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The effect of two types of memory training on subjective and objective memory performance in healthy individuals aged 55 years and older: a randomized controlled trial

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Abstract

The objective of the study was to examine the effectiveness of two types of memory training (collective and individual), compared to control (waiting list), on memory performance. Participants were 139 community-dwelling older individuals recruited through media advertisements asking for people with subjective memory complaints to participate in a study. Data were collected at baseline, and at 1 week and 4 months after the intervention. Training efficacy was assessed using measures of subjective and objective memory performance. After the intervention, participants in the collective training group reported more stability in memory functioning and had fewer feelings of anxiety and stress about memory functioning. In addition, positive effects were found on objective memory functioning. Compared with the other two groups, the collective training group participants had an improved recall of a previously learned word list. Compared to controls, participants in the individual training group reported fewer feelings of anxiety and stress in relation to memory functioning.

Keywords: Memory; Intervention; Memory self-efficacy; Aging

1. Introduction

Elderly individuals often complain about their memory and are concerned that this perceived memory loss might lead to degenerative disorders such as Alzheimer's Disease [1,2]. A decline in memory functioning in old age might explain in part subjective memory complaints [3–5]. However, this explanation is not adequate because complaints of memory loss are not always associated with an actual decline in objective memory function [6–10]. Research shows that memory complaints are determined by several other factors besides objective memory performance [11,12]. The knowledge, beliefs, and perceptions people have about their own memory functioning and the memory system in general, termed 'metamemory', are considered an important factor [2,13–15]. Metamemory covers several dimensions that are relevant to everyday memory functioning. One of these dimensions, 'Memory Self-Efficacy' (MSE), can be defined as the level of confidence a person has in the effectiveness of his or her own memory in different situations [16]. MSE is considered an important moderator of changes in memory functioning and can effect memory performance through cognitive, affective, and motivational processes [17,18]. For example, low expectations of successful memory functioning could lower motivation to achieve a good performance or could even cause avoidance of situations that call on memory. This negative influence could lead to a poorer memory performance and in turn reinforces the negative memory beliefs elderly have [19].

We designed a training program to improve objective memory and MSE. This program emphasizes how MSE works in relation to everyday memory performance. Participants are asked to actively register memory failures and successes in a dairy, to help them to gain insight into their memory functioning and to analyze their everyday memory problems. In addition, memory skills are trained by teaching the participants internal (repeating, visualization, making associations) and external (habits, agenda, people around you) memory strategies. Another important aspect of this training program is education on how the memory works in old

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age. Educating elderly people on how memory works and about the difference between normal and pathological aging are indispensable aspects of memory training. Other important aspects essential to optimal memory functioning, such as time, attention, concentration, good vision, and hearing are also discussed in depth [20].

To our knowledge, there have been few studies evaluating intervention programs focused on influencing and adjusting maladaptive beliefs about memory performance, combined with memory skills training [21]. Furthermore, most studies evaluated group-training programs. Group sessions are known to have a comforting and motivating effect because people can share problems with a relevant peer group [22]. However, self-taught memory-training programs are also an effective form of memory intervention [23–25], and are advantageous in that a large group of subjects can be reached in a fairly inexpensive way. Moreover, self-taught memory-training programs have some practical advantages, such as the fact that participants do not have to go to the training at fixed times and have the opportunity to study at their own speed. Therefore, we offered the intervention as a collective training program and as an individual self-taught training program, based on a handbook about memory functioning in daily life, and which contained the essentials of the collective training intervention.

The aim of the present study was to examine the effectiveness of these two forms of our memory-training program in comparison with control, in improving memory performance in a large group of community-dwelling older individuals.

2. Methods

2.1. Participants

All participants were older people recruited through media advertisements asking for people with subjective memory complaints to participate in a study. Participants were included in the study if they were 55 years or older, had a good comprehension of the Dutch language, were mobile enough to travel independently to the research center, were not using psychotropic medication on a daily basis, and had not previously participated in a neuropsychological research program. Exclusion criteria were a score below 24 on the Mini-Mental State Examination (MMSE) [26], a diagnosis of central nervous system pathology, or a major psychiatric disorder.

The Medical Ethics Committee of the University Hospital Maastricht approved the protocol and all participants gave informed consent.

2.2. Intervention

2.2.1. Collective training

The memory-training program was developed by Ponds and Bouwens [27] and taught by experienced teachers of the service center of the home care organization Groene Kruis Heuvelland in Maastricht, The Netherlands. The program was developed to increase knowledge of normal memory functioning and normal memory decline with aging, and to promote insight into one's memory functioning. The maximum number of participants per group was 12, to ensure that the training group could function optimally, and for logistic reasons. The training was administered in eight 2-h sessions, one session a week. Each session was structured: homework and last week's theme were discussed first and then the new theme or topic was introduced. All themes were illustrated with practical assignments. The themes involved were: short- and long-term memory, storage and retrieval of information, age-related decline in memory functioning, differences between normal memory functioning and dementia, memory self-efficacy, the relation between memory functioning and physical and psychological health, and internal and external memory strategies. All topics were discussed briefly in the last session. All participants received a reader.

2.2.2. Individual training

The Dutch book 'Geheugensteun' ('Memory Support') [28] covers the same content in the same order as the above described memory-training program. All themes discussed in the collective memory-training sessions are also extensively described in the book. The memory-training book differed from the collective training program in that there were fewer practical assignments and homework and subjects had to study on their own. To facilitate and motivate this self-study, all subjects were given a study schedule, and after 4 weeks they were telephoned to ask them if they were on schedule with their reading and if they had any questions about the book.

2.3. Measures

The outcome variables were obtained from a test battery that included subjective and objective memory tests to measure memory functioning before and immediately after the intervention and 4 months later. All measures were administered by trained assistants who were not involved in the memory training.

2.3.1. Objective memory tests

The Visual Verbal Learning Test (VVLT) [29] is a verbal memory task to measure the ability to learn new verbal information and retrieve information from memory. Fifteen low-associative words are presented to the subject five times. After each presentation the subject is asked to recall as many words as possible, with no restriction concerning the order of recall (immediate recall). The maximum score that can be obtained after five successive trails is 75. Twenty minutes after the last presentation the subject is again requested to recall as many correct words as possible (delayed recall). Parallel versions of the memory task were used for each assessment.