

Dementia and Technology

Understanding the implications of a SAR lead cognitive training intervention for older adults with and without MCI G. Mois, C. Page, B. Collette, K. N. Smith, C. Wysocky, P. Gibson, K. G. Emerson, S. Correia, L. Boccanfuso, A. Ramachandran, L. M. Renzi-Hammond, J. M. Beer *Gerontechnology* 25(s)

Purpose The number of people who are impacted by dementia worldwide has been incrementally growing, with nearly 10 million new cases each year [1]. Although some dementia related risks are unmodifiable risk (e.g., family history, age), many risk factors are modifiable (e.g., socialization, cognitive engagement, lack of physical activity) [2]. Modifiable risk factors can be mitigated through lifestyle changes and engaging behavioral interventions (e.g., cognitive training) to support prevention and delay the progression of cognitive decline in patients with mild cognitive impairment [3]. Cognitive training utilizes high-impact cognitive exercises to enhance functioning across various cognitive domains (e.g., attention, memory) to help reduce the risk of cognitive decline [4]. Multi-domain focused cognitive training is thought to provide greater cognitive challenge, increased stimulation of neural plasticity, and increased likelihood of achieving statistical and clinical significance compared to single-domain training [5]. For example, musical engagement (e.g., piano lessons) can provide an excellent multi-domain model for studying neuroplasticity. Physical and economic barriers can make it challenging for older adults to participate in “hands-on” music learning activities, such as learning to play a new instrument. Technologies, such as socially assistive robots (SAR), show a promising potential to help bridge an access gap to these types of cognitive training resources and support adaptability based on users’ needs and preferences [6]. The goal of our research is to provide an in-depth understanding surrounding the potential of leveraging a SAR to deliver a music engagement (piano lessons) cognitive training intervention for older adults with and without mild cognitive impairment. **Methods** We conducted a randomized, controlled trial (NCT04051918) investigating cognitive function improvements from a 6-month music learning cognitive training intervention, delivered by a human-less computer-based instruction. Older adult participants (N=41) (M=72.56±5.38 years; 66% female; 82% White/Caucasian; 16% non-White); met inclusion criteria (less than 3 years of music education or experience, over age 65 years, TICS-41 score = 24-37) and were randomized to the same music learning curriculum delivered autonomously in-person, either via a computer based system or a SAR. Participants completed measures (social, cognitive, technology) and interviews at baseline, midpoint (3 months), and post intervention (6 months). All participants received an 88-key piano to allow them to practice at home. **Results and Discussion** Across both groups, there were improvements across multiple cognitive domains (e.g., executive functioning). When asked about the social attributes of the technologies, participants reported minimal discomfort and moderate warmth. Participants varied in their perception of technology-instructor competence, with a significant decline in perceived competence with the progression of music lessons (as lessons got harder). Overall, participants across both groups reported high levels of perceived ease of use, usefulness, and self-efficacy. Workload scores indicate that participants in both groups experienced increases across all domains with time. The SAR group reported higher workload scores than the computer condition, potentially attributed to a novelty effect or interaction complexity. Our findings provide important insights and implications for the delivery of technology-mediated cognitive training interventions. Moreover, we outline considerations for the design of interventions for the utilization of SARs as a medium of delivery.

References

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Address: College of Public Health, University of Georgia, 100 Foster Rd, Athens, GA 30606, United States

Email: mois@uga.edu