

Worksite-Based Internet Multimedia Program for Family Caregivers of Persons With Dementia

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Purpose: Our goal was to evaluate the efficacy of a multimedia support program delivered over the Internet to employed family caregivers of persons with dementia. **Design and Methods:** The evaluation of this program involved 299 employed family caregivers participating in a pretest–posttest randomized clinical trial with a 30-day follow-up and a waitlist control condition. Validated instruments include the Center for Epidemiologic Studies–Depression scale, the State–Trait Anxiety Inventory, the Caregiver Strain scale from Benjamin Rose, and Positive Aspects of Caregiving used in the nationwide REACH study. **Results:** Those who viewed *Caregiver’s Friend: Dealing with Dementia* 30 days postexposure demonstrated significant improvements in depression, anxiety, level and frequency of stress, caregiver strain, self-efficacy, and intention to seek help, as well as perceptions of positive aspects of caregiving. **Implications:** Interactive multimedia interventions delivered over the Internet appear to be uniquely suited to provide low-cost, effective, conve-

nient, individually tailored programs that present educational information, cognitive and behavioral skills, and affective learning opportunities. This makes Web-based multimedia a promising avenue for work–life balance programs, employee-assistance providers, and organizations interested in improving family caregiver health and well-being.

Key Words: EAP, Work–Life balance, Elder care, Depression, Internet, Caregiver, Multimedia, Coping

As more employers recognize the strain that family caregiving poses for their employees, management will increasingly be looking for cost-effective ways to alleviate this threat to productivity. Our purpose in this study was to test the efficacy of an interactive multimedia program designed to support family caregivers who also work outside the home. Because relatives caring for a person with dementia exhibit the greatest incidence of depression, strain, and anxiety (Ory, Yee, Tennstedt, & Schulz, 2000; Pinquart & Sörensen, 2003; Schulz, O’Brien, Bookwala, & Fleissner, 1995), the intervention focused on this subpopulation of caregivers.

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Theoretical Foundation

The Stress and Coping model by Lazarus and Folkman (1984) served as our theoretical basis for the development and evaluation of this multimedia worksite intervention, with revisions based on Folkman’s recent work (2001). In this model, individuals faced with a stressor make two appraisals, referred to as the primary and secondary appraisal. The primary appraisal involves an assessment of how stressful or threatening the situation is. The secondary appraisal involves the individual’s assessment of his or her ability to cope, including an assessment of personal and physical resources. The individual’s

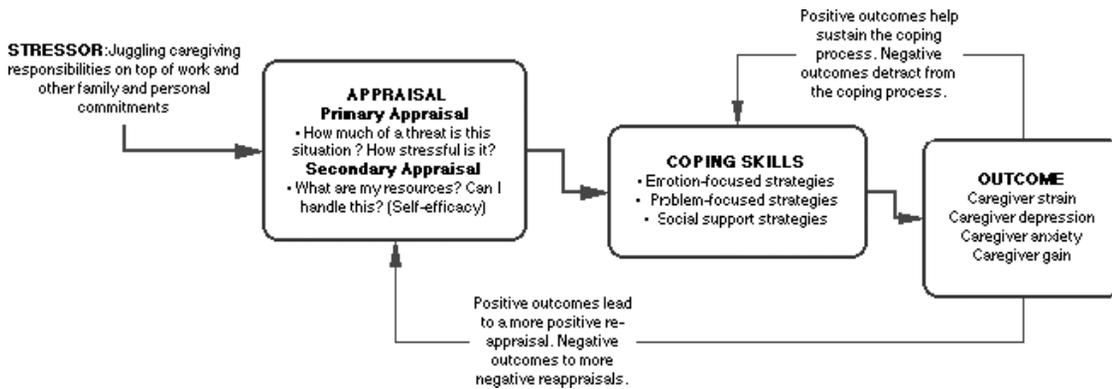


Figure 1. Stress and Coping Model applied to employed family caregivers, with Folkman's revisions.

subjective conclusion regarding ability to cope with the situation—the secondary appraisal—is often equated to Bandura's (1977) concept of self-efficacy.

