INCREASED EMPLOYABILITY OF THE UNEMPLOYED AGED 50+ THROUGH COGNITIVE TRAINING?

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Introduction

In most industrial countries the actual demographic development results in an increasing shortage of skills. Thus employability not only of older workers but also of older unemployed people gains increasing relevance. Against this background it is important that abilities in different dimensions of fluid intelligence not only show age-related decline but that also a loss of cognitive stimulation in everyday life can have similar effects (e.g., Baltes, Lindenberger, & Staudinger, 2006). On the contrary Schooler and colleagues revealed a positive influence of complex and cognitively demanding jobs on mental abilities which was even stronger in older adults (Schooler et al., 1999). Recent studies also showed positive effects of cognitive training interventions in young adults and older retired persons (Schmiedek, Lövdén, & Lindenberger, 2010). It remains unclear, however, to which degree performance gains in the trained tasks can be transferred to untrained tasks of same or different dimensions, i.e. whether a general improvement of cognitive functioning can be achieved. Whereas a large online study with 11.430 participants could not show any transfer effect on untrained tasks, even if they were very similar to the trained ones (Owen et al., 2010), some laboratory studies revealed that observing transfer effects requires both the trained and the transfer task to rely on same brain structures (Dahlin et al., 2008) or the acquisition of general strategies (Persson & Reuter-Lornez, 2008). Also variable training regimes are of advantage.

With our study we aimed to investigate whether software-based cognitive training interventions have the potential to increase cognitive abilities in older unemployed persons who tend to be less used to further training. We were particularly interested in possible transfer effects from trained to untrained tasks in different domains of fluid intelligence.

Method

Participants (42-64 years, 58.6% women) were enrolled in general further education measures of the federal state of Brandenburg ("Academy 50plus") and were course-wise assigned to either a control (n = 36) or an experimental group (n = 51). In addition to their normal course work, the experimental group received a 4-week cognitive training applied with help of the internet platform Happyneuron (Scientific Brain Training, Villeurbanne Cedex, Frankreich). This platform was chosen after extensive evaluation of three alternative providers of cognitive training software in respect to how much training and transfer effects could be expected. Sixteen training sessions of 45 minutes each were performed over 31 days on average. In each training session the participants performed four so-called core exercises from the four cognitive dimensions perceptual speed, working memory, episodic memory, and reasoning. These exercises were complimented on a daily basis by a selection from 16 additional exercises from the same four cognitive dimensions as well as exercises from the dimensions perception and language. Transfer was tested in pre and post sessions with nine standard cognitive tests. Performance changes in the trained and transfer tasks were analyzed with repeated measures ANOVA for experimental and control group as well as with additional factors gender and age (younger and older than 54 years).

Results

All participants of the experimental group increased their performance levels in the four core tasks from pre to post session ($p<.001$; effect size between .26 and .74). There was no effect of gender or age. In the nine transfer tests no difference between experimental and control group in the pretest was observed. Participants in the experimental group showed transfer effects (indicated as stronger performance increase from pre to posttest than the control group) in tests of perceptual speed ($p<.001$; effects size=.26) and spatial perception ($p<.001$; effect size=.07). Again there was no age or gender effect. No transfer was found for the dimensions working memory, episodic memory and reasoning. Interestingly, also subjective well-being and subjective estimates of own cognitive abilities increased during the training.

Discussion

The performance increases for the trained tasks confirm prior findings for larger samples and different age groups. With respect to transfer effects results are mixed. We were able to show that transfer is possible if transfer tasks are similar to trained tasks ("near transfer") but also for "far transfer" (transfer to more different tasks) as shown for the spatial perception task. We assume that the conceptual design of the training which was characterized by high variability (many different tasks), high repetition number or the core tasks, and high adaptability (dynamic adaptation of difficulty to individual performance levels) was the key to induce such transfer effects (cf. Schmiedeck et al., 2010; Jaeggi et al., 2008). We conclude that cognitive interventions, embedded in general further education measures, have positive effects on objective and subjective cognitive performance, motivation, and self-efficacy of older unemployed persons and therefore are effective to increase or regain their employability.

References

Baltes, P.B., Lindenberger, U., & Staudinger, U.M. (2006). Lifespan theory in developmental psychology. In R. M. Lerner (Ed.), *Handbook of Child Psychology* (6th ed., Vol. 1, pp. 569-664).

Dahlin, E., Stigsdotter Neely, A., Larsson, A., Bäckman, L. & Nyberg, L. (2008). Transfer of Learning After Updating Training mediated by the Striatum, *Science*, 320(5882), 1510-1512.

Jaeggi, S. M., Buschkuehl, M., Jonides, J. & Perring, W. J. (2008). Improving fluid intelligence with training on working memory. *Proceedings of the National Academy of Science* 105, 6829-6833.

Owen, A.M., Hampshire, A., Grahn, J.A., Stenton, R., Dajani, S., Burns, A.S., Howard, R.J. & Ballard, C.G. (2010). Putting brain testing to the test. *Nature* 465, 775-779.

Persson, J. & Reuter-Lorenz, P.A. (2008). Gaining Control. Training Executive Function and Far Transfer of the Ability to Resolve Interference. *Psychological Science* 19 (9), 881-888.

Schmiedek, F., Lövden, M. & Lindenberger, U. (2010). Hundred days of cognitive training nhance broad cognitive abilities in adulthood: findings from the COGITO study. *Frontiers in Aging Neuroscience* 2, Article 27.

Schooler, C., Mulatu, M.S., & Oates, G. (1999). The continuing effects of substantively complex work on the intellectual functioning of older workers. *Psychology and Aging*, 14, 483-506.