Effects of a Multimedia Project on Users’ Knowledge about Normal Forgetting and Serious Memory Loss

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Abstract Objective: The aim of the project was to develop and evaluate the effectiveness of a CD-ROM–based multimedia program as a tool to increase user’s knowledge about the differences between “normal” forgetfulness and more serious memory loss associated with Alzheimer’s disease.

Design and Measurements: The research was a controlled randomized study conducted with 113 adults who were recruited from the community and who expressed a concern about memory loss in a family member. The intervention group (n = 56) viewed a module entitled “Forgetfulness: What’s Normal and What’s Not” on a laptop computer in their homes; the control group (n = 57) did not. Both groups completed a 25-item knowledge-about-memory-loss test (primary outcome) and a sociodemographic and technology usage questionnaire; the intervention group also completed a CD-ROM user’s evaluation.

Results: The mean (SD) number of correct responses to the knowledge test was 14.2 (4.5) for controls and 19.7 (3.1) for intervention participants. This highly significant difference (p < 0.001) corresponds to a very large effect size. The program was most effective for participants with a lower level of self-reported prior knowledge about memory loss and Alzheimer’s disease (p = 0.02). Viewers were very satisfied with the program and felt that it was easy to use and understand. They particularly valued having personal access to a confidential source that permitted them to become informed about memory loss without public disclosure.

Conclusion: This multimedia CD-ROM technology program provides an efficient and effective means of teaching older adults about memory loss and ways to distinguish benign from serious memory loss. It uniquely balances public community outreach education and personal privacy.

This article reports on the outcomes of a CD-ROM–based intervention program designed to be used by people concerned about memory loss in family members or friends. The project’s specific aim was to develop the CD-ROM program and evaluate its effectiveness as an educational tool designed to increase viewers’ knowledge about the differences between normal forgetfulness and more serious memory loss associated with Alzheimer’s disease. A secondary goal was to explore whether there would be any viewer trends in response to the feedback provided by the program that suggested need or no need for additional clinician evaluation. A third goal was to determine the viewers’ impressions of the technology features, navigational tools, and overall ease of use. There were three testable hypotheses:

- Viewers’ (intervention group) knowledge about memory loss associated with Alzheimer’s disease will be significantly greater than that of non-viewers (control group) (primary outcome).
- Viewers with little previous knowledge about memory loss will have test scores equal to those of subjects who initially report a great deal of knowledge about memory loss associated with Alzheimer’s disease.
- Viewers will be satisfied with the program design and features, with those expressing less knowledge at baseline being the most satisfied.

**Background**

Alzheimer’s disease is a major health problem in the United States today, affecting an estimated 4 million people, 90 percent of whom are 65 years of age or older. The prevalence of Alzheimer’s disease doubles every 5 years for persons after age 65 years, and one study indicates that nearly half of all people 85 and older have some form of dementia. The majority of persons suffering from Alzheimer’s disease are cared for at home by families who must cope with significant personal, social, and financial costs. In 2000, Harrow estimated the total annual caregiving cost per care recipient to be $23,436 for informal care costs and $8,064 for formal care (1997 dollars). Leon et al. estimated the total annual national cost of caring for Alzheimer’s disease patients to be between $51 and $89 billion.

The significant personal and societal costs increase the importance of addressing Alzheimer’s disease. Failure to acknowledge or act on early signs of memory loss hinders diagnosis and makes patients with Alzheimer’s disease an extremely difficult population to reach for care. Significant delays in recognizing the signs of serious memory loss and seeking diagnostic evaluation for Alzheimer’s disease are frequently reported in the literature. The lag between the onset of cognitive symptoms and appropriate clinical evaluation is often more than 2 years.

Helping families recognize early signs and symptoms of Alzheimer’s disease allows people to take action early, enabling them to assume some control over important issues related to the disease’s course. Although treatments are available that help slow the disease’s initial progression and manage related symptoms, therapy must be initiated as early as possible for maximal benefit. The advantages of early assessment for Alzheimer’s disease include the opportunity to rule out other treatable disease, to provide timely family education, to treat with medications in the early stages, to manage symptoms and enhance safety, and to make personal and financial plans with with the affected person.

