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**Purohit Saraswati**  
Assistant, Lecturer, JSS  
College of Nursing, Ramanuja  
road, Mysuru, Karnataka,  
India

**Sunitha PS**  
Assistant, Lecturer, JSS  
College of Nursing, Ramanuja  
road, Mysuru, Karnataka,  
India

**Rashmi P**  
Assistant, Lecturer, JSS  
College of Nursing, Ramanuja  
road, Mysuru, Karnataka,  
India

**Corresponding Author:**  
**Purohit Saraswati**  
Assistant, Lecturer, JSS  
College of Nursing, Ramanuja  
road, Mysuru, Karnataka,  
India

## Games to improve cognitive functions in children

**Purohit Saraswati, Sunitha PS and Rashmi P**

### Abstract

Children in their critical period or commonly known as golden age are in their optimal stage where they grow and develop rapidly and absorb anything which is exposed to them. Therefore, this is the period when the parents and older person have the opportunity to give the appropriate influence thus the children's development can result optimally in all areas. The first and most critical aspect is the cognitive ability. Cognitive ability can become the basis of all input to be processed in the children's mind, thus its development will affect the children's ability to absorb anything from their surroundings. This article will discuss about learning activities which are effective to improve early childhood cognitive development. The discussion reveals that children in their early age are more active and effective in activities which are designed as games and will result more in their development as they are engaged in social interaction. Some games are proposed as alternatives for the children and parents to conduct and to be involved in.

**Keywords:** Games, cognitive functions and golden age

### Introduction

Brain training, or cognitive training, refers to a set of different activities or games that are tailored to enhance or maintain an individual's cognitive abilities, especially later in life. Cognitive (or brain) training includes a range of activities that are aimed at specific elements of cognition, such as those that test your working memory, reasoning & judgment, problem-solving, and attention. Cognitively stimulating activities can include mind-teaser games such as specific apps, crosswords, and sudoku, educational activities such as quizzes, intellectual inquiries, and mental challenges, in addition to some video games.

Cognitive functions are important for daily life at any age. One purpose of Smart Ageing is to investigate how to improve cognitive functions. Cognitive function includes a variety of mental processes such as perception, attention, memory, decision making, and language comprehension. Cognitive function serves a critical role in everyday behavior and social behavior. For instance, when one goes shopping, it is necessary to memorize information about what to buy, how to make a proper judgment to buy, and how to have a conversation with shop assistants. Considering communication with a friend, we identify the friend by looking at faces or hearing a voice and sharing information with the friend.

Our cognitive functions change during our lifetimes <sup>[1, 2]</sup> Cognitive functions improve from childhood to young adulthood. Some cognitive functions such as executive functions and working memory reach a peak during 20s or 30s. However, semantic knowledge (semantic memory) develops to the age of 60 or 70. An elderly person might experience a decline of several cognitive functions, including memory, attention, executive functions, and processing speed. A research study has demonstrated that higher cognitive functions in children and young adults are positively correlated with higher academic achievements. A decline in the cognitive abilities of older people has been shown to engender difficulty in performing basic activities of daily living. Consequently, improvements of cognitive functions using intervention programs are attracting attention at all age levels.

"This idea of training core cognitive abilities is new for people, especially in education, because it isn't content-based and because traditionally, school is thought of as a place where you're learning math facts or how to write an essay about history," This idea that your core cognitive abilities, like your attention and your working memory, kind of are at the periphery. It's not the focus of why you go to school <sup>[3]</sup>.

Through improving essential and underlying core cognitive abilities, children can perform better at higher order mental activities in school, such as analysis, evaluation and application. To improve memory, you first have to decide whether in this exercise you want to exercise visual memory (remembering what you see) or auditory memory (remembering what

you hear and read). Next you have to choose short-term or long-term memory. Short-term memory lasts only for 30 seconds, but it is impossible to create a long-term memory without first making a short-term memory. Here is a great example of an auditory short-term memory exercise:

### **How many words in a list can your child remember without making a mistake?**

First write down the word lists. At first, you say only one word and they repeat only one word, such as *map*.

Now you progress to two words to remember such as *street, door*. Now your child repeats *street, door*.

Now try a list of three words such as *person, silver, slip*.

Keep adding additional words until the child begins to make mistakes. You are taking a measure of their single isolated word memory capacity. If they give you a response in 30 seconds or less, this is one way to measure auditory short-term memory. If they can remember the list half an hour later, then you have created a long-term memory.

### **Improving your child's memory**

If your child can make a crazy picture in their head of what they are trying to remember, then it is more likely that a long term memory can be formed. Ask child to have their crazy pictures in their heads interact with each other in order to help remember the sequence or order of the words.

When measuring short-term or 30-second memory, 4-year-olds can typically remember a list of three short words. A 5-and-a-half-year-old might be able to repeat four simple short words such as *mom, dad, dog, cat*. A 6-and-a-half-year-old should be able to recite four words. Some 12-year-olds can remember five words in a list. But many adults struggle with accuracy for lists of five, six, or seven items.

Normal adult auditory memory capacity is thought to be seven chunks of information and a word is considered to be one chunk. That is why our original phone numbers were 7 digits long. We tended to make lots of memory mistakes when we added area codes, and phone numbers expanded to 10 digits.

Improving memory can be made more challenging by trying to remember words that are not easy to visualize such as *or, next, that, yet, for*. You can also exercise the brain by trying to remember lists of words while jumping with a jump rope or drawing xxx's across a page.

After professional brain training, most of us can easily remember a list of 20 items, and many can do more. One of memory techniques is to throw distracting words in while children are trying to memorize a list. For example while they are trying to learn a list adds in several color words that they are supposed to ignore while they memorize their word list.

