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Self-guided strategy-adaption training for older adults: Transfer effects to everyday tasks

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ABSTRACT

Objectives: The goal of the present research was to examine the potential of a learner-oriented approach to improving older adults' performance in tasks that are similar to real-life situations that require strategic deployment of cognitive resources. A crucial element of this approach involves encouraging older adults to explicitly analyze tasks to consider how to adapt trained skills to a new task context. In an earlier study, a specialist-directed intervention produced training gains and transfer to some untrained memory tasks.

Method: In the present study, older adults received a manual instructing them about principles of task analysis, two memory strategies, and strategy adaptation. Self-guided strategy-adaption training involved practicing some memory tasks as well as instructions on how the trained skills could be applied to new tasks that were not practiced. The criterion tasks involved practice tasks, non-practiced tasks that were discussed in the manual, and transfer tasks that were never mentioned in the manual. Two of the tests were from the Everyday Cognition Battery (inductive reasoning and working memory).

Results: As compared to a waiting-list control group, older adults assigned to self-guided strategy-adaption training showed memory improvements on tasks that were practiced or discussed during training. Most important, the learner-oriented approach produced transfer to the everyday tasks.

Conclusion: Our findings show the potential of instructing task appraisal processes as a basis for fostering transfer, including improving older adults' performance in simulated everyday tasks.

1. Introduction

Training older adults to use mnemonic strategies typically produces improvements in the particular tasks being trained (Gross et al., 2012; Verhaeghen, Marcoen, & Goossens, 1992), but standard strategy training rarely produces transfer to tasks that were not practiced during training (see Rebok, Carlson, & Langbaum, 2007). Indeed, mnemonic training benefits have a narrow range of transfer (Brooks, Friedman, Gibson, & Yesavage, 1993; Hill, Sheikh, & Yesavage, 1988; Kliegl, Smith, & Baltes, 1990; Oswald, Rupprecht, Gunzelmann, & Tritt, 1996). As McDaniel and Bugg (2012) argue, memory training should target areas of concern for older adults and focus on materials that will improve their everyday functioning. Given that strategy interventions typically focus on tasks and materials that are easy to use for training purposes, the failures of people to generalize strategic behavior to new memory task contexts are disappointing. In the current paper, we examined the potential of a *learner-oriented approach* to improving older adults' performance on tasks reproducing real-life situations requiring strategic deployment of cognitive resources. This represents a very important effort in order to get closer to generalize training gains to everyday life, which is the final goal of training.

Given the general failure of mnemonic training programs to achieve transfer, we developed a novel intervention – the self-guided strategy-adaption training – based on a *learner-oriented* approach. In it, older adults are treated as active partners in attempting to achieve generalization of strategic behavior (Bottiroli, Cavallini, Dunlosky, Vecchi, & Hertzog, 2013; Cavallini, Dunlosky, Bottiroli, Hertzog, & Vecchi, 2010). We explicitly engage older adults in a discussion about how their newly acquired strategies could potentially be adapted for use in different task environments. As in other approaches (e.g., Cavallini, Pagnin, & Vecchi, 2002; Cavallini, Pagnin, & Vecchi, 2003), older adults were taught memory strategies, and they practiced them on different amount of materials (i.e., different tasks with increasing number of items across sessions). Critically, here we do not

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merely train older adults to use a strategy for a particular task hoping that they will adapt it to new tasks. The idea was instead to promote transfer in the training program itself by giving older adults a procedure – based on task analysis and strategy adaptation – to be followed for every new task.

Several studies showed the efficacy of this approach in promoting transfer. Cavallini et al. (2010) taught older adults to use interactive imagery (i.e., mental creation of an active picture of the words interacting) and sentence generation (i.e., creation of a semantic link among words by making up a sentence), and they practiced these memory strategies with two memory tasks: single words and word pairs. Another group received identical strategy training but was also provided with *transfer instructions* during training in which the trainer and older adults discussed (without practice) how the strategies could be adapted to two untrained tasks. Both types of training yielded pre-training to post-training improvements on the trained tasks. However, only those adults receiving explicit discussion of strategy generalization showed higher performance, relative to controls, on one of the untrained tasks.

Although a brief discussion of applying trained strategies to new tasks was partly effective, the benefits of explicit training in strategy adaptation are more impressive. Bottiroli et al. (2013) introduced the *strategy-adaptation training*. It focused on teaching older adults to do a simple task analysis to help them adapt trained strategies to meet the demands of new tasks. This is based on self-regulated-learning theory stipulating that effective strategy use requires analyzing the characteristics of a task and adapting strategies to match those characteristics (Lemaire, 2010). The training instructions stressed what older adults have to do whenever encounter a new task requiring intentional memorization. That is, they should first assess the task by identifying (a) whether external cues would (or would not be) available during the test and (b) the nature of the materials to which meaning needed to be added. Next, they were to adapt the trained strategies (i.e., interactive imagery and sentence generation) to work best for that configuration of task features. Identifying the cues available at test would help older adults to integrate them to the to-be-learned materials using either imagery or sentence generation. Also, identifying the nature of the materials would help them decide which strategy to use to organize the to-be-learned materials and elaborate items in a meaningful manner. The task analysis and subsequent strategy adaptation were supported by teaching older adults to address three questions. The first two questions – (1) Does the memory task involve a cue, and if so, what is it? (2) What is the nature of the materials to which you need to add meaning? – triggered task analysis. The third one – (3) How can you adapt the sentences and imagery strategies to help you meaningfully process the to-be-learned materials? – triggered strategy adaptation. In contrast to using only brief transfer instructions, these questions were meant to encourage a focus on the specific procedures by which training strategies can be adapted for learning new materials. The rationale was that providing older adults with explanations for how to adapt strategies will facilitate their application of these new tools to other memory-demanding tasks.

