

The effects of improvisational theatre (improv) vs. group television watching on cognitive ability and mood in people with age-related memory complaints

Dustin Harris, Justin Koh, Andrew C Lai, Josue Fernandez

As people age, there is a high chance their cognitive abilities will decline. The Baby Boomer population will soon reach an age where this is a major problem. As cognitive ability declines, so does quality of life. Everyday, 10,000 baby boomers turn 65 and this trend will continue for the next 15 years. With potential millions in need of a solution, cost is a major issue as well. Different forms of stimulation, like music and puzzles, have been shown to improve cognitive ability. Improvisational theatre is a form of stimulation that has not been thoroughly researched in older adults. This is a randomized control pilot study for utility and preliminary efficacy of improvisational theatre on cognitive ability and mood in older adults with age-related memory complaints. 11 elderly participants with age-related memory complaints from an assisted living center were randomized into an improv class (n=5) or a television watching control group (n=6). The improv group participated in an improv class once a week, for 8 weeks, lasting one hour per session. The passive stimulation group watched television or a movie for one hour a week at the same time as the improv class, for 8 weeks. The participants were given the following surveys one week prior to the start of the study and again the day of the last session: Montreal Cognitive Assessment, Verbal Fluency Test, Letter-Number Sequencing Test, Geriatric Depression Scale, Memory Functioning Questionnaire and the Functional Activities Questionnaire. The improv group demonstrated an average improvement in executive function, memory self-appraisal, phonemic cognition, and a decrease in mild cognitive impairment. The verbal fluency test, which measures phonemic cognition showed significant improvement with a p-value of 0.037. In the television watching group, there was an average improvement in executive function, phonemic cognition and some aspects of memory self-appraisal. None of which were significant. No adverse events occurred during the study. This study shows that improv has the potential to improve phonemic cognition because there was a significant increase in the study. Though the other areas that were tested (depression, executive function, working memory, memory self-

appraisal or mild cognitive impairment) did not improve significantly, all either improved more than the control group or regressed less than the control group. Since this was the first study of its kind, more researchers should explore the effects of improv on cognition in elderly persons. Subjectively, the improv participants improved greatly in their ability to follow and remain active during the various games.

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1 The Effects of Improvisational Theatre (Improv) vs. Group Television Watching on Cognitive
2 Ability and Mood in People with Age-Related Memory Complaints

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11 **Abstract**

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Introduction

With the aging of the Baby Boomers, the population of the elderly will reach over 60 million in the coming years. Older adults will account for 25% of the U.S. Population in the coming future.^{1,2} As people age, they frequently develop mild memory complaints that usually indicate a decline in memory performance compared to abilities in young adulthood but not severe enough to affect daily functioning. This condition has been termed “normal aging” or “age-associated memory impairment” and has not been found to increase the risk for greater cognitive deficits (Crook et al, 1986; Small et al, 2000). These are just the early changes, eventually the cognitive deficits may become worse, so prevention research is being done. Since there are so many people in need of treatment for this impairment, it needs to be effective and affordable.^{1,2} The treatment will be given to people who want to maintain their independence for as long as they can.¹

It has been shown that cognitive training can delay the effects of mild cognitive impairment.¹ Different forms of stimulation have increased various forms of cognition, including memory. “Memory is the ability to retain, store, and recall information” (Kueider 2012). There are many different types of memory, each have varying forms of improvement in different studies involving various cognitive training techniques.¹ Computer cognitive training has shown to have improvements in immediate memory, attention, visuospatial and delayed memory.² Video games, music and puzzles have similar effects. This may be due to the brain being able form new connections, even late in life, this is termed 'plasticity'.³ Having new experiences and learning new skills can form new pathways through dendrites in the brain.³ This shows that memory deficits can be reversed and non-drug treatments can be used to this effect.

