



Comparing two different orientation strategies for promoting indoor traveling in people with Alzheimer's disease



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ABSTRACT

The present study compared two different types of orientation strategies: an assistive technology program (AT, i.e., remotely controlled sound/light devices) and a backward chaining procedure (BC) for promoting indoor traveling in four persons with moderate to severe Alzheimer's disease (AD). A social validation assessment of the two strategies was also conducted employing undergraduate students as raters. For three out of four participants, AT intervention was more effective than the BC procedure, whilst for the fourth participant the two types of intervention had a comparably satisfying efficacy. A doubly Multivariate Analysis of Variance on social validation assessment data provided generally more positive scores for the AT intervention. These results suggest that AT programs (a) can be valuably employed for restoring and maintaining independence in indoor traveling in people with moderate to severe AD, and (b) might be perceived as preferable to conventional teaching strategies within daily contexts.

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1. Introduction

Alzheimer's disease (AD) is a progressive neurodegenerative brain disorder that usually occurs in old age, and is marked by a decline in cognitive functions such as remembering, reasoning, and planning, and by a variety of behavioral and psychiatric symptoms, such as agitation, delusions and depression (Ferri et al., 2005; Mayeux, 2003). People suffering from AD often show disorders in spatial and topographical orientation, at first restricted to new and unfamiliar environments, and then extended to familiar ones (e.g., Caffò et al., 2012; Monacelli, Cushman, Kavcic, & Duffy, 2003), with negative implications on independence and self-confidence (Conde-Sala, Garre-Olmo, Turró-Garriga, López-Pousa, & Vilalta-Franch, 2009; León-Salas et al., 2013; McLaughlin et al., 2010; Passini, Pigot, Rainville, & Tetreault, 2000; Rainville, Passini, & Marchand, 2001).

Recently, Caffò et al. (in press) reviewed the strategies for reducing topographical orientation disorders in elderly people with dementia, specifically in persons with AD. Eight experimental studies published between 1981 and 2013 were analyzed and their approaches were classified as restorative or compensatory, depending on whether they relied or not on residual

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learning ability, respectively (Sitzer, Twamley, & Jeste, 2006). Studies based on compensatory strategies employed new ways of performing cognitive and behavioral tasks, which would bypass cognitive deficits. Specifically, they relied on the use of spatial cues (Namazi, Rosner, & Rechlin, 1991; Nolan, Mathews, & Harrison, 2001) as well as assistive technology (AT) programs (Lancioni et al., 2011; Lancioni, Perilli, et al., 2013). Studies based on restorative strategies, on the other hand, aimed to restore functioning in specific domains with the ultimate purpose of returning it to pre-morbid levels, or slowing the progression of the disease. Interventions employing restorative strategies included reality orientation (Hanley, 1981), errorless-based technique (Provencher, Bier, Audet, & Gagnon, 2008) as well as backward chaining programs (McEnvoy & Patterson, 1986; McGilton, Rivera, & Dawson, 2003).

Results of the studies reviewed suggested that it is possible to reduce spatial orientation disorders in dementia, and specifically in AD. In terms of the assessment of training efficacy, all the studies reported positive/mixed changes on spatial and topographical orientation abilities after the interventions. Both compensatory and restorative approaches seemed to be valuable in enhancing correct way-finding behavior, with various degrees of effectiveness. The best results were obtained with compensatory strategies, in particular with AT programs. These interventions proved to be highly effective in reducing spatial orientation disorders in AD, probably because they were aimed at supporting and recovering functional daily life ability without requiring effective learning skills. Restorative strategies, by contrast, showed partial results, especially at follow-up measurements. Studies using these strategies suggested that cognitive training programs may have only a modest impact on way-finding skills, slightly improving spatial and topographical memory functions in the short-term period.

While the results of the two approaches seemed clearly different, questions about participants' characteristics and experimental designs made it quite difficult to draw a definite conclusion about those approaches and their usability. Indeed, participants included in the intervention programs had different levels of cognitive functioning, ranging from mild to extremely severe (i.e., Mini Mental State Examination from 4 to 24), or not even specified (McEnvoy & Patterson, 1986). Moreover, six of the eight studies employed a single-subject design, while two studies employed a case-control design. A third question that was not really taken into account when evaluating the differences between the two approaches concerns their practicality in terms of environmental interference/disturbance and human and economic costs (Lancioni et al., 2011; Lancioni, Perilli, et al., 2013; Lancioni, Singh, et al., 2013).

The present study was aimed at pursuing within-subject comparisons between an assistive technology-based (AT) orientation program (i.e., a compensatory strategy) and a backward chaining (BC) program (i.e., a restorative strategy) with four participants with moderate to severe AD who traveled to indoor destinations. These comparisons were to shed some light on the first two questions stated above. The study also proposed a social validation assessment, in which psychology, nursing, and special education undergraduate students, were asked to rate the patients' travel performance on a number of questions related to practicality and affordability of the two program conditions (Callahan, Henson, & Cowan, 2008). This assessment was thought useful for a better appreciation of the third question mentioned above.

2. Method

2.1. Participants

The patients (Jenny, Woody, Michael and Marlon) were 81, 89, 67 and 83 years old, respectively. Jenny and Woody were deemed to function at the moderate level of Alzheimer's disease, while Michael and Marlon were diagnosed to be at a severe level of the disease. Their scores on the Mini Mental State Examination (Folstein, Folstein, & McHugh, 1975) were 12, 17, 6, and 10, respectively. None of them was depressed according to scores on the Hamilton Depression Rating Scale (Hamilton, 1960). Michael and Marlon received pharmacological treatment in the form of galantamine and rivastigmine, respectively. Jenny and Woody lived in a residential care facility, whilst Michael and Marlon attended a day center. All of them were involved daily in a supervised activity program and were able to walk without any support. They showed no hearing or vision loss and understood simple verbal instructions. Their spatial and topographical orientation abilities were very poor, and they failed to orient themselves even in very familiar environments and could not travel independently. Nonetheless, they seemed to be willing to travel from one room to another and to enjoy the opportunity to go for a little walk in the morning. This study was well accepted by the staff personnel of the facilities that the participants attended, and was formally approved by an Ethics Committee connected to those facilities. The patients' families had provided formal consent for their participation in the study.

2.2. Setting and sessions

Data were collected between February and May 2012. Two routes for each patient were arranged. For the patients of the residential care facility (Jenny and Woody), the first route started from the living room and ended inside their own bedroom; the second route corresponded to the reverse path, that is, from the bedroom to the living room. For the patients of the day center (Michael and Marlon), the first route started from the living room and ended in the coffee corner; the second corresponded to the reverse path, that is, from the coffee corner to the living room. The routes were approximately 18–20 m long, and matched in number of turns, since each route had two 90-degree turns. Each route was divided into five sections of the same length. Within each session, the patient was asked to reach the target destination to show the research assistant pictures and/or to meet people present there. All the patients were familiar with the rooms used as starting points and target

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