Factors that commonly impede the diagnosis of Alzheimer’s disease are caregivers’ lack of knowledge and family members’ reluctance to seek help. Early signs of cognitive impairment are insidious, part of the typically slow progression of the disease, making it difficult for persons to recognize. The person affected and family members frequently attribute early signs of memory loss to normal aging and deny the importance of increasingly impaired cognitive and behavioral functioning. Affected persons and their family members may be fearful, and embarrassed about discussing symptoms; they may lack easy access to medical care, may believe nothing can be done for the disease, or may have been told by a physician that the memory loss is simply due to old age.

Mahoney identified the concept of “normalization” in family members of persons with early-stage Alzheimer’s disease. She reported that, consciously or unconsciously, family members increasingly cued and guided the affected person and gradually assumed additional responsibilities that not only decreased the demands on the affected person but also reduced early recognition of his or her deficits. Frequent communication problems among the physician, patient, and family members during the evaluation period added another layer of complexity to the already stressful process. Also, the time and expense of the evaluation process itself are deterrents to obtaining a diagnosis. Spousal caregivers, however, have reported benefits of an evaluation that include finding out what was actually wrong and ruling out
other causes of memory loss. Similar benefits have been reported by other investigators.7

Reports of successful evidence-based community interventions that help people recognize serious memory loss are critically lacking. Since families usually make the decision to seek professional evaluation, interventions that educate them to recognize the disease are especially needed.1 Developing community outreach programming is a priority of the Alzheimer’s Association; their funding enabled this 3-year project and attests to its practical significance.

Development Model and CD Content

Conceptual Framework

A cognitive-behavioral four-stage theoretic model guided the program’s development.19 The related research literature indicated that knowledge provides the foundation for reasoned action. Persons in a state of contemplation, wherein they had a concern about memory loss in a family member but had not taken action, were our target audience. Content was developed to provide the knowledge foundation (stage 1), and the computer-based multimedia program was designed to allow viewers to easily navigate the information and choose the delivery style, to foster user engagement (stage 2). After using the program, viewers were queried about their behavioral response to the program’s recommendations for no evaluation or further evaluation (stage 3). The final phase of behavioral action (stage 4) suggests that periodic reinforce-ment and ongoing maintenance of supportive activities are needed to engender desirable actions.

Content

Content was developed from the literature on memory loss, including the National Consensus Panel recommendations on Alzheimer’s disease and the recommendations of professional organizations and other educational programs.20–22 Internet-based and local focus group research was conducted with family caregivers of patients with Alzheimer’s disease, to promote an understanding of caregivers’ responses to early-stage Alzheimer’s disease.5,17 A draft module on memory loss was developed and used with several focus groups, which were representative of the intended audience, to critique the content. All sessions were taped and analyzed according to traditional grounded theory methods.23,24 Information gained from this process informed the choice of program content and media delivery and led to the development of five educational modules (Figure 1).

Module 1: Forgetfulness: What’s Normal and What’s Not?

The core module contained the critical information about memory loss that all participants in the intervention group viewed. This module was the most interactive in its design, using 37 screens of text with integrated audio, static pictures, and three video graphic clips to provide strategic visual and auditory sensory stimulation to clarify and reinforce the con-
In the video clips, two actors—Harry (who has serious memory loss) and Helen (who has normal forgetfulness)—portray the key learning points and the cognitive differences that are described in the videos. At the end of this module, users completed the Family Questionnaire, a five-item memory assessment screen developed by the National Chronic Care Consortium and the Alzheimer’s Association.

Depending on their scores, participants received either an assurance that “no signs of serious memory loss are evident at this time” or affirmation that the “memory loss noticed may be more than normal forgetfulness.” Those who “passed” the screening were offered a menu screen from which they could exit the program or view additional modules. Those who “failed” the screening were given a recommendation to have their relative evaluated by a clinician. Only these viewers were encouraged to view module 2, which instructed them in behaviors to observe and report to the clinician during an evaluation and other information to bring to the diagnostic visit.