While improvisational theatre has been shown to stimulate cognition in the general population (Magerko et al 2009), it has not been studied in older adults with age-related memory complaints. Improv involves a different kind of thinking that isn't regularly experienced in everyday life, “the process and product of creativity occur simultaneously” (Lewis and Lovatt, 2013) because it is not scripted.⁴ The actor must think on his feet to come up with the next line. When he can't think of anything, he must turn to his other partners in the scene, this makes improve a social experience also.⁴ The improv scene/world is constantly changing. Once you are in the scene, every action creates a ripple in a pond, everyone one must react as the world changes around them.⁴ The improv space is limited only by the imagination of the improvisers, they must picture themselves as someone else in a whole new world.⁴ Within each character, story and world there involves limitless details left up to the actors. “One way of viewing improvisation is as the act of real-time dynamic problem solving” (Magerko 2009).

Improv involves short unscripted theatre scenes, called games, most games have guidelines that dictate the do's and do not's of the scene.⁵ Suggestions involving the location or situation of the scene are asked of the audience or given by the teacher.⁵ Nothing is known about the content of the scene before a suggestion is obtained. The actors have very little time to prepare what they will say or do. Magerko goes on to describe improv as:

“(a) the creation process of narrative content takes place entirely in real- time, (b) there is no explicit coordination between the actors, and (c) in the case of unscripted improv, the

constraints on a performance are typically of the form of a set of game rules plus audience suggestions, both of which are typically unknown to the performers until right before a scene is performed.”(Magerko 2009).

Sometimes actors draw inspiration from past experiences, which causes you to access your memory for real-time use during a scene.⁵ Actors in the scene must communicate to have the scene progress and use mental imagery to make the improv world around them more real.⁵

We developed this program using past research involving stimulation and cognition. With the lack of improv-specific research in the elderly, there was not much to model the study after. We believed there was a probable chance of having an effect on the participants. To address the growing concern of Alzheimer's and Dementia in the elderly, more novel ideas are needed. To end this, improv is simple, fun, and cheap, making it a viable option for treatment.

This study measures executive function, memory self-appraisal, frequency of forgetting, seriousness of forgetting, retrospective functioning, mnemonic usage, phonemic cognition, working memory, mild cognitive impairment and depression.

Methods

Ethics Statement

This study was approved by the University of California, Los Angeles Institutional Review Board. The assigned number is IRB#13-000596. Written informed consent was obtained from each participant prior to the initiation of the study.

Study Design

This is a randomized, control trial to assess cognition and mood in elderly persons with mild cognitive impairment. Participants were randomized to either the television or improv group. Using a random number generator, each participant was assigned a number; even numbers were placed in the improv group, odd numbers were placed in the television watching group, or Passive Stimulation Group. Each subject completed several evidence-based cognition and mood measures at the beginning of the study. The measures included: Letter-Number Sequencing, the Geriatric Depression Scale, a verbal fluency test, the Functional Activities Questionnaire, the Montreal Cognitive Assessment (MoCA), and the Functional Memory Questionnaire. Participants either watched television for one hour per week in groups (control group), or participated in a one-hour improv class (intervention group) each week for 8 weeks. The improv class played games, acted out scenes, and role played. At the completion of the final television-watching and improv class, participants completed the measures given at the beginning of the study. The improv class was taught by Dustin Harris using common improv activities. The participants warmed up with singing, clapping, and playing games that raise the energy of the participants. They passed around imaginary objects and learned several rhyming games. After warm-up the participants sat down. They were called up in groups of 2, 3, and 4 depending on the game. The process of calling up the participants was random and/or up to the motivation of the participants. The games had the participants assume imaginary acting roles and interacting with each other. The participants were required to switch roles with little notice or have their imaginary environment changed at a moment's notice. These games were trying to elicit laughter and fun from the

participants. The passive stimulation group sat together and watched "The Price is Right", "Days of our Lives" or other daytime television shows/movies that were on television while the research team was at the site. This group was used as a control for the improv treatment. The participants played some combination of the following improv games:

