

# **Socially Assistive Robots for Interaction With Older Adults With Dementia**

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## **Objectives.**

The study will evaluate the overall effectiveness of Ryan Companionbot (aka Ryan) with interactive gameplay to have a positive impact on a user's cognitive function, performance of activities of daily living, and mood. An active control group will perform solitary physical and cognitive activities such as walking and crossword puzzles, sudoku, or solitaire. Our hypothesis is individuals playing interactive cognitive and physical games with Ryan will have a greater positive effect on cognitive function, performance of activities of daily living, and mood compared to individuals engaging in solitary physical and cognitive activities.

## **Desing.**

The study addresses design and analysis problems common to published brain training intervention studies and follows recommended best practices of preregistration, adequate documentation, pretest baseline, control conditions, sampling and randomization, dosing, blinding, contingent analysis, statistical analysis, and scattershot publishing without full documentation. The pilot study will be comprised of two groups of people diagnosed with mild Alzheimer's disease and related dementia senior subjects. Subjects will play games with and administered by Ryan, 2-3 times a week and 30-minutes per day. The team will measure the changes and improvement in the social/emotional well-being of these two groups and eventual changes in the cognitive/memory functions of elderly people living in a similar environment.

## **Methods.**

The study with Ryan CompanionBot will occur in ESC's and Kavod's library or atrium or a location free of distractions and intrusion. A staff member will be present during all sessions to assist with user operation, document behavioral observations, and ensure the safety of participants by intervening if the subject shows signs of distress. Ryan's sensors will record all of the subject's activities and interactions including the gameplay. The system will record all dialogs between the subjects and Ryan, along with Ryan's decisions for additional analysis of the individuals' behaviors. Prior to running the sessions, we will interview each participant and his/her caregivers to understand the main weaknesses and problems related to physical and cognitive limitations from their dementia, and to learn about their favorite colors, objects, animals, music, names of close relatives, and cherished belongings to personalize the experience. Participants will complete the Saint Louis University Mental Status (SLUMS) test, a screening method for Alzheimer's and other dementia. Scores range from 0 to 30. Scores of 27 to 30 are considered normal in a person with a high school education. Scores between 21 and 26 suggest a mild neurocognitive disorder. Scores between 0 and 20 indicate dementia. The measurement will be conducted three times throughout the study.

## **Statistical Analysis Plan.**

Statistical analysis will include multi-way Analysis of Variance (ANOVA) to find the significance of the findings and the effect of different parameters and variables on the measured outcomes within and between the two groups.