Module 2: Evaluation

The second module reviewed the various types of clinicians that are frequently involved in memory loss evaluations and included a guide to the components of the medical history, to help family members better prepare for the evaluation. Questions typically asked

Figure 2 Opening screen for “At the clinic” module.
Our focus groups revealed family members' fears that memory loss clinics would be highly invasive ("sticking needles in one's head") and indifferent to families' concerns, and we wanted to address these negative perceptions to encourage clinic use.

Module 4: Making Plans and Learning about Resources

This module offered text-based content information about four major planning areas—health care, legal arrangements, financial/estate planning, and housing options. Related contact information and referrals were included as well as links to the local and national agencies that provide assistance for people with serious memory loss problems and their families. The narrator reminds viewers that we are all members of families and share the experience of seeing relatives and friends develop health problems. They are reminded that during a health crisis there is little time to obtain information, investigate options, and fully discuss care alternatives. Prior planning is strongly recommended.

Module 5: Common Family Experiences and "Sara's Story"

In a video clip, a daughter tells the viewer about the different ways relatives reacted and dealt with her parent's diagnosis of Alzheimer's disease. Prior research and our focus group feedback indicated that family members frequently have very different opinions about the severity and implications of memory problems in an older relative. Actors portray different responses in "How Families Come to Terms with the Diagnosis of Serious Memory Loss or Alzheimer's Disease," from the denial stage to eventual acceptance.

Technical Design

Program development proceeded in two phases—the research data collection phase and the end product, which was a stand-alone CD-ROM personal-computer–based program. For the research data collection aspect, the project was engineered using Microsoft Active Server Pages technology, which incorporated ActiveX Data Objects, Java scripts, and Visual Basic scripts computer programming code. Using these integrated technologies in the development phase facilitated data collection. A Microsoft Access database was used to record the user's navigation and length of stay in each of the modules. The CD-ROM was designed using Macromedia Director multimedia development software.

The data collection phase (Figure 3.) commenced when the user inserted the program's CD-ROM into his or her computer's CD-ROM reader (step 1). The program started automatically, and at the first screen the user was authenticated with a six-digit user name and password that were assigned before registration and were designed specifically to maintain the user's anonymity (step 2). The user was then verified against the system's database (step 3), and if the authentication was successful, the user was presented with the second screen of the system (see Figure 1), which showed five navigational choices and a "quit" button.

Figure 3  Process flowchart. for use of the CD-ROM. The numbered steps are described in the text.
(steps 6 to 10). However, if the authentication was not successful, the user was forwarded to a “login failure” page and was asked to “try again.”

The user could receive help from a research assistant, and the system administrator’s telephone number was provided, although it was never needed. After successful login, the user entered the program content area, starting with module 1. All the visited pages were recorded. Specifically, the entrance and exit times along with the page names were recorded into the system’s database for future evaluation (step 5). After the user completed the core module (step 6), the memory assessment screener was conducted, a score was recorded, and feedback was given about whether assistance should be sought. Modules entitled “Evaluation” (step 7), “At The Clinic” (step 8), “Resources” (step 9) and “Sara’s Story” (step 10) were then recommended for additional viewing.

Geriatric User Interface

The program design was strategically constructed to integrate geriatric “user friendly” design features and adult/geriatric learning style preferences.\(^{26}\) Strategically, the scripts were written using simple messages that were free of jargon and at a grade 8 readability level. The font was Arial, a sans serif style, in sizes ranging from 14 to 18 points, and the text was unjustified to enhance ease of screen reading. The screen colors featured a blue back screen with yellow or white letters, or light backgrounds with bold dark letters, because these combinations are the most clearly perceived by older adults and cause the least eye fatigue. Blinking banners, moving decorative figures, and multiple screen inserts were avoided, on the basis of findings from our pilot testing.

A professional announcer, whose voice and pacing had been tested in a prior telecommunication project for ease of understanding by older adults, narrated the text. Consistent screen formatting and navigation tools were employed. Initially, use of touch screen was planned, but this idea was abandoned, because the only portable touch screen available during the development period overlay the laptop screen and distorted the display. Instead, the design was revised to make mouse navigation easier, and an on-site research assistant was available to offer assistance, if needed. Video clips and pictures, which alternated with static text, were strategically embedded to highlight and reinforce important knowledge.

