

Featured Articles

## Web-enabled conversational interactions as a method to improve cognitive functions: Results of a 6-week randomized controlled trial

Hiroko H. Dodge<sup>a,b,c,\*</sup>, Jian Zhu<sup>d</sup>, Nora C. Mattek<sup>a,b</sup>, Molly Bowman<sup>a,b</sup>, Oscar Ybarra<sup>e</sup>, Katherine V. Wild<sup>a,b</sup>, David A. Loewenstein<sup>f</sup>, Jeffrey A. Kaye<sup>a,b,g</sup>

<sup>a</sup>Department of Neurology, Layton Aging and Alzheimer's Disease Center, Oregon Health & Science University, Portland, OR

<sup>b</sup>Oregon Center for Aging and Technology (ORCATECH), Oregon Health & Science University, Portland, OR

<sup>c</sup>Department of Neurology, Michigan Alzheimer's Disease Center, University of Michigan, Ann Arbor, MI

<sup>d</sup>Department of Biostatistics, University of Michigan, Ann Arbor, MI

<sup>e</sup>Department of Psychology, University of Michigan, Ann Arbor, MI

<sup>f</sup>Department of Psychiatry and Behavioral Sciences and Center on Aging, University of Miami, Miller School of Medicine, Miami, FL

<sup>g</sup>Portland Veterans Affairs Medical Center, Portland, OR

### Abstract

**Introduction:** Increasing social interaction could be a promising intervention for improving cognitive function. We examined the feasibility of a randomized controlled trial to assess whether conversation-based cognitive stimulation through personal computers, webcams, and a user-friendly interactive Internet interface had high adherence and a positive effect on cognitive function among older adults without dementia.

**Methods:** Daily 30-minute face-to-face communications were conducted during a 6-week trial period in the intervention group. The control group received only a weekly telephone interview. The cognitive status of normal subjects and those with mild cognitive impairment was operationally defined as a global clinical dementia rating of 0 and 0.5, respectively. Age, sex, education, mini mental state examination score, and clinical dementia rating score were balancing factors in randomization. The subjects were recruited using mass-mailing invitations. The pre- to postintervention differences in the cognitive test scores and loneliness scores were compared between the control and intervention groups using linear regression models.

**Results:** Eighty-three subjects participated (41 in the intervention group and 42 in the control group). Their mean  $\pm$  standard deviation age was  $80.5 \pm 6.8$  years. Adherence to the protocol was high. There was no dropout and mean percentage of days completed of the targeted trial days among the intervention group was 89% (range 77%–100%). Among the cognitively intact participants, the intervention group improved more than did the control group on a semantic fluency test ( $P = .003$ ) at the post-trial assessment and a phonemic fluency test ( $P = .004$ ) at the 18-week assessments. Among those with mild cognitive impairment, a trend ( $P = .04$ ) toward improved psychomotor speed was observed in the intervention group.

**Conclusion:** Daily conversations by way of user-friendly Internet communication programs demonstrated high adherence. Among the cognitively intact, the intervention group showed greater improvement in tests of language-based executive functions. Increasing daily social contacts through communication technologies could offer cost-effective home-based prevention methods. Additional studies with a longer follow-up duration are required to examine whether the intervention slows cognitive declines and delays the onset of dementia.

© 2015 The Authors. Published by Elsevier Inc. on behalf of the Alzheimer's Association. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

\*Corresponding author. Tel.: 503-494-6695; Fax: 503-494-7499.  
E-mail address: [dodgeh@ohsu.edu](mailto:dodgeh@ohsu.edu)

**Keywords:** Social engagement; Conversational interaction; Internet; Communication technology; Oregon Center for Aging and Technology (ORCATECH); Randomized controlled clinical trial; Prevention study; Mild cognitive impairment

