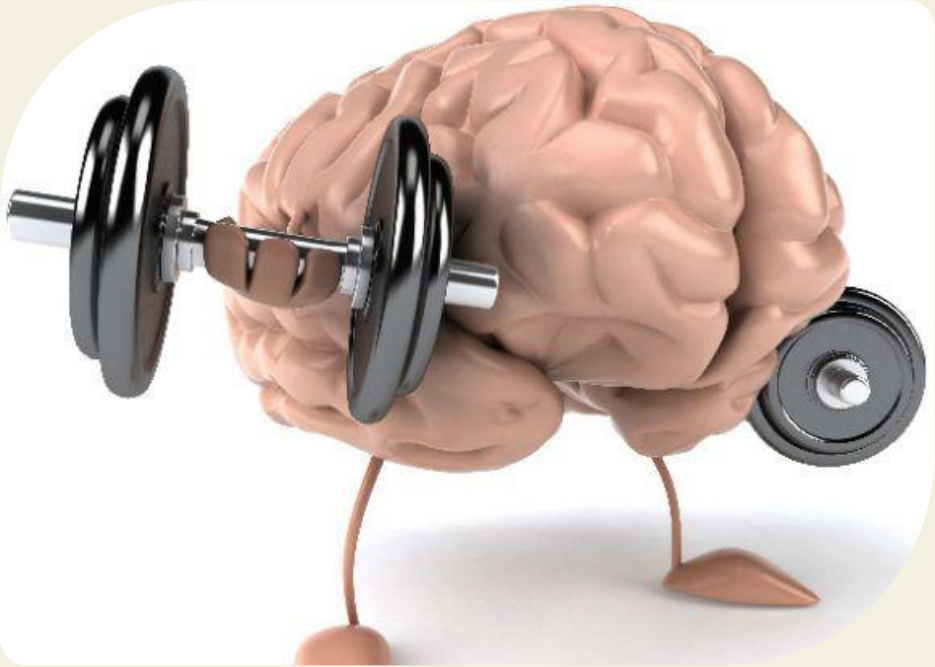
How Does Age Affect How Muscle Memory Develops?



Why Muscle Memory?

Muscle memory is a part of all living things. It is why you can walk without thinking, ride you bike after years of not practicing, and even just drive your car everyday. Muscle memory is why we can do these everyday activities without a second thought. Therefore, it is important to understand how it works and how it is developed in different age ranges.

How does age affect how fast muscle memory develops?

How Muscle Memory Actually Works

Muscle memory is “The ability to reproduce a particular movement without conscious thought, acquired as a result of frequent repetition of that movement.” (languages.oup.com) It has three phases. The cognitive phase, the associative phase, and the autonomous phase. According to my.clevelandclinic.org, the cognitive phase is when you have to think