Learning style preferences were addressed by placing descriptive text alongside graphic images and giving viewers the choice of seeing, reading, or hearing information. Viewers could control the audio volume and use a headset or external speakers, or both. They also could review sections repeatedly, as desired. Viewers could exit after module 1 or continue through as many modules as wanted. Users were given as much control as possible over the program and were allowed to tailor it to fit their individual needs.

Methods

Design

The experimental design involved random assignment to the intervention group and a post-test-only measurement schedule.\(^{27}\) The post-test-only design has the advantage of eliminating the problem of retest artifacts and priming, believed to be the most important threats to the validity of an analysis based on a knowledge measure. Although unequal baseline knowledge remains a threat to the validity of this design, random assignment reduces this risk. Furthermore, we included parallel measures of baseline knowledge to determine the degree to which randomization was successful in this regard. The Institutional Review Board at the Hebrew Rehabilitation Center for Aged provided human subject approval to conduct the study. Eligible participants had to be concerned about memory loss in another person age 65 years or older. They had to have at least monthly in-person contact with the person of concern and to have known them for ten years or more. Participants were sought who were not current or recent caregivers for a person with Alzheimer’s disease and who resided in the community within a 60-mile radius of Boston. Participants were recruited through newspaper and community newsletter notices, presentations at elderly-adult community sites, and local TV coverage. Research staff returned all calls, described the project, administered a brief telephone screen, and scheduled a home interview appointment for those who met the eligibility criteria.

Data Collection and Intervention Protocol

After obtaining the written informed consent and conducting the baseline home interview, the research assistant opened an envelope that contained the randomization assignment. Those randomized to the control group were given the Alzheimer’s disease knowledge test and offered the opportunity to view the CD-ROM program at the end of the project. Intervention users received instruction on how to view the CD-ROM using the project-supplied laptop computer. All users initially viewed module 1 on forgetfulness.
After this module, the program was interrupted and users were given the knowledge test. The knowledge test was administered after the user had viewed module 1 and before the user had viewed additional modules, to control for variability in exposure to the intervention, given anticipated differences in viewers’ choices about the number of modules to see. After testing, users had the opportunity to continue with any or all of the remaining four modules. When finished, users were asked to complete the users’ CD-ROM evaluation.

Measures

Sample characteristics, health status, knowledge about memory loss, computer usage, and attitudes toward computer usage were obtained, to describe the sample and assess the adequacy of randomization using key technology related variables.

- **Sample characteristics.** Sociodemographic information was collected using six questions to elicit age, gender, marital status, ethnicity, education, and general health status.

- **Health.** A single-item measure of self-rated health from the MOS SF-36. Health Impressions ranged from poor (1) to excellent (5). A higher score indicated better perceived health.

- **Knowledge about memory loss.** Two self-report items asked respondents to rate their perceived knowledge about normal forgetfulness and Alzheimer’s disease, using a Likert scale ranging from 1 (a great deal) to 5 (a little).

- **Computer experience.** This addressed ownership (yes/no), skills and activities (yes/no), usage (from 1 [rarely] to 4 [daily]), and skill level (from 1 [beginner] to 5 [very skillful]).

- **Adoption of technology.** A single item self-report with responses that ranged from 1 (very hesitant) to 5 (very eager to try).

- **Attitudes-toward-computers questionnaire.** Self-report of comfort and ease with computers, which used a five-item subscale with a reported alpha coefficient of 0.63. Efficacy (ability to learn how to use a computer) was a five-item subscale with an alpha coefficient of 0.78, and utility of computers a six-item subscale with an alpha coefficient of 0.67. Response options were on a Likert scale ranging from 1 (strongly agree) to 5 (disagree strongly).

- **Technology usage.** Usage was measured by content and time and automatically recorded by the computer per participant file to provide data about the patterns of usage and referral recommendations.