---

## 1. Introduction

Almost 2 decades ago, Rowe and Kahn [1] suggested the key elements of successful aging, including (1) a low probability of disease, (2) high levels of function, and (3) active engagement with life. The definition of “active engagement with life” varies across individuals and cultures. In epidemiologic studies, self-reported social engagement—one component of active engagement with life—has been extensively examined in relation to cognitive well-being. However, no set of standard activities was used across studies. Various activities were included, such as reading, playing games or musical instruments, going to classes, doing crossword puzzles, playing cards, going to the cinema or theater (often categorized as cognitive activities), visiting friends or relatives and attending organizations (as social activities), and dancing and walking (as physical activities). Furthermore, larger social networks (a structural aspect of social connectedness) were also found to be protective against dementia [2–12]. It is as yet unknown which factors of social engagement or networking might reduce the risk of dementia. For example, playing games has often been categorized as an intellectual/cognitive stimulating activity; however, playing games with someone requires social interaction. Thus, the question is whether it is the social interaction or playing the game itself that is protective against cognitive decline. Randomized controlled trials (RCTs) with clearly specified elements and doses of social engagement are needed to clarify the mechanism of the protective function of social engagement and networks on cognitive function and, ultimately to translate this knowledge into actionable programs.

One integral component of being socially active is the ability to interact with others. Linguistic ability is known to be highly correlated with late-life changes in cognition in healthy older adults and those with dementia [13–15]. Furthermore, the results from psychological studies have suggested that the task of conversation is highly cognitively stimulating. Conversations require attention, working memory, the organization and control of thought (executive functions), and social cognition to understand others’ intentions and feelings [16,17], in addition to linguistic ability. To develop a prevention approach against cognitive decline that can be easily adapted to the oldest-old and those with mild cognitive impairment (MCI) or those with low motivation or apathy, we developed a clinical RCT, focusing on conversation. We examined whether face-to-face conversation—a core component of social interaction—can enhance cognitive functions by stimulating social cognition. To facilitate efficiency and

quantification of outcomes, we used contemporary technologies, including personal computers (PCs), webcams, and the Internet, to deliver the conversational interventions. From the epidemiologic and psychological data discussed in the Introduction, we hypothesized that our trial intervention would lead to improved attention, executive function, verbal fluency, and memory (i.e., domains frequently impaired among patients with Alzheimer’s disease). The objectives of our study were to assess the feasibility, adherence, and post-trial changes in cognitive functions and loneliness. In the report, we present the protocol and results of the RCT.

## 2. Methods

### 2.1. Subject recruitment

From November 2011 to August 2012, we distributed 2000 survey questionnaires targeting those living in retirement communities and senior centers located in the Portland, metropolitan area, within an approximately 1-hour commute from the Oregon Health & Science University (Portland, OR). Sixteen retirement communities and senior centers that covered a wide range of socioeconomic status (including low-income household retirement communities designated by the municipal government) and that had agreed to collaborate in research studies with our university were included. We conducted information sessions at each community and center to explain the upcoming trial. The survey was distributed at the conclusion of the information session and also by mail through the retirement communities and senior center administrative offices.

In the survey, we collected information, including demographic data, types and frequencies of social engagement, loneliness, and PC usage. After a brief introductory paragraph describing our trial, we asked individuals whether they would be interested in participating in the trial, and, if so, to provide their contact information. They were informed that they could decline to participate any time after learning about the study. The main information collected in the survey is listed in [Table 1](#).

### 2.2. Randomization

We invited those who had provided their contact information to participate in in-person screening interviews ([Figure 1](#)). The information collected at the interview is listed in [Table 1](#), and the study inclusion and exclusion criteria are listed in [Table 2](#). Trained research associates conducted the interviews. The subjects were randomly assigned to either the control or intervention group using the balancing factors of age (3 groups: aged 65–74, 75–84,

Download English Version:

<https://daneshyari.com/en/article/3032101>

Download Persian Version:

<https://daneshyari.com/article/3032101>

[Daneshyari.com](https://daneshyari.com)