Once an individual has appraised the situation, he or she then employs his or her coping skills. These coping skills can include emotion-focused approaches (e.g., avoidance, magical thinking), problem-focused strategies (changing behaviors), and utilization of social support systems. According to the Stress and Coping model (Lazarus & Folkman, 1984), the application of coping skills results in an outcome that impacts new appraisals, sparks new applications of skills, and so on. Coping is not a static event, therefore, but rather a process that unfolds in a cyclic pattern: The outcome influences future appraisals, which then influence the new application of coping skills, which in turn result in a new outcome.

By and large, caregiver studies have focused on the negative outcomes of depression, strain, and anxiety (Pinquart & Sörensen, 2003). Folkman's recent work (2001) has revealed that caregiving also generates simultaneous perceptions of reward or gain that can positively influence appraisals and coping skills much the way negative outcomes contribute to subjective burden and poor coping adaptations (see Figure 1).

Existing Interventions

Over the past two decades, many interventions have been developed to assist family caregivers. Reviews of dementia caregiver interventions from 1982 to 2000 (Bourgeois, Schulz, & Burgio, 1996; Kennet, Burgio & Schulz, 2000) note that the Lazarus-Folkman model has commonly been used as the theoretical foundation. The most effective interventions have multiple components, addressing two or more of the following: knowledge (generally about dementia itself and available community resources), affect (e.g., management of the caregiver's emotions), cognitive skills (e.g., problem solving), and behavioral skills (e.g., communication skills, home modifications, ability to access social support).

Successful interventions tended to be tailored to the needs of the individual and involved the option of repeat visits, providing access or exposure over an extended time span. Although many interventions have documented improvements in their targeted domain (e.g., education, problem solving), they have not as a rule been able to generalize to alleviating depression or anxiety.

Interactive Video, the Internet, and Multicomponent Delivery.—Interactive video programs have the ability to consistently deliver knowledge, demonstrations of cognitive and behavioral skills, and affective learning. In particular, the use of video modeling appears to address affective learning and promote behavioral change through the application of concepts from social learning theory (Bandura, 1997). Within the context of the Stress and Coping model, interactive video has the potential to greatly impact self-efficacy—the secondary appraisal—of the caregiver and therefore lead to more positive outcomes.

Individual Tailoring.—Multimedia programs also offer a promising and relatively inexpensive method of individualizing content to maximize relevance and impact (Kreuter, Farrell, Olevitch, & Brennan, 2000). Onscreen surveys can guide the computer algorithms to present only those items pertinent to the individual's situation, thereby saving time and increasing efficacy.

Exposure Over Time.—With Internet delivery, an interactive intervention can be accessed 24 hr a day, 7 days a week, addressing issues specific to the individual on an *as-needed* basis, without the cost or inconvenience of attending a class, individual counseling, or a support group. Internet access is more widespread than is commonly realized. As of January 2005 (Pew Internet and American Life Project, 2005), 66% of American adults reported going online, even those thought to have limited access: 54% of high school graduates, 63% of persons aged 50–64, 51% of African Americans, and 63% of Hispanics.

In terms of the optimal setting for repeated exposure to caregiving interventions, Lechner and Gupta (1996) recommend the worksite. With 61% of dementia family caregivers employed outside the home (Ory et al., 2000), the worksite is indeed an ideal venue.

Elder Care and the Worksite

Employee elder care duties cost U.S. businesses over \$29 billion per year in lost productivity caused by absenteeism, daily interruptions, and staff turnover (Metropolitan Life Insurance Company, 1997). As a consequence, an increasing number of employers are recognizing the need to offer elder care support. A Hewitt Associates (2001) survey of 1,020 major U.S. employers revealed that 49% offered their employees some form of elder care benefit. Acknowledging the convenience and ever-increasing accessibility of the World Wide Web, many worksites are turning to the Internet as a practicable means of dissemination for employee support programs (Raber, 1999).

The Research Questions

Our goal in this study was to create a multimedia Internet intervention to offer ongoing worksite support to employed family caregivers of persons with dementia. Using the revised Stress and Coping model (Folkman, 2001), we asked these questions: Can exposure to the program (a) improve caregiver appraisals? (b) increase the use of constructive coping skills? (c) reduce the negative outcomes of depression, anxiety, and strain? (d) increase positive perceptions of caregiving (caregiver gain)?

