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Keep Your Brain Fit! A Psychoeducational Training Program for Healthy Cognitive Aging: A Feasibility Study

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A psychoeducational face-to-face training program (Keep Your Brain Fit!) was developed to support the working population in coping with age-related cognitive changes and taking proactive preventive measures to maintain cognitive health. A feasibility study was conducted to test the training program presented in a workshop format. Participants completed an online questionnaire immediately after the workshop and three weeks later. The questionnaire assessed participants' appreciation of the workshop and evaluation of subjective cognitive functioning. 155 men and women between 40 and 65 years old (mean age: 53.8) participated in the workshops. The results showed the participants' appreciation of the knowledge they gained by participating in the workshop. Participation reduced negative emotions toward cognitive functioning in 69% of the participants, and almost 50% indicated that they were better able to cope with cognitive challenges. This psychoeducational program may offer a valuable contribution to the coping strategies of the aging workforce. Adjustments were made based on participants' evaluations, and the program was made suitable for online use in order to reach a broader audience.

As people grow older, they increasingly encounter difficulties regarding changes in their cognitive abilities such as memory (Schaie, 1994). Such changes often lead to worry and frustration in older adults (Mol, Ruiter, Verhey, Dijkstra, & Jolles, 2008). Continuous learning and skill development is stimulated in many workplaces due to the new development of communication and information technologies. Stenfors, Magnusson Hanson, Oxenstierna, Theorell, and Nilsson (2013) showed that information and communication technology demands are associated with increased cognitive complaints.

Much research has been devoted to the development of cognitive interventions for older adults. Recently, we showed that although older adults sometimes seem to benefit from cognitive interventions, such effects rarely generalize to other cognitive domains or everyday life activities (Reijnders, van Heugten, & van Boxtel, 2013). It has been stressed that future interventions should increase awareness and knowledge of cognitive changes and decrease negative beliefs and negative memory-related affect about cognitive functioning (McDougall, 2009; Rebok, Carlson, & Langbaum, 2007).

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Previous intervention studies focused on negative beliefs, subjective cognitive functioning, and memory self-efficacy. In a study by Valentijn et al. (2005), a memory-training program resulted in reduced feelings of anxiety and stress in relation to memory functioning in both a group training and an individual training (Valentijn et al., 2005). In a study by van Hooren et al. (2007), a goal-management training program reduced feelings of annoyance about cognitive failures and increased ability to structure activities in daily life. Cognitive training programs based on enhancing self-efficacy showed improvements in both performance and memory self-efficacy in most of the everyday memory tasks, as well as an increased control regarding the participants' own memory (Hastings & West, 2009; West, Bagwell, & Dark-Freudeman, 2008). In the intervention studies mentioned here, only older adults (age 54 and older) were included (Hastings & West, 2009; Valentijn et al., 2005; van Hooren et al., 2007; West et al., 2008).

Our goal was to develop a psychoeducational training program (Keep Your Brain Fit!) aimed at the middle-aged-to-older working population (40–65 years old). This training program combined elements that were previously effective in increasing subjective cognitive functioning and memory self-efficacy (Hastings & West, 2009; Valentijn et al., 2005; van Hooren et al., 2007; West et al., 2008). The intervention was developed in two steps. First, a feasibility study was done in which the content of the training program was tested in face-to-face workshops. Second, the content of the training program was adjusted according to participants' evaluations and made suitable for online use. The effectiveness of the online training program will be investigated in a future randomized controlled trial (RCT). In this paper, we report on the results of the feasibility study.

METHODS

Participants and Procedure

Employed people between 40 and 65 years of age were recruited from companies in the southern part of the Netherlands via intranet advertisements posted between February 2012 and December 2012. People could register online for the two-hour in-company workshop (Keep Your Brain Fit!). Workshops were all hosted by a medical doctor (MvB) and a psychologist (JR) and offered in groups of 10-to-20 participants. After the workshop, participants completed an online questionnaire assessing the participants' appreciation of the workshop and self-evaluation regarding their subjective cognitive functioning. The self-evaluation questions were again asked after three weeks.

Training Program

Lifestyle & Cognition Monitor

One week before participating in the workshop, participants received a link to an online Lifestyle & Cognition Monitor. This module included questions about lifestyle factors, forgetfulness, and meta-memory. Individual scores were compared to normative data derived from the Maastricht Aging Study, a longitudinal study of determinants of healthy cognitive aging (Jolles, van Boxtel, Ponds, Metsemakers, & Houx, 1998). Participants received a result form showing their personal scores compared to the normative data in a textual and graphical format, providing

personal feedback about factors that may affect current and future cognitive aging. The content of the monitor was discussed with the participants during the workshop.