### Outcome Measures

Knowledge about memory loss, the primary outcome, was measured using the Knowledge-about-Memory-Loss test, a new measure developed to test one’s general knowledge about the major differences between normal forgetfulness and serious memory loss problems. The first 60-item version was pilot tested with a sample of older adults, and an item response analysis revealed that the initial set of questions were too easy. The instrument was revised and retested with two more groups of older adults, resulting in a final version of 25 questions. Questions were included on the basis of their ability to represent key information points that differentiated forgetfulness from Alzheimer’s disease while providing a desirable range of scores capable of discriminating among higher and lower levels of knowledge in a short, easy-to-understand style. The response categories included “true,” “false,” and “don’t know,” which was equated with an incorrect answer. Correct responses were scored 1, all other responses scored 0, providing a range of total scores between 0 and 25. The internal consistency reliability coefficient (Kuder Richardson-20) for this instrument was 0.82.

A users’ satisfaction evaluation was developed, based on prior work by Mahoney et al., to evaluate the innovative method for delivering the educational program via a CD-ROM. The evaluation contained questions measuring how comfortable the respondent was using the program, how easy it was to use and navigate through the program, the usefulness of the information in each of the modules viewed, and the user’s overall impressions of the program and CD-ROM format.

Contacts with clinicians, a secondary outcome, was measured by the participants’ self-reports of the number of actual contacts made with a clinician specific to their referents’ memory loss problem in the 6-month period following enrollment.

### Analysis

The enrollment goal for this study was 50 intervention participants and 50 control participants. This sample size was chosen on the basis of a medium effect size — at least half a standard deviation — and assuming a type-I error rate of 5 percent and a type II error rate of 20 percent. As a preliminary step, intervention and treatment participants were com-
pared by age, sex, marital status, ethnicity, level of educational attainment, self-rated health, knowledge about normal forgetfulness and Alzheimer’s disease, and familiarity with computers and technology. To compare the means across groups for continuous variables, t tests were used, and chi-square analysis was employed for categorical variables. Control and intervention groups did not vary significantly in demographic characteristics.

The main effect analysis, hypothesis 1, involved a test of the significance of the difference in the mean number of correct responses for participants randomized to the intervention and control condition. We used t test to assess the null hypothesis that the intervention and control groups had an equal number of correct responses to the knowledge test.

Our second hypothesis specified that the intervention would be differentially effective for viewers with different levels of self-reported previous knowledge about memory loss. That is, that those with low level of knowledge before viewing the CD-ROM would have post-intervention scores similar to those with a high level of previous knowledge. To test this hypothesis, we used MANOVA and included an interaction term for intervention group membership and prior knowledge. In addition, t tests stratified by level of prior knowledge were computed. The third hypothesis, that viewers would be satisfied with the program design and features and that those expressing less knowledge at baseline would be the most satisfied, was evaluated with descriptive statistics.

## Results

### Randomization Effects and Baseline Characteristics

Among the 199 contacts, 133 were eligible and 113 enrolled (85 percent recruitment rate) and were randomized into the control group (57 participants) or intervention group (56 participants). Of the 19 people who declined participation, most said they or their spouse were ill or were no longer interested in research participation. Control and intervention participants did not differ significantly in terms of key characteristics, which are summarized in Table 1, attesting to the adequacy of randomization.

Almost three quarters of the participants were women, who ranged in age from 65 to 86 years at screening. The mean age was 73.3 (SD, 5.0) years for control subjects and 71.8 (SD, 3.8) years for intervention participants. There was some evidence of an
imbalance in marital status representation, but this did not attain statistical significance. Most participants described themselves as white (95 percent) and had some formal education beyond high school (72 percent control, 79 percent intervention; \( p = 0.414 \)). Participants indicated a level of knowledge of normal forgetfulness and Alzheimer’s disease about midway between “I know a moderate amount” (2) and “I know something” (3). A majority of participants (88 percent control, 82 percent intervention; \( p = 0.407 \)) owned or reported having easy access to a computer.