Methods

Intervention

Caregiver's Friend: Dealing With Dementia is a Web-based multimedia intervention that provides text material and videos that model positive caregiving strategies. Funded by the National Institute on Aging, program content was created for this project by research scientists and instructional designers on the basis of an extensive literature review; interviews with academic gerontologists, social workers, nurses; and focus groups with an ethnically and geographically diverse range of family caregivers (see Table 1).

Individualized Tailoring.—To personalize the program, viewers are invited to click on *Guide Me*, a questionnaire concerning the individual's particular situation. The result is a list of links within the program tailored to that viewer's specific concerns and the care receiver's level of dementia. Tailored input also is available through the use of questions inserted at the beginning of pertinent sections. For

Table 1. Composition of Focus Groups

Demographic	Gender	Number	City
African American	Male	9	Oakland, CA
African American	Female	13	Washington, DC
Caucasian	Male	7	Portland, OR
Caucasian	Female	10	San Diego, CA
Hispanic	Male	10	San Diego, CA
Hispanic	Female	11	Tampa, FL

instance, viewers who click on *Changing roles* are asked to select their relationship to the care recipient. Spousal caregivers receive information on finances, socializing, and losing a companion, whereas adult children are offered information on losing a parent, long-distance caregiving, and helping the parent's spouse.

Multiple Components.—The components of knowledge, cognitive, and behavioral skills, and affective learning are presented across three modules developed from formative data: Being a Caregiver, Coping With Emotions, and Common Difficulties. The coping strategies presented in all three modules emphasize problem-focused techniques and social support skills.

Being a Caregiver.—This module focuses on educating the caregiver about common caregiving issues. Through video testimonials, viewers learn about the challenges and rewards of caregiving, and they receive tips for juggling home and work responsibilities. Upon request, the viewer can receive a personalized report that describes common pressures experienced by families, depending on the level of cognitive impairment, how long the viewer has been providing care, and where the care receiver is in the trajectory of the illness (prediagnostic, diagnostic, chronic, or terminal stage). Cognitive and behavioral skills are addressed by means of dramatizations of communication skills, and a section of video testimonials on managing stress assists with affective learning.

Coping With Emotions.—This module focuses exclusively on affective issues, with video testimonials of caregivers discussing cognitive and behavioral strategies that have helped them deal with common emotions such as guilt, anger, grief, resentment, fear, anxiety, and helplessness.

Common Difficulties.—This module addresses common concerns and is tailored by the severity of dementia. For instance, a caregiver for someone in the early stages of dementia is presented with suggestions on topics such as disclosure, or how to maximize the ability to function independently. A viewer coping with the later phases is presented with

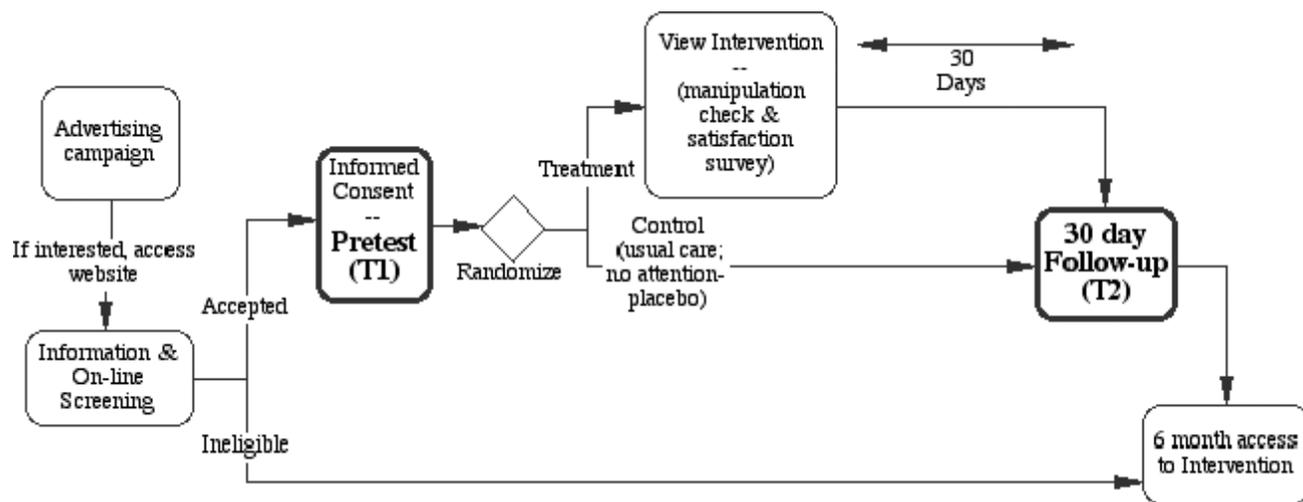


Figure 2. Research design.

strategies and dramatizations on handling difficult behaviors such as aggression, paranoia, anxiety, and flat affect.