### **Brain training games playing in the car**

Brain training is fun and rewarding. Busy parents can easily reinforce brain training even while they are driving around in their mini vans. Here is a top ten list of easy brain training games for families on the go....

Ten Brain Exercises for Families on the Go

1. Have your child call out the number and suit on standard Number cards as fast as they can go. Record their time on a timer as well as the number of mistakes that are made, so

that you can see the speed and accuracy improve as they go along. Make sure they say number and suit correctly and in the same order of numbers. They should complete all arranging numbers before you record their time.

2. Keep a tennis ball in your car. Have your child throw a tennis ball rhythmically from one hand to the other hand while they spell their spelling words one letter at a time. This can also be used to orally say their times tables, or skip count. A jump rope or a step bench can be substituted for the tennis ball.

3. Keep a tablet of graph paper in your car. To improve attention and concentration, tell your child to draw a repeating pattern of shapes in the boxes such as circle, triangle, rectangle, star. See if they can draw the pattern correctly for one minute. Progress to 2, 3, and 4 minutes to lengthen the attention span and time on task. Ask them to proof their work for mistakes, and mark any mistakes with a highlighter pen.

4. Practice note taking and memory by having your children write down license plate numbers as well as make, model, and color of passing vehicles. Two children or more can play at the same time, and can compare their notes to see who has the most entries in 10 minutes, and who would make the best detective or police officer.

5. Using paper and a pencil, give your child a time on the clock, such as 11:15 am Central Standard Time. Ask them to draw that time on a traditional clock face with minute and hour hand as well as record that time in writing as it would appear on a digital clock. Next tell them to draw the clock as it would appear in 6 hours and thirty minutes. Draw the clock as it appeared 2 hours and 10 minutes ago.

6. To improve both memory and attention, say the alphabet backwards, spell your full name (first, middle, and last) backwards. Recite the pledge of allegiance backwards.

7. Play category games: List all the colors that you know in one minute, in two minutes. List all the words that you know that mean small (tiny, little, petite, miniature, nano, micro, elfin). List all the animals you know, list all the words that you know that mean red (scarlet, auburn, crimson, brick, lipstick, cherry). Can you clip paperclips together while you say them?

8. Keep a few simple children's board puzzles in the car. They should be 20 pieces or less. How quickly can you assemble it? To increase the difficulty level, spray the entire puzzle one color...assemble it on a timer and try to go faster and faster.

9. Keep two identical Indian maps in the car. Play games to try to improve your child ability to listen and follow multistep directions and develop orientation skills. Start the game in your home state. Go two states East, go two states North, go one state West....What is the name of the capital city where you end up???? [4].

### **Easy materials to keep in the car**

List of the materials you can keep in a grab bag in your car for brain training on the go:

- Number cards
- Stop watch or cell phone timer
- Lined paper
- Copy paper
- Pencils& pens, highlighters
- Tennis ball
- Spelling word list
- Jump rope
- Graph paper
- Box of colored jumbo paper clips
- Children's board puzzle (20 pieces or less)
- Indian map

## The best apps for your brain

### 1. Lumosity

This popular app is split into sessions of three games tailored to your goals: memory, attention, problem solving, processing speed or flexibility of thinking. The games are played against the clock and change every time. Developers say just one session a day can improve mental skills and users can track progress and compare performance with others. (Free for limited access, upgrade for \$15 a month or \$80 a year; available for iOS)

### 2. CogniFit Brain Fitness

Improve cognitive abilities, such as memory and concentration, with sleek, fun and addictive games designed by neuroscientists. Users can track progress and access insights about overall brain health. Competitive players can challenge friends, too. After an initial quiz, the app adapts each game's difficulty to your profile and gives you recommendations based on your results. Developers found that users saw improvement by spending at least 20 minutes, two to three times a week, playing the games. (Free for four games or full subscription for \$13 a month or \$120; available for iOS)

### 3. Brain Trainer Special

Like Lumosity, this Android app contains games that have you memorizing letter sequences, phone numbers and solving assorted math problems to keep your mind in tip-top shape. Difficulty levels range from easy to brain-tingling hard. (Free; available on Google Play)

### 4. Brain Fitness Pro

Brain Fitness Pro employs a series of memory training exercises to increase focus, memory and problem-solving skills. Developers say that intensive working memory training dramatically increases attention and general cognitive skills and that these benefits remain long term. (\$4; available for iOS)

### 5. Happify

Train your brain to be happier? Yep, research shows that some activities help build your ability to conquer negative thoughts, show gratitude, cope with stress, and empathize — all essential ingredients for a fuller, happier life. Using fundamentals of positive psychology, which involves focusing on the strengths and virtues that enable individuals to create fulfilling lives, the app's quizzes, polls and gratitude journal — combined with a positive community — gradually teach life-changing habits. The goal is to build these skills and keep users smiling all day. (Free; available for iOS)

### 6. Positive Activity Jackpot

This app was originally developed for service members returning from combat with high risk for post-traumatic stress disorder. It uses augmented reality with an Android phone's GPS to find nearby activities and diversions for someone coping with depression. If you cannot make up your mind what to do, "pull the lever" and let the app's jackpot function make the choice for you. PAJ is based on a form of behavioral therapy called pleasant event scheduling, which encourages a daily schedule of enjoyable activities to improve moods and overcome despondent thoughts. (Free; available on Google Play)

### 7. Fit Brains Trainer

More than 360 unique games and puzzles aimed at stretching and improving your mental agility lead users through various tasks. Sessions get harder as you improve and will always challenge you and provide a solid brain workout. Keep track of your progress and performance tools and the program offers training recommendations for best results. (Free; available on iOS and on Google Play) <sup>[5]</sup>.

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