**Program Usage**

The home interview intervention plus the educational session lasted, on average, 1.5 hr for the group participants and 45 min for the control group. Participants in the intervention group spent, on average, 38 min viewing two modules. Participants spent the most time—an average of 31 min—viewing the forgetfulness module. Thereafter, the diagnostic module was viewed by 17 participants for an average of 3 min, Sara’s story by 13 participants for an average of 9 min, the clinic module by 10 participants for an average of 13 min, and the resources module by 8 participants for an average of 4 min.

**Intervention Effectiveness**

The mean number of correct responses to the knowledge test was 14.2 (SD, 4.5) questions for control subjects, and 19.7 (SD, 3.1) questions for intervention participants. This difference was highly significant \( (t = -7.6; \ p < 0.001) \) and corresponds to a very large effect size \( 30 \). 1.2 standard deviation units using the sd of the control group as the normative measure of variability in test scores, supporting hypothesis 1. The effectiveness of the CD-ROM intervention is summarized in Table 2.

**Knowledge Differences**

Hypothesis 2, which posited that viewers with little previous knowledge about memory loss would attain knowledge test scores similar to those reporting a great deal of knowledge, was also supported. This hypothesis involves two questions: whether self-assessed knowledge of normal forgetfulness is related to knowledge test scores among controls, and whether this relationship is different between controls and intervention group participants.

The distribution of knowledge scores according to self-reported prior knowledge is shown in Table 2. Among control participants, who did not view the CD-ROM, increasing self-assessed knowledge of normal forgetfulness was related to knowledge test scores among controls, and whether this relationship is different between controls and intervention group participants.

Results suggest a linear increase in the number correct with increasing prior knowledge. However, the same was not true among participants in the intervention group, where there was essentially no relationship between self-assessed prior knowledge and the number of correct responses on the knowledge test.

**Program Satisfaction**

As indicated in Table 3, the vast majority of viewers were satisfied with the program, regardless of their level of pre-existing knowledge, and this supports hypothesis 3.

### Table 3

Relative Frequency Distribution (%) of Cross-classification of Overall Satisfaction with CD-ROM and Pre-intervention Self-assessed Knowledge about Normal Forgetfulness, for Intervention Group Only (n = 56)

<table>
<thead>
<tr>
<th>Knowledge about Normal Forgetfulness (before Intervention)</th>
<th>Very Satisfied</th>
<th>Somewhat Satisfied</th>
<th>Neither</th>
<th>Somewhat Dissatisfied</th>
<th>Very Dissatisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>A great deal (n = 5)</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>A moderate amount (n = 33)</td>
<td>36</td>
<td>16</td>
<td>2</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Something (n = 10)</td>
<td>12</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Very little (n = 5)</td>
<td>7</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Don’t know (n = 3)</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Over 80 percent of users reported feeling very relaxed using the program, and all but one person reported not being embarrassed by using it. When asked to evaluate the mechanics of using the CD-ROM, over 80 percent of users reported that it was very easy to use and that they did not need assistance. Eighty percent of users also reported that they could view the screen and read the words very easily; most said that they understood the material and that the differences between normal forgetfulness and more serious memory loss problems were explained very well. The few negative impressions reported were related primarily to the mechanics of the program; despite our adjustments, six people (10.8 percent) found the mouse difficult to use, and two people (3.6 percent) found some parts of the program hard to hear.

Contact with Clinicians

The extent to which viewers followed program recommendations about making or not making contact with clinicians was explored. The family assessment tool was completed by 44 intervention participants (79 percent), of whom 27 (61 percent) received affirmation that their family member was not currently experiencing serious memory loss and 17 (39 percent) received a recommendation for further evaluation. The rate of clinician contacts among all 44 participants completing the assessment was 16 percent. Among the 27 participants who received affirmation of no serious memory loss, 3 (11 percent) made clinician contacts, compared with the 17 participants who received a recommendation for evaluation, of whom 4 (24 percent) made clinician contacts.