The Workshop

The workshop itself was given in a structured manner, within a standard time frame (two hours), and consisted of three modules:

- A lifestyle module, in which a short introductory movie of 10 minutes was shown about the cognitive aging process, with a particular stress on brain plasticity. Next, evidence-based factors known to affect cognitive functioning were discussed. The following factors were included: general health, active lifestyle, social network, mood, anxiety, stress, life satisfaction, sleep and nutrition. All of these 'lifestyle' factors had been queried in the online Lifestyle & Cognition Monitor. By filling in this monitor participants had received a personal scoring form, which gave them an indication which factors could be improved (Fernandez & Goldberg, 2009; Jeste, Depp, & Vahia, 2010; Lazeron & van Dinteren, 2010).
- A memory module, which addressed the nature of memory complaints and everyday mistakes. It was stressed that both young and older people make everyday mistakes, although older people are often more worried about them. Participants were taught briefly about how memory works and about the causes of forgetfulness (for example, lack of attention or interference). Also the term memory self-efficacy was explained and how worrying about forgetfulness can lead to diminishing memory self-efficacy. Next, participants were asked to register some past memory failures in a memory diary to help them gaining insight into the possible causes of memory failures. After that, the use of internal (e.g., rehearsal, visualization) and external (e.g., agenda, to-do list) memory strategies that can help the memory system to work more efficiently were discussed and illustrated (Ponds & Verhey, 2000).
- An effective work module, which addressed different kinds of attention (selective, divided, and sustained), situations in which attention errors often occur and strategies to improve attention (e.g., regular breaks, minimal interference). Next, an example of a planning model (goal management model) was discussed and illustrated. This model is also known as the Stop-Set-Split-Check Model, and it provides a systematic way of performing a task following the four consecutive steps (In de Braek, Dijkstra, Ponds, & Jolles, 2012; Levine et al., 2000; Levine et al., 2007). Finally, a short summary of the three modules was given, and participants were invited to formulate future action points in writing.

Measures

After the workshop, a link was provided to an online questionnaire about appreciation of the workshop and self-evaluation questions about subjective cognitive functioning. Participants could complete this questionnaire within one week. The self-evaluation questions were again asked after three weeks.

Participants' Appreciation

Participants graded the Lifestyle & Cognition Monitor and the workshop on a 10-point scale and graded different subparts of the workshop on a 5-point Likert scale. Participants answered the following questions: Was the outcome of the monitor useful to you (yes/no/don't know)? Did the monitor give you insight in your personal situation related to factors influencing healthy cognitive aging (yes/no/don't know)? What did you think of the duration of the workshop (too long/fine/too short)? In addition, participants were asked to give comments about how the training program could be improved.

Self-Evaluation

Participants compared several aspects of their functioning after the training program to their functioning prior to the training program. Selected domains were the following: (a) making cognitive mistakes, (b) being hindered by cognitive mistakes, (c) being worried about cognitive abilities, (d) being afraid about becoming demented, (e) feeling able to cope with cognitive challenges. Answers were rated on a five-point scale ranging from *worse than before the training* to *better than before the training* (Hoogenhout, de Groot, & Jolles, 2010; Hoogenhout, de Groot, van der Elst, & Jolles, 2012). These self-evaluation questions were asked directly after participation in the workshop and again after three weeks.

Statistics

Demographic data and participants' appreciation and self-evaluation scores were analyzed by means of descriptive statistics. Independent samples *t* tests were used to investigate whether appreciation and self-evaluation differed among men and women. To explore potential associations between other background characteristics (age, educational level) and participants' appreciation and self-evaluation, Pearson's correlation coefficients were calculated. All analyses were carried out with IBM SPSS statistics software, version 19 (SPSS, Chicago). Alpha was set at 0.05.

RESULTS

Demographic Data

In total, 13 workshops were given with 155 participants (57 male, 98 female). Mean age was 53.8 (*SD* 6.7), and mean education level was 6.0 (Higher vocational education) (*SD* 1.4) on an eight-point scale ranging from *primary school* to *university degree*.

Participants' Appreciation

Participants' mean evaluation of the monitor was 7.3 (*SD* 0.9), and their mean evaluation of the workshop was 7.7 (*SD* 0.8) on a 10-point scale ($n = 151$). The three subparts of the workshop

TABLE 1
Participants' Evaluations on How to Improve the Training Program

Most frequently given comments
1. Increasing the number of exercises
2. Increasing the length of the workshop in order to explain information in more detail
3. Making the information more personal
4. Adding a list for further reading
5. Interaction with other participants

(lifestyle, memory, and effective work) were rated, respectively, as 4.0 (*SD* 0.5), 3.9 (*SD* 0.5), and 4.0 (*SD* 0.5) on a 5-point scale. Most participants were satisfied with the duration of the workshop (82%); they indicated that the monitor was useful (78%) and provided insight into their personal situation (70%). Most frequently given comments on how to improve the training program are summarized in Table 1.