Bottiroli et al. (2013) tested the strategy-adaption approach by comparing performance on transfer (i.e., neither practiced nor discussed during training) tasks of a strategy-adaption training (receiving strategy training and explanation on how to analyze tasks and to adapt the strategies to other tasks), a transfer-instructions-alone training (receiving strategy training and transfer instructions but not strategy-adaptation training, as in Cavallini et al., 2010), and a waiting-list control group. Both training procedures enhanced older adults' performance on the trained tasks and those tasks that were discussed during training. However, performance improvements on tasks that were never discussed during training was greater after strategy-adaptation training.

Interestingly, the benefits of adopting a learner-oriented approach were also preserved if it was administered via in-home training using a manual (Bottiroli et al., 2013), suggesting that intensive training on strategy adaptation with a trainer present was not necessary to generate the effect. Older adults were given their manual which contained four lessons teaching the two mnemonics and the strategy-adaptation principles and four homework assignments to be carried out during a two-week period. Cavallini and colleagues (Cavallini et al., 2014) also tested the efficacy of this approach with older adults living in a residential care centre. This was done by reducing task complexity and length for older residents who were free of major disabilities and not cognitively impaired. Again, the strategy-adaptation manipulation promoted both training and transfer effects even for residential-care older adults.

These findings highlight the potential of this learner-oriented approach. However, to have real-world impact, memory training programs must improve adults' performance on cognitively-demanding everyday activities (e.g., Dunlosky, Bailey, & Hertzog, 2011; McDaniel & Bugg, 2012; Wiegand, Troyer, Gojmerac, & Murphy, 2013). In this instance, we conceptualize everyday cognition as the performance on problems constructed to be similar to cognitive tasks older individuals might perform in their daily lives (Allaire & Marsiske, 1999). Even if the strategy-adaptation approach promotes transfer to other memory tests, it may not promote remembering in everyday life, which often has different features and manifestations than laboratory tests (e.g., Herrmann & Gruneberg, 1993; Hertzog et al., 2000; Schnitzspahn, Ihle, Henry, Rendell, & Kliegel, 2011). It is an open question whether the learner-oriented approach can be applied to realize transfer of strategies and their adaptive use on problems encountered in everyday life.

The current study examined the potential of the strategy-adaptation training in promoting transfer (as compared to a waiting-list control group) on older adults' performance both on untrained memory tasks and on tasks reproducing everyday-life situations requiring strategic deployment of cognitive resources. As in Bottiroli et al. (2013), training was on a manual, i.e., self-guided, that older adults used at home. Criterion tasks were three memory tasks taken from Bottiroli et al. (2013) and two subtests of the Everyday Cognition Battery (ECB; Allaire & Marsiske, 1999), measuring multiple basic cognitive abilities (i.e., inductive reasoning and working memory) as expressed in the context of important instrumental everyday tasks (i.e., medication use, financial planning, and food nutrition). We focused on these domains given that they are those in which older adults are expected to perform well in order to maintain independent functioning and are predictive of institutionalization and mortality (e.g., Czira et al., 2014; Weatherbee & Allaire, 2008).

2. Method

2.1. Participants

Participants were community-dwelling volunteers recruited through an advertisement in a local newspaper mentioning for a memory training program using an at-home training manual. The advertisement recruited volunteers who were 60 years of age or older and who had never participated in a memory-training intervention. This study did not enroll individuals nominated by someone else (e.g., someone calling in behalf of a parent with mild cognitive impairment). Older volunteers were not given any tangible incentives (e.g., money or gifts) to participate. All older adults were assigned to either the self-guided strategy-adaption training group – consisting in strategy training and explanation on how to analyze tasks and to adapt the strategies to other tasks – or a waiting-list control group (see Table 1).

Random assignment to the two groups (using a blocked randomized procedure) was used in an attempt to equate the groups with respect to education and age. Block-randomized assignment did not achieve fully equated groups, although group differences in age and years of education were not statistically significant [age: $F(1, 59) = 1.85$, $p = 0.18$, $\eta_p^2 = 0.03$; years of education: $F(1, 59) = 2.47$, $p = 0.12$, $\eta_p^2 = 0.04$].

Prior to testing, older adults filled out a general demographic questionnaire, to ensure that there was not previous diagnosis of

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