocks.

The specific types of items located by the users with an ETA are listed in Table 3. (Table 3 and 4 report only those users the authors could confirm as using the ETA.) The Laser Cane group reported using their aid for locating objects in their travel path more frequently than did the Sonicguide group. The Sonicguide users, however, made more frequent reports of using the aid to detect landmarks or hazards (head-height objects) than did the Laser Cane users.

TABLE 3—Items Reported Located with ETA by 5 Sonicguide Users and 3 Laser Cane Users^a

Item	Sonicguide		Laser Cane	
	Number	Percent	Number	Percent
Hazards (head-height)	5	100%	2	67%
Objects (in travel path)	4	80%	3	100%
Landmarks	3	67%	2	67%
Other (parked cars, better line of travel)	2	40%	0	0%

^aThe authors were able to confirm use of the aids by these subjects.

Table 4 presents the aid(s) used on the day prior to the telephone interview as reported by the Sonicguide and Laser Cane subjects themselves. The Sonicguide users appeared more likely to use a long cane (without the ETA) and/or a sighted guide than to use their ETA.

TABLE 4—Aid Reported Used on the Day Prior to Telephone Interview by 5 Sonicguide Users and 3 Laser Cane Users^a

Aid	Sonicguide		Laser Cane	
	Number	Percent	Number	Percent
Sonicguide	2	40%	—	—
Laser Cane	—	—	1	33%
Long Cane	4	80%	2	67%
Sighted Guide	2	40%	0	0%
Guide Dog	1	20%	0	0%

^aThe authors were able to confirm use of the aids by these subjects.

DISCUSSION

The major focus of attention on electronic travel aids has historically concerned the development of the devices, their distribution to prospective users, and the development of training curricula. Less attention has been given to validating these processes in terms of the long range interaction between an ETA and a user's life patterns.

The National Academy of Sciences' evaluation of the C-4 Laser Cane (1973) provided some information concerning use of the Laser Cane during training and for a limited period of time following training. The study concluded (in part) that the Laser Cane was most effective in two situations—first, “in moderate density urban traffic along familiar routes” and second, “in unfamiliar urban areas with low traffic density.” The present study supports the latter conclusion since Laser Cane users reported frequent use of the cane in light business areas. However, in comparison to the Sonicguide, the Laser Cane does not appear to be most effective in urban areas.

The NAS study also concluded that the Laser Cane was not effective in conditions such as building interiors, high density (noisy) traffic conditions, or in crowded corridors. In the present study the Laser Cane users did not commonly report using the aid in crowded areas; they did, however, report more frequent use of the Laser Cane indoors than did the Sonicguide users.

In agreement with the NAS study was the finding that Laser Cane users and Sonicguide users were both more likely to rate their own travel ability higher than would a trained observer. The present subjects rated themselves as exceptional travelers.

The present study also elicited reports (from users) that their travel frequency increased following ETA training. This finding may be in conflict with the NAS study finding that Laser Cane use did not increase travel frequency. However, since direct observations of

travel frequency were not made in the present study it is possible that the finding represents only the users' belief, and not an actual increase in travel frequency.

Airasian (1972) conducted a questionnaire survey of Binaural Sensory Aid (Sonicguide) users and instructors from the United States, England, Australia, and New Zealand. The questionnaire was designed to obtain information on user characteristics, training, mobility skills before and after ETA training, mechanical adequacy of the device, and attitudes toward training and use of the device. Because of differing methodologies (e.g., questionnaire versus on-site visit) and subject populations (e.g., non-veteran versus veterans and congenital versus adventitiously blinded) direct comparisons between the present study and Airasian's are hazardous. Some differences are apparent: in particular, Airasian reports that 79 percent of the users retained their aid, while the present study concludes that 44 percent retained their aid and could use it effectively. Such disparities suggest a need for further research to determine retention and use patterns within defined populations.

The Patterns of Use and Disuse

Those veterans trained with an ETA but no longer using it were questioned to obtain information on why they chose not to use the aid. A principal reason reported was a change in home, business, or school location such that the aid was no longer felt to be effective (or necessary) to meet the new mobility situation. For example, the previous situation may have required extensive or complex travel, while the new situation either did not require sufficient travel or involved travel in an environment not suited to the aid. In these cases it may be postulated that a subsequent change would lead the veteran to resume using the aid—although no evidence currently exists to support or refute this position.

A second reason cited for discontinuing use of the aid was that the individual (through use of the ETA) became so familiar with his environment, or so confident of his travel ability in that environment, that the aid did not add to his travel ability and was therefore no longer used. In these cases the users cited the aid as necessary and useful during initial familiarization with the environment. At a later time the ETA's output became too redundant to warrant continued use.

Other users reported opposite reactions. For example, one individual continued using the aid in familiar environments and employed it to "explore" his travel route. He gained a great deal of enjoyment from the aid as an environmental sensor—while only infrequently employing it as a mobility aid.

When asked about the areas traveled with their ETA, Sonicguide users were more likely to report utilizing the ETA in urban areas than were Laser Cane users, while the latter more frequently reported using their ETA inside buildings. Due to the small population these results are not suitable for statistical analysis, but they are at least suggestive of a differential application of the two aids. If subsequent research confirms such differentiation it may eventually be possible to match one or the other aid to certain users on the basis of travel patterns. Such matching might be thought of as analogous to the prescribing of low-vision aids, wherein many aids will provide a user with better visual acuity but only one aid (or one system of aids) will allow him to achieve optimum performance in a particular task he must perform.

In conclusion, the study found that 8 of the 18 veterans participating in the study continued to use their ETA and were able to demonstrate effective performance with it. The remaining veterans either could not demonstrate effective use of the aid or had returned the aid to the Veterans Administration. Among those no longer employing the aid, a frequent statement was to the effect that the aid had initially been very helpful, but due to changes in environment, self-confidence, knowledge of the environment (gained with the help of the ETA) or other factors, the aid was no longer employed. These findings indicate that the importance of the ETA is greater than that reflected in a 44-percent use rate.

On the basis of these findings the following recommendations are made:

1. Followup studies should become integral parts of all ETA programs. The purpose of these studies should include evaluation of current training programs as well as evaluation of user performance variables.
2. Additional research should compare use patterns of the Sonicguide with those of the Laser Cane to determine if they are in fact differentially employed by users, and to determine if such differentiation is a valid guideline for prescribing Sonicguides or Laser Canes to prospective users.
3. The present study found ETAs to be of relatively short-term use to many users; however, despite the short duration, the impact of the aid was evident. Thus, consideration should be given to applying ETAs, in some instances, as an orientation tool with the goal of improving initial mobility training and initial adjustment to mobility within the user's environment. The explicit agreement between the instructor (representing the agency) and the client would be that the use of the ETA is for a limited period of time and is intended only as a supple-

- ment to orientation and mobility training.
4. This concept of the use of ETAs as a supplement to normal orientation and mobility training should receive appropriate research attention. An example: the use of the Laser Cane's auditory output as a secondary source of reinforcement in teaching the concept of hand centering and arc width in the use of the long cane.
 5. Additional guidelines need to be developed and validated for optimum selection of ETA candidates.
 6. The possibility of employing ETA's to improve poor mobility skills should be explored.

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