Design

Procedure.—We recruited participants through a national campaign that included wire service advertising, contact notices on corporate Web sites, e-mail announcements on caregiver-related listserves, newsletter articles, and worksite promotional flyers. Interested persons were directed to a Web site that described the study and provided an online screening survey (see Figure 2).

To allow for the broadest representation of caregivers in the workforce, we required participants to be employed at least part time and have at least four contacts a month caring for a family member with substantial memory problems. (We determined level of memory loss by the caregiver's report of three out of five symptoms based on the Early Identification Tool 2 Family Questionnaire, National Chronic Care Consortium & the Alzheimer's Association, 1998). Because subjective rather than objective burden is the pivotal factor in caregiver distress (Zarit, Todd & Zarit, 1986), there were no sampling criteria related to specific caregiving tasks. Participants simply needed to have regular contact and report experiencing stress as a result of their caregiving role.

We invited those who did not fit the criteria to provide their contact information to be notified when the program would be available for open viewing after the study was over. Individuals who qualified for the study completed an on-screen informed consent and then an online pretest (T1) survey. Upon completion of the pretest, participants were mailed a \$20 check. We randomly assigned them to either the Web-based caregiver intervention (the treatment group) or to a usual care waitlist control group with no attention-placebo.

We informed participants in the control condition by e-mail that they would receive an e-mail in 30 days inviting them to answer another set of questions (the 30-day, T2 follow-up), at which time they would be free to view *Caregiver's Friend*. We sent those in the treatment group an e-mail message asking them to schedule an initial viewing and inviting them to partake of the intervention repeatedly, at their convenience, throughout the course of the next 30 days. The day before their scheduled first visit, we sent treatment participants an e-mail reminding them of the program. We then sent those who did not log on for that first visit an additional e-mail asking them to reschedule.

Following their first viewing of *Caregiver's Friend*, the treatment group completed an immediate manipulation check survey including only the self-efficacy and intention questions—the two out of eight constructs that could change immediately following the manipulation or intervention—and a six-question satisfaction survey. Thirty days later, we asked the treatment group, like the control group, to complete a full follow-up assessment (T2). Upon completion of T2, we sent each participant \$30 and gave him or her open access to the program. At the conclusion of the study, we sent a notice to those who had been initially screened out, inviting them to use *Caregiver's Friend*. All of the comparison measures analyzed and discussed in this article relate to the T1 baseline and T2 30-day follow-up results.

Measures

We examined several possible consequences of the intervention, based primarily on the Stress and Coping model (Lazarus & Folkman, 1984) with revisions by Folkman (2001; see Figure 1). We also used the theory of reasoned action (Ajzen & Fishbein, 1980) and the Transactional Model of Behavior Change (Prochaska & DiClemente, 1983). The broad

theoretical foundation of this evaluation resulted in an ambitious set of measures. We placed a high priority on keeping the number of questions to a minimum so as not to overburden already burdened caregivers. In an effort to keep the number of questions manageable, therefore, if an instrument had subscales that addressed topics *not* covered in the intervention, we excluded those subscales. Additionally, we targeted self-efficacy and intention measures specifically toward caregiving behaviors emphasized in the program. We included the following instruments in the online surveys.

Stress (Primary Appraisal).—Given the additional outcome measures of depression, anxiety, and strain, in the spirit of parsimony, we used only two initial screening questions: “In the past four weeks, how often have you felt stressed by your caregiving activities?” (4-point scale from never to regularly) and “When that happened, how stressed did you usually feel?” (7-point scale from not at all stressed to extremely stressed). The two items were highly correlated ($r = .74$). To arrive at a measurement of stress that reflected both its intensity and incidence, we created a Frequency \times Intensity cross-product score for the outcome analysis.

