N. CHARNESS (Convener). ***Cognitive training panel.*** *Gerontechnology 2012;11(2):219;* doi:10.4017/gt.2012.11.02.058.00 **Participants:** *E. ZELINSKI* (USA), *J. KRAY* (Germany), *K. SLEGERS* (Belgium), *W. BOOT* (USA). **ISSUE** We know that cognitive abilities such as working memory and executive functioning decline with age. Can we intervene to promote better cognition in adulthood? What role can technology play? Since the initial critical review by Hertzog et al.[1], there has been increasing controversy over the efficacy of cognitive interventions. The speakers will describe a diverse set of initiatives to train older adults. **CONTENT** Speakers will review the state of cognitive interventions, including laboratory studies, field studies, and randomized clinical trials, discussing their strengths and weaknesses, and evaluating their effectiveness and the validity of the outcomes. Elizabeth Zelinski will discuss the results of a meta-analysis comparing effects of extended practice versus aerobic training and the implications for neuroplasticity. Jutta Kray will report findings on age differences in the effectiveness of task switching and verbal self-instruction training and whether these effects generalize to trained and untrained tasks. Karin Slegers will discuss the results from a randomized control trial on the effects of computer and internet use on cognitive abilities of healthy older adults. Walter Boot will examine the efficacy of commercial videogame interventions and the role of older adults in the perceptions and attitudes to such games. **STRUCTURE** Speakers will talk for about 15 minutes each, take questions following their presentations. They will then convene as a panel to discuss findings and conclusions with the audience. **CONCLUSION** This expert panel will describe the state of the art for cognitive training, provide useful guidelines for future research, and highlight the critical issues to be resolved.

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Keywords: health & self-esteem, cognitive training, cognitive interventions, guidelines, effectiveness, aging, technology

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W.R. BOOT, M. CHAMPION, D.P. BLAKELY, T. WRIGHT, D.J. SOUDERS, N. CHARNESS. ***Video game interventions to address cognitive aging****. Gerontechnology 2012;11(2):219-220;* doi:10.4017/gt.2012.11.02.145.00

Purpose Recent research has demonstrated broad benefits of video game play to a variety of perceptual and cognitive abilities[1]. We explored whether an intervention involving handheld video games might effectively address declines associated with cognitive aging, and factors that influence game intervention compliance. Previous research has suggested that the largest benefit is obtained from fast-paced action game training. We compared this style of game to a game specifically marketed to older adults to improve cognitive abilities. **Method** Sixty-two older adults (M=74 years old, SD=6, range=54–86) were assigned to play one of two video games or to a no-game control group. One game group received an action video game to play (Mario Kart) and the other game group received a brain fitness game (Brain Age 2). Participants were asked to play their game for a period of 60 hours over the course of 3 months and a battery of perceptual and cognitive ability measures[2] was administered before and after this three month period. Intervention compliance was assessed with diary data and phone interviews. Participants also completed surveys related to their game experience and their training expectations. **Results & Discussion** Contrary to previous studies, no benefit of action game training was observed on tasks measuring perceptual and cognitive abilities. Consistent with prior finding, the brain fitness game also had little effect[3]. However, the results of the action game group must be considered in light of low intervention compliance. Participants were more than twice as likely to comply with the training protocol if they were assigned the brain fitness game. Compared to the brain fitness game, participants who received the action game rated their game experience as significantly less enjoyable and were less likely to perceive their game experience as something that would benefit everyday abilities. In sum, the game that should have produced the largest benefit was disliked most by older adults, resulting in poor compliance. Future studies, and ultimately interventions with the intent of addressing specific perceptual and cognitive deficits associated with

advancing age, need to consider not just the types of games that are effective, but the types of games that older adults are able and willing to play.

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Keywords: cognitive aging, video games, training, transfer of training

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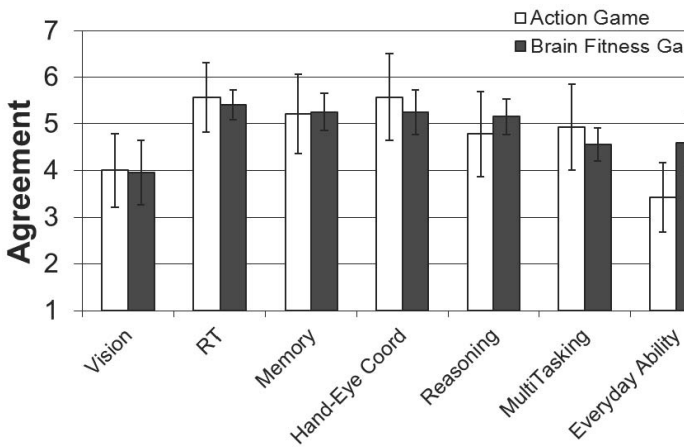

*Figure 1. Perceived benefit agreement scores as a function of game type; Participants who received the action game rated it as significantly less likely to improve everyday abilities; Error bars represent 95% confidence intervals; *=p<.05*