Self-Evaluation

Of the 145 participants who filled in the self-evaluation questions directly after the training, 18 (12.4%) indicated they made fewer cognitive mistakes than before the training. Fifty-four of the 145 (37.3%) participants indicated that they were (much) less hindered by their cognitive mistakes, while 2 (1.4%) participants reported more hindrance. A total of 101 of the 145 (69.2%) participants indicated being (much) less worried about their cognitive abilities, and 8 (5.5%) reported being more worried. Fifty-two of the 145 (35.8%) participants indicated being (much) less afraid about becoming demented, and only 3 (2.1%) reported being more afraid. Seventy-one of the 145 (49%) indicated being better able to cope with cognitive challenges. One participant reported being less able to cope with cognitive challenges.

Of the 145 participants who filled in the self-evaluation questions directly after the training, 35 participants also completed the self-evaluation questions after three weeks. The percentages for the self-evaluation questions directly after the training and three weeks later are shown in Table 2.

TABLE 2
Self-Evaluations One Week and Three Weeks after Participation in the Workshop

	Self-evaluations	
	After participation in the workshop (n=145)	*Three weeks later (n=35)*
Making (much) less cognitive mistakes	12.4%	28.6%
Being (much) less hindered about cognitive mistakes	37.3%	51.4%
Being (much) less worried about cognitive abilities	69.2%	79.4%
Being (much) less afraid about becoming demented	35.8%	32.4%
Better able to cope with cognitive challenges	49%	45.7%

Participants' Characteristics in Relation to Evaluations

Independent samples t tests showed no significant differences in appreciation of the workshop between men and women ($t = -0.96$, $p = .92$), and there were no significant differences on the five self-evaluation questions between men and women ($t = -1.60$, $p = .11$; $t = 0.85$, $p = .39$; $t = -0.41$, $p = .67$; $t = -0.17$, $p = .85$; $t = 0.47$, $p = .63$). No significant associations were found between age and appreciation of the workshop ($r = .12$, $p = .14$), between age and the five self-evaluation questions ($r = -.05$, $p = .54$; $r = .12$, $p = .14$; $r = .11$, $p = .19$; $r = .14$, $p = .09$; $r = .01$, $p = .86$), between level of education and appreciation of the workshop ($r = .05$, $p = .48$) or between level of education and the (five) self-evaluation questions ($r = -.07$, $p = .34$; $r = .04$, $p = .61$; $r < .01$, $p = .97$; $r = -.14$, $p = .09$; $r = -.12$, $p = .12$).

DISCUSSION AND CONCLUSION

Discussion

The results of this feasibility study showed that participants' appreciation of the workshop was good (grade: 7.7). Most participants were satisfied with the duration of the workshop and indicated that the Lifestyle & Cognition Monitor was useful for providing insight into their personal situation. Results also showed that almost 50% of the participants reported being better able to cope with cognitive challenges after participating in the workshop, and participation led to reduced negative emotions toward cognitive functioning in the majority of participants (69.2%). This percentage even increased three weeks after participating in the workshop (79.4%), but the latter finding could be biased due to the small number of respondents after three weeks ($n = 35$). Additional analyses showed that there were no associations between appreciation of the workshop and demographical characteristics.

Based on participants' evaluations of the training program, a number of adjustments were made. First, the total amount of information was increased and a number of exercises were added: keeping a Memory Diary, practicing with memory strategies, identifying high-risk moments for attention errors, and practicing with the goal-management model. Furthermore, a personal workbook was added, which contains a summary of the information given in the training program and the exercises that participants completed. Also, a comprehensive list for further reading was added.

E-Health Application

In order to reach a much broader audience, the training program was adapted for online use. Additional adjustments were made that were especially directed at maintaining—or even increasing—the personal aspects of the training program. First, information is provided in two ways: as instructional text and in a video clip. Second, the online program was designed as a computer-generated tailored intervention. By tailoring the information based on respondent characteristics, the intervention becomes more personalized, which may increase attentiveness to the message, increase the relevance of the message, and support compliance with the online program (Dijkstra & De Vries, 1999). Tailoring is partly based on the Lifestyle & Cognition

Monitor, which was tested during this feasibility study. The effectiveness of the online training program will be investigated in a RCT (Dutch trial registry: NTR 3973).

Conclusion

This feasibility study showed that the developed psychoeducational program may offer a valuable contribution to older workers in coping with age-related cognitive changes. The training program was adapted for online use in order to reach a much broader audience.

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