Discussion

The findings indicate that the CD-ROM program on the differences between normal forgetfulness and more serious memory loss exerted very large effects. This is particularly impressive since the effects occurred after participants only viewed the 31-min module, “Forgetfulness: What’s Normal and What’s Not,” the first in the five-module program. After the testing, many users went on to view additional modules, and it is plausible that we are underestimating additional learning effects. Regardless, the effectiveness of the single forgetfulness module is an important finding, because it supports the use of this multimedia CD-ROM format as a very efficient and practical means to transmit knowledge to the public.

It was anticipated that viewers who already had a great deal of knowledge about memory loss would be at a ceiling level; that is, they would have little or no room for improvement given the basic content of both the program and the knowledge test. Alternatively, those who reported little previous knowledge would have more potential to acquire new knowledge. Our findings support this premise and suggest that low self-reported knowledge about memory loss and forgetfulness can be used to target the intervention to the subgroup that will benefit most from its effects.

Participants were very satisfied with the program, and they found it easy to use even if they had no prior computer experience. The majority of participants (85 percent) reported having easy access to a computer and positive attitudes toward using computers and, notably, our users were predominately female and over age 65 years. Our results counter concerns of critics who believe that older adults, and women in particular, do not readily adopt new technologies. This substantiates our prior research findings that older adults will learn to use technology if it is personally relevant to them.17 Users reported that they liked the program content and that the medium helped them better understand memory issues, a finding that might be attributed to our accounting for the learning style preferences of older adults and designing the program to be geriatric-user friendly.32,33 Viewers preferred seeing the interactive multimedia features (video clips and side-by-side visual comparisons) rather than reading text materials.

Selective use of the interactive multimedia features to demonstrate the key memory loss symptoms emerged as a critical component. As one participant commented, “I had read about the symptoms of Alzheimer’s disease, but I never really understood the degree to which a behavior became abnormal until I saw the comparisons.” Another participant mentioned how telling it was to “see the personality changes” associated with Alzheimer’s disease, because he had assumed they were “an expected part of aging.” As Table 3 indicates, those participants who reported limited knowledge about Alzheimer’s disease were much more likely to be satisfied, presumably because they were learning new material. Unexpectedly, those with a great deal of knowledge about memory loss also were very satisfied, which may be because they received affirmation of their beliefs.

The exploratory analysis of participant contacts with clinicians, seeking further information and advice, showed a lower rate of clinician contacts (11 percent) among participants who received confirmation of no serious memory loss and a higher rate (24 percent) of
clinician contacts among participants who received a recommendation for evaluation. This suggests a differential effect, depressing contacts when not recommended and promoting more contacts when appropriate. These findings are tentative, however, given the small number of participants who received an evaluation referral.

The research was powered only to identify the main effect of the knowledge test, an anticipated limitation of the study. Now that there is evidence of the program’s effectiveness on the knowledge outcome, future research is needed to specifically address the behavioral action outcomes, using a much larger sample to determine whether there is a program referral effect. In addition, future research should consider including periodic reinforcement opportunities to increase the likelihood of behavioral follow-up actions, such as referral follow-up, as suggested by the final stage of the cognitive-behavioral model.19

There was an intense interest by the public in both the topic of memory loss and the use of our computer-based program to obtain the information. Many people who responded to our recruitment efforts did so because they were interested in assessing themselves for signs of serious memory loss. Several commented that they did not feel comfortable discussing their personal memory loss concerns with family members or professionals for fear of being ridiculed or, worse, treated as incompetent. We found that persons struggling with the tensions and ambiguities of memory loss in a family member or in themselves particularly liked the confidential and self-screening nature of our computer-based program.

Other technology intervention researchers have reported that many people are less embarrassed and more self-disclosing of sensitive topic areas when they interact with a computer rather than a person.34,35 Similarly, our users highly valued having access to credible information delivered in the privacy of their homes with the ability to do the screening themselves.

Some researchers point to the problem of self-awareness as a serious limitation to the usefulness of self-assessment for memory-impaired patients.15,36 Mundt et al.,37 however, showed the feasibility of conducting either informant or self-assessment using a computer-automated telephone screening for early dementia. Findings from our study suggest that there is an audience interested in self- and referent assessment for cognitive impairment and that this remains an important area for further research and development.

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