J. KRAY. ***Effectiveness of task switching training in adulthood.*** *Gerontechnology 2012;11(2):220* doi:10.4017/gt.2012.11.02.160.00 **Purpose** To evaluate whether task-switching training is an effective cognitive intervention to improve cognitive abilities in younger and older adults. **Method** Pretest-training-posttest assessments with an active control group were applied to determine the transfer scope of a task-switching training, that is, to examine whether improvements in the trained switching task lead to improvements in untrained switching tasks as well as to improvements in other cognitive abilities such as working memory, inhibitory control, and fluid intelligence. The effectiveness of training treatments was also measured by comparing differential training conditions varying in cognitive control demands. **Results & Discussion** Results so far show that the use of verbal self-instructions during task switching[1] and task-switching training are efficient cognitive interventions, as they lead to improvements in task switching in younger and older adults. We also found improvements in other cognitive tasks after task-switching training, indicating a relatively broad transfer scope[2]. However, training of a verbal self-instruction strategy did not lead to additional improvements in an untrained switching task, suggesting that the transfer of verbal strategies is limited in old age[3]. Results of a new study will examine the control processes that contribute to the transfer of training in younger and older adults.

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Keywords: cognitive training, task switching training, transfer scope, aging

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Full paper: No

K. SLEGERS, M.P.J. VAN BOXTEL. ***Potential benefits and risks of computer and for older adults: A randomized controlled intervention study.*** *Gerontechnology 2012;11(2):221;* doi:10.4017/gt.2012.11.02.232.00
Purpose It has been suggested that continued mental activity may protect against cognitive decline in later life. For instance, the idea of reserve capacity[1], suggests that individuals with high levels of intellectual, educational, or occupational attainment can sustain more brain damage before compensation mechanisms fail, and structural brain damage leads to clinical manifestations. Moreover, dynamic factors referred to as 'intellectually engaging activities' or 'cognitive activities' appear to be negatively related to cognitive decline[2]. This is in line with the 'use it or lose it' principle[3], implying that cognitive activity may have a protective effect against a decline in higher brain functions, especially in later life. The use of computer and internet applications may also provide such cognitive activity and at the same time hold great promise to maintain autonomy and increase quality of life for older adults. The research presented here aimed at studying the impact, both positive and negative, of acquiring computer skills and of using a computer and internet facilities on several aspects of autonomy in later life. In order to achieve this objective, an intervention study was performed to investigate the impact of computer and internet use on four separate domains: cognitive functioning, wellbeing, quality of life and social network, the use of everyday technology, and physical functioning. **Method** The intervention consisted of a brief training and subsequent use of a computer with an internet connection at home for a 12-month period. Participants who were interested in learning to use a computer and the internet were randomly assigned to the Intervention Group, the Training/No-intervention Group, or the No-training/No-intervention Group. A fourth group consisted of participants with no interest in computer use. Participants were 236 healthy, community-dwelling older adults aged 65 to 75. At three moments during the intervention, a cognitive test battery was administered (baseline, 4-month follow-up, 12-month follow-up). This battery included tests of verbal memory, psychomotor speed, processing speed of general information, cognitive flexibility, selective attention and subjective cognitive functioning. In addition, a questionnaire was administered at all test occasions covering several domains of wellbeing, autonomous functioning, and the use of everyday technology. **Results & Discussion** The results of this randomized controlled study showed no effects, neither positive nor negative, of computer and internet use on cognitive functioning, autonomy, well-being and social network, the use of everyday technological devices and subjective physical functioning. Overall, it was concluded that computer and internet usage by healthy older adults is a safe activity, albeit with no robust advantage for cognitive capacity in healthy older adults.

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Keywords: health & self-esteem, use-it-or-lose-it, cognitive reserve, computers, internet
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Full paper: No

E. ZELINSKI. ***Improving performance on cognitive tasks: A meta-analysis.*** *Gerontechnology 2012;11(2):221-222;* doi:10.4017/gt.2012.11.02.245.00 **Purpose** Cognitive exercise for 'brain training' using computer technology is a recent innovation. Studies of repetitive practice of cognitive skills on simple tasks using computers, i.e. extended practice training, may produce transfer, that is to say improvement on tasks that were not practiced during training. Aerobic exercise has historically been suggested to improve older adults' performance on cognitive tasks. The two types of training were contrasted to determine which is more generally effective. **Method** In studies with groups of adults over age 55 that used either aerobic or extended practice interventions, untrained task performance were evaluated and selected for analyses; a control group was also included. There were 42 studies with 3,781 participants. Between-group effect sizes (d's) that

accounted for improvements in performance in the control groups due to test-taking were computed. There was a total of 218 effect sizes. Multilevel modeling to accommodate multiple outcomes in individual studies was used to test differences in effect sizes as a function of training type (aerobic vs. extended practice)[1]. **Results & Discussion** Average model estimated that effect sizes differed significantly from zero, but there were no differences between extended practice and aerobic exercise (ds=0.33). High quality studies (d=0.42) produced larger effect sizes than low-quality (d=0.22) ones. Both extended practice and aerobic exercise improved performance on untrained cognitive tasks in older adults. The use of technology for cognitive training is effective in older adults. However, we caution that it is important that commercial products for training be tested for efficacy, as few randomized controlled clinical trials have been conducted on such products. This research was supported in part by grant R01AG10569 from the National Institute on Aging.

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Keywords: meta-analysis, aerobic exercise, extended practice,transfer, cognitive training
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