- "Conductor" involves each participant sitting in a circle and making their own noise. They repeat this noise along with each other participant. The conductor in the middle of the circle motioned for the participants to go louder, softer or focus on a select few.
- "Blind line" involves the participants acting out an unscripted scene. During the scene, the participants must pick up pre-written lines off the ground and read them aloud. The participant then must justify the line they just spoke.
- "New choice" involves the participants acting out an unscripted scene. At any point in the scene, the teacher will call "New Choice" and whatever was previously said by an actor in the scene will have to be replaced by a new line of dialogue.
- "Good, bad, worse" involves the audience asking the participants for advice. One participant will give good advice, one will give bad advice and the last participant will give worse or terrible advice.
- "Categories" involves the participants sitting in a circle. The teacher will pick a category and the participants will go around and name things in that category. The categories ranged anywhere from cars to colors.
- "Naive replay" involves the participants acting out an unscripted scene with one person absent. The absent person should still have a part in the scene. This person will then enter after the scene has completed and the scene will be replayed with the missing person now present. The missing person should have no knowledge of the scene.
- "Questions only" involves the participants acting out an unscripted scene that only involves questions.
- "Alphabet" involves the participants sitting in a circle. The participants will go around saying sentences in a story starting with the first letter in the alphabet and continue through the alphabet. Until the story has concluded.
- "Freeze tag" involves the participants acting out an unscripted scene. The audience members will yell "freeze." The participants will freeze and then switch places with the audience member that yelled "freeze." The scene will resume in the same positions but in a new location and plot.
- "Zip, zap, zop" involves the participants sitting in a circle. The participants pass around the energy and say zip, zap or zop. They must alternate in sequence.
- "Red ball, red ball" involves the participants sitting in a circle. They will pass around an imaginary red ball. Then, a green ball and blue ball will be added in to be passed around.

Inclusion Criteria

The study included participants who have either noticed a subjective change in their memory, or have been predetermined by the site manager as suitable to benefit from the study.

- a. Agreement to participate in the 10 week study
- b. Experiencing either no memory problems, mild memory problems or diagnosed with Mild Cognitive Impairment.
- c. Age 50 to 100 years.
- d. Adequate visual and auditory acuity to allow neuropsychological testing.
- e. Physically healthy.

Exclusion Criteria

- a) Diagnosis of probable Alzheimer's disease (AD) or any other dementia (e.g., vascular, Lewy body, frontotemporal) (McKhann et al, 1984). Evidence of other neurological or physical illness that can produce cognitive deterioration. Volunteers with a history of stroke, TIA, carotid bruits, or lacunes on MRI scans will be excluded. Determination of dementia will be based on the clinical evaluation including assessment of functional abilities, and cognitive screening.
- b) Current diagnosis of any major psychiatric disorder according to the DSM-IV TR criteria (APA, 2000).
- c) Use of cognitive enhancing supplements (e.g. Ginkgo biloba).
- d) Pregnancy.

Screening

Before the study, eligibility was determined by the manager of the site using her knowledge of the possible participants. If she felt these people had age-related memory complaints, they were recommended for the study. The managers also asked various persons they work with if they personally felt they had age-related memory complaints. Those who recognized they did, were recommended for the study.

Recruitment

Site managers and employees of the group home City View Villa recommended participants for our study. The manager informed participants, who they felt had age-related memory complaints, about the class and research study. If the patients felt they had age-related memory complaints and they were interested in the study, a meeting was scheduled with the research team to discuss the logistics of the study and consent was obtained.

Confidentiality

Identifiable information was only accessed by the principle investigator, Dustin Harris. When not used for the study, the data was locked in a safe. During data analysis, participant identifiers were obscured to preserve participant confidentiality.

Outcome Measures

The following tests/surveys were given to the participants:

- Functional Activities Questionnaire which measured executive function.