Self-Efficacy (Secondary Appraisal).—We asked six self-efficacy questions regarding areas of caregiving that were emphasized in the intervention: confidence to do a good job caring for their care recipient; to juggle their many roles; to deal with the stress of caregiving; to make a plan to address a problem with their care recipient; to resolve any problems with their care recipient; and to turn to their family for help. Participants responded on a 7-point Likert scale from 1 (not at all confident) to 7 (extremely confident; $\alpha = 0.85$).

Coping Skills.—We used two specific subscales of the Revised Ways of Coping (Vitaliano, Russo, Carr, Maiuro, & Becker, 1985): problem-focused strategies (15 items; $\alpha = 0.83$) and social support (6 items; $\alpha = 0.81$). The former dealt with active behavioral and cognitive strategies, such as “I made a plan of action and followed it” and “I accepted my strong feelings but didn’t let them interfere with other things too much.” The latter subscale focused on formal and informal support mechanisms, such as talking to others, consulting a professional, and other means. (Because the intervention did not address emotion-focused ways of coping—e.g., magical thinking—participants were spared having to answer this subscale.) Responses to the Ways of Coping instrument assessed the perceived frequency of using these strategies over the previous 4 weeks, and we scored them on a 4-point Likert scale from 1 (never used) to 4 (regularly used).

In addition to the development of coping skills, increased intention is an important precursor and

measure of progress toward behavioral change (Ajzen & Fishbein, 1980; Prochaska & DiClemente, 1983). As a consequence, we measured intention to get support—a crucial behavior for working caregivers—by looking at five possible sources: family, friends, the medical system, the social service system, and long-term-care facilities (five items; $\alpha = 0.65$).

Outcomes.—The outcomes of interest were caregiver strain, caregiver gain, depression, and anxiety. To measure caregiver strain, we used three subscales from the Caregiver Strain Instrument developed by the Benjamin Rose Research Institute (Bass, McClen-don, Flatley-Brennan, & McCarthy, 1998). Fourteen self-report questions ($\alpha = 0.84$) began with the stem “During the past 4 weeks, because of helping the patient, I felt . . .” Responses included items that assessed caregiver health, relationship strain, and mastery of skills, and we scored items on a 5-point Likert scale, with answers ranging from 5 (strongly agree) to 0 (strongly disagree). We did not include the subscale on leisure time, as this topic was not specifically addressed in the intervention.

We used the Positive Aspects of Caregiving survey (nine items; $\alpha = 0.91$; see Tarlow et al., 2004) to measure caregiver gain. This instrument employed a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree).

We assessed depression by using a total of nine items ($\alpha = 0.83$): eight items were from the Center for Epidemiologic Studies–Depression (CES-D) scale (Radloff, 1977), and a single item assessing suicidal ideation was based on the CES-D scale format (Lewinsohn, Rohde, & Seeley, 1996). Although there are many short forms of the CES-D measure, we chose these eight items as they match eight of the nine symptoms for major depression listed in the fourth edition of the American Psychiatric Association’s *Diagnostic and Statistical Manual of Mental Disorders*. We added the ninth item on suicidal ideation as it completed this content validity approach. The stem of the questions asked participants to rate how often on a 4-point Likert scale they had particular feelings in the past week. We scored items from 3 (most or all the time) to 0 (rarely or none of the time).

We measured state anxiety by using the 10-item subscale of the State–Trait Anxiety Inventory. ($\alpha = 0.76$; Spielberger, Gorsuch, & Lushene, 1970). Participants were asked to rate how they feel “right now” by using a 4-point Likert scale, from 3 (very much so) to 0 (not at all). We did not use the Trait subscale as the intervention would not change trait anxiety, and because the large sample size and randomization addressed any existing participant variations in this domain.

Satisfaction Survey.—Immediately after their first program use, an online survey asked participants in the treatment group to respond to six questions

Table 2. Results From the Repeated Measures ANOVAs

Variable	Treatment		Control		Condition × Time Effect		
	Pre <i>M</i> (<i>SD</i>)	Post <i>M</i> (<i>SD</i>)	Pre <i>M</i> (<i>SD</i>)	Post <i>M</i> (<i>SD</i>)	<i>F</i>	<i>p</i>	η^{2a}
Stress	14.2 (7.7)	10.8 (6.2)	12.3 (7.0)	11.6 (6.4)	15.19	<.001	.05
Self-efficacy	23.2 (7.9)	25.7 (7.4)	22.7 (7.9)	23.5 (8.1)	5.87	.016	.02
Intention to get support	15.6 (6.2)	17.4 (6.6)	15.7 (6.4)	15.7 (6.9)	9.76	.002	.03
Ways of coping	66.5 (11.1)	67.5 (11.6)	65.3 (11.6)	66.3 (10.5)	0.01	.971	.00
Caregiver strain	41.2 (10.3)	39.1 (9.5)	39.8 (9.7)	39.9 (9.7)	4.90	.028	.02
Caregiver gain	30.9 (7.0)	32.6 (7.1)	30.8 (6.7)	30.9 (6.7)	5.35	.021	.02
Depressive symptoms	16.8 (11.3)	15.4 (9.7)	15.4 (10.9)	16.4 (11.2)	6.83	.009	.02
State anxiety	15.6 (5.8)	14.7 (5.6)	14.7 (6.4)	15.6 (6.4)	4.78	.030	.02

^aEffect size (η^2 values) per Cohen (1988): small = .01; medium = .06; large = .14.

regarding the intervention. The first five included 7-point Likert-scale questions about overall satisfaction with the program, usefulness of the information, how enjoyable it was, ease of use, and how likely they would recommend the program to a friend. In the Satisfaction Survey, ratings ranged from 1 (not at all satisfied, useful, enjoyable . . .) to 7 (extremely satisfied, useful, enjoyable . . .). The last question was qualitative in nature and asked respondents to type in a text field what they felt could be done to improve the program.

Results

Participants

Of those individuals who were interested in the study and completed the initial screening questionnaire, 329 were eligible to participate. Of these, 307 participated through the T2 30-day follow-up assessment. The results subsequently presented here are based on 299 participants (150 treatment and 149 waitlist control) who had complete data on all of the measures at the pretest (T1) and the 30-day follow up (T2). Comparisons between those who dropped out and those who completed the study yielded no significant differences on demographic characteristics and baseline measures. Thus, there were no apparent biases that were due to attrition.

Seventy-three percent of the participants were female, and their mean age was 46.9 years ($SD = 12.2$; range = 19.2–84.3), almost identical to the nationwide NAC/AARP study (National Alliance for Caregiving and the American Association of Retired Persons, 1997) in which 73% of caregivers of older adults were female and averaged 46 years of age. Eighty percent of evaluation participants were Caucasian, 4% African American, 8% Hispanic, and 8% other. Ninety percent had completed at least some college or trade school. Thirty-three percent of these caregivers had primary responsibility for their care recipient, 27% shared primary responsibility, and 40% did not have primary responsibility. They cared for a parent (67%), a spouse or partner (7%), some other relative (23%), or a nonrelative (3%).

There were no significant differences between the treatment and control participants on any of these variables.

Program Usage

A total of 150 treatment participants visited *Caregiver's Friend* during a 30-day interval, including 59% who visited once and 41% who visited more than once (19% twice, 11% three times, and 11% four or more times). The mean total time spent using the program summed across all visits was 32.2 min ($SD = 43.5$; range = 1–368).

Baseline Differences

We ran a multivariate analysis of variance model to compare the two conditions on the eight outcome measures at baseline as a means to examine group equivalency. The multivariate test was nonsignificant at $F(8, 294) = 0.96$, $p = .467$, indicating no overall differences between the two conditions. However, univariate tests revealed a significant difference between conditions on one of the eight measures, caregiver stress, at $F(1, 301) = 5.09$, $p = .025$.

Pretest–Posttest Change

To test for change after 30 days in the eight dependent measures between the two conditions, we conducted a double multivariate repeated measures analysis of variance (i.e., 8 measures × 2 time measurements × 2 conditions). The multivariate Condition × Time effect was significant, $F(8, 290) = 4.25$, $p < .001$, $\eta^2 = 0.11$ (moderately large effect size; Cohen, 1988). At the 30-day follow-up (T2), the two conditions differed significantly from each other with respect to change across the dependent measures. To further interpret this multivariate effect, we examined univariate repeated measures analyses of variance for each of the dependent measures (see Table 2). As one can see, we obtained significant Condition × Time effects in the hypothesized direction for seven of the eight measures, with

small-to-moderate effect sizes (Cohen; see far right column in Table 2).

Compared with the control group, treatment participants reported significantly greater gains with respect to the measures of self-efficacy, intention to get support, and caregiver gain. In addition, the treatment participants reported significantly greater reductions in caregiver stress, caregiver strain, depressive symptomatology, and state anxiety compared with the control participants. The only scale that did not differ with respect to pretest–posttest change across conditions was the Ways of Coping scale, which measured self-reported frequency of employing specific stress-reduction strategies. Because several of the outcomes were significantly intercorrelated (gain-score mean, $r = .17$; range, $r = -.04$ – $.49$; Cronbach's $\alpha = 0.60$), we conducted Roy-Bargman stepdown F tests in order to identify which of the outcomes had significant Condition \times Time effects that were independent of each other. We found caregiver stress, stepdown $F(1, 297) = 15.19$, $p < .001$, and intentions to get support, stepdown $F(1, 297) = 7.97$, $p = .005$, to have significant independent Condition \times Time effects.

Because the two conditions differed significantly on caregiver stress at baseline, we also used an analysis of covariance to examine group differences at posttest, adjusting for baseline level. In a manner consistent with the repeated measures analysis of variance results, we found that, controlling for baseline level, $F(1, 289) = 9.87$, $p = .002$, the two conditions differed significantly on caregiver stress at posttest.

Dose-Response Analysis

We conducted a dose-response analysis to examine whether the length of exposure to the program (time spent across all sessions) was significantly associated with change in the outcome measures across the 30-day trial period for the participants assigned to the treatment condition. We created a composite outcome measure by calculating pretest–posttest gain scores for each of the eight measures, standardizing each gain score, and computing the mean value of the standardized gain scores. The correlation between total time spent in the program and the composite gain score was significant at $r = .30$, $p < .001$. Thus, more time spent viewing the program was associated with significantly greater change in outcome, which provides further support for the internal validity of the study. There were no significant differences in outcomes between those who viewed the program only once and those who returned for subsequent visits.

Program Manipulation Check and Viewer Satisfaction

Because the control group did not complete this interim assessment, we conducted a within-subjects

comparison on the outcome measures of caregiver self-efficacy and intentions to get support. We designed this manipulation check to evaluate the extent to which the intervention affected the two constructs that could demonstrate an immediate response. We obtained a significant effect for immediate change in intentions to get support [$F(1, 93) = 21.15$, $p < .001$]; however, immediate change in caregiver self-efficacy was not significant [$F(1, 93) = 0.75$, $p = .389$]. As noted in Table 2, caregiver self-efficacy was significantly improved by the 30-day assessment.

We obtained favorable ratings on each of the consumer satisfaction items. On average, treatment participants indicated that they were quite satisfied with the program ($M = 5.1$; $SD = 1.2$); found the information to be quite useful ($M = 5.0$, $SD = 1.3$); indicated that the program was quite enjoyable ($M = 4.6$; $SD = 1.3$); found the program to be very easy to use ($M = 5.8$; $SD = 1.3$); and reported that they would be very likely to recommend the program to others ($M = 5.6$; $SD = 1.4$). The overwhelming majority of qualitative comments were positive in nature. Many respondents likened the program to a support group but acknowledged the greater convenience of Internet delivery.

Discussion

With an average exposure of only 32 min to the program, of the eight outcome measures examined, seven yielded significantly positive results a full month after viewing the intervention. Exposure to *Caregiver's Friend* significantly improved caregiver appraisals and reduced depression, anxiety, and strain, while increasing the perception of caregiver gain, although the frequency of employing coping skills did not appear to be impacted significantly. When the outcomes were taken together, their effect size represented a moderately large amount of improvement.

Unlike most interventions in the past two decades (Bourgeois et al., 1996; Kennet et al., 2000), *Caregiver's Friend* has demonstrated the ability to significantly affect depression and state anxiety, as well as strain and gain. One explanation of the success of the program may be the nature of its delivery—an interactive multimedia program presenting materials tailored to the needs of the viewer—as well as the ability of the worksite setting and Internet format to support easy as-needed access. Additionally, this caregiver intervention may owe its efficacy to the fact that it targets the multiple components observed to be highly effective in previous interventions: knowledge, cognitive and behavioral skills, and affective learning.

Beyond the outcomes, *Caregiver's Friend* also significantly and positively affected participants' appraisal of their situation. Those who viewed the

program experienced reduced intensity and frequency of stress (primary appraisal) over time. They became more confident—reported increased self-efficacy—in their ability to handle many of the demands of caregiving. They also expressed a significantly greater intention to access help from others.

The data from the evaluation indicate no significant improvements in the participants' frequency of employing specific coping skills. In their research, Ptacek, Smith, Espe, and Rafferty (1994) indicate that a lack of demonstrable change may be a measurement problem, suggesting stressors in the moment often confound answers regarding the incidence of employing coping strategies over an extended period of time. Rather than ask for self-reports based on recall over a period of days or weeks, Stone, Kennedy-Moore, and Neale (1995) recommend a daily log, with some triangulation based on observations by persons close to the participant. Given the problems of a 4-week recall interval, it may be that viewers of *Caregiver's Friend* were not accurately recalling their deployment of coping strategies.

An important finding in this study is that significant results were achieved with only 32 min total exposure, which represents a quite minimal intervention. Meta-analyses of existing interventions suggest that high dosage—in the form of repeated, ongoing access—is correlated with positive impact. When we measured dosage of the present intervention in terms of total time exposed—rather than number of visits as expected—more time viewing *Caregiver's Friend* was significantly associated with greater outcomes.

Randomized assignment reduces the likelihood of initial disparity between the two sample groups. One possible explanation for these effects is that the treatment group may have gone on to visit other Web sites or seek resources outside the intervention. If so, such extended help-seeking behavior can reasonably be viewed as a positive consequence of exposure to the intervention. The treatment participants did have exposure to the manipulation check and satisfaction survey, whereas the controls did not. Because this included an assessment of only two of the eight constructs, a multiple test effect offers a possible, but probably limited, explanation. As with any randomized evaluation in which the control group lacks an attention-placebo, there is the potential for a halo effect. Because treatment condition respondents received some additional e-mail contact, we cannot rule out differences caused by participant expectancies or attention received.

If we assume that there are no significant threats to validity, however, one explanation may be an incomplete understanding of the mechanism of dosage. Amount of exposure may be a more complicated factor than it appears. For instance, with a different multimedia intervention also averaging a surprisingly similar amount of exposure (32 min), a randomized control trial of a CD-ROM focusing

solely on knowledge demonstrated a large effect size and significant differences between treatment and control conditions (Mahoney, Tarlow, Jones, & Sandaire, 2002). In another randomized control study—despite a relatively low-intensity exposure (average of only 55 min over a 4-month period)—users of an automated, telephonic support system who entered the evaluation with low to middle levels of caregiver mastery demonstrated significant improvements (Mahoney, Tarlow & Jones, 2003). An analysis of comments from a subset of the treatment group who did not use the automated intervention revealed that these nonusers perceived value from the program in terms of a greater sense of comfort and security, knowing it was available around the clock. They simply had no pressing need to use it during the course of the study.

Perhaps a similar mechanism is involved with the success of the worksite Internet intervention evaluated in this article: Increases in self-efficacy (secondary appraisal) may have resulted not solely as a function of the amount of time viewers were exposed to the intervention, but also by the simple knowledge that there was easy, ongoing access to resources should they be needed. The time efficiency of such light touch, technological interventions makes them worthy of future research.

Although the mechanism of dosage and the measurement of coping efforts have yet to be fully resolved, what we do know is that the consequences of viewing *Caregiver's Friend* were positive. Viewers experienced a significant reduction in depressive symptoms, in caregiver strain, and in state anxiety, while simultaneously experiencing an increase in positive perceptions of caregiving. As predicted by the revised Stress and Coping model (Folkman, 2001), they also appeared to experience improved appraisals of their situation in the form of increased self-efficacy and reduced stress.

Implications for Practice

Interactive multimedia interventions delivered over the Internet appear to be uniquely suited to provide low-cost, effective, convenient, individually tailored programs that present educational information, cognitive and behavioral skills, and affective learning opportunities. This makes Web-based multimedia a promising tool for work-life balance programs, employee-assistance providers, and organizations interested in improving family caregiver health and well-being.

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