- Memory Function Questionnaire which measured memory self-appraisal in the following categories- - frequency of forgetting, seriousness of forgetting, retrospective functioning, and mnemonic usage.
- A verbal fluency test which measured phonemic cognition.
- Letter-Number Sequencing which measured working memory.
- The Montreal Cognitive Assessment which measured mild cognitive impairment.

Statistical Considerations

The pre and post results of the study, in both groups, were run in a two-tailed T test with a significant P-value of 0.05.

Results

Participants

This study began with 15 participants. 3 exited the study on their own volition and one was under the age of 50 years old. This last participant still participated in the improv class but his memory deficits were due to previous drug use and advanced age. His results were not included in the study. Out of the 11 participants, 8 were female and 3 were male. The average age was 73.3 years in the passive stimulation group and 79 years in the improv class group.

Outcome Measures

As seen in the attached below, in most areas, there was an improvement in the improv group. The Geriatric Depression Scale score in the improv group improved from 4.8 to 3.4, which is a larger improvement than in the television group, 3 to 2.5. In the Functional Activities Questionnaire, again there was an improvement. The improv group went from 8.8 to 7.7 and the television group went from 7.83 to 6.83. The Memory Functioning Questionnaire is broken down into general frequency of forgetting, seriousness of forgetting, retrospective functioning, and mnemonic usage. In the improv group there was an improvement in each area except for retrospective functioning. In the control group, there was only improvement in retrospective functioning and general frequency of forgetting. Both groups improved in verbal fluency but the improv group's improvement was significant with a p-value of 0.037. The MOCA showed improvement in the improv group but regression in the control group. Lastly, both groups regressed in the Letter-Number Sequencing test. Yet, the improv group regressed to a lesser degree 7.2 to 6 instead of 7 to 4.33.

Test	Pre-GDS	Post-GDS	Pre-FA Q	Post - FA Q	Pre-MF Q	Post - MF Q	Pre - VF	Post -VF	Pre-MOC A	Post-MOC A	Pre - LNS	Post-LNS
Television (Control)	3	2.5	7.83	6.83	152.83, 87.5, 18.1, 33.67	162.17, 84.17, 18.83, 30.83	5.5	7.83	17.5	15.66	7	4.33
Improv (Experiment)	4.8	3.4	8.8	7.7	147.25, 97, 19, 22	176, 104.25, 18.25, 23	7.5	16.5	21.6	22.4	7.2	6

Figure 1: The average score for each group, before and after the study. MFQ is broken down into general frequency of forgetting, seriousness of forgetting, retrospective functioning, and mnemonic usage. GDS= Geriatric Depression Scale, FAQ= Functional Activities Questionnaire, MFQ= Memory Functioning Questionnaire, VF= verbal fluency, MOCA= Montreal Cognitive Assessment, LNS- Letter-Number Sequencing.

Discussion

As evidenced by the results, the average change in most areas that were tested was positive. There was even a significant change in phonemic cognition shown by the verbal fluency test

results.

The GDS-SF test, which measures depression, showed a greater improvement in the improv group over watching television. Same with the FAQ, which measures executive function, and several areas of the MFQ. The only areas where there was regression in the improv group were retrospective functioning in the MFQ and working memory in the LNS. There was also regression to a greater degree in the television group in working memory. Subjectively, there were indeed changes in the improv group. The participants became much better at improvisational theatre. Because the improv experience is different every time, the participants could not memorize how to perform better. It is in the author's opinion that cognition improved over the course of the study which led to better functioning during the improv performances.

Some limitations of the study included lack of funding and lack of incentive for the participants, creating a very small sample size. We hope those reading may learn from this experiment and improve upon it. We learned that improv can have some positive effect on cognition in elderly persons experiencing age-related memory complaints compared to those who just watch television.

In the future, this experiment will be repeated with better funding and a much larger sample size. This may not happen for a few years so it is up to the reader to take the necessary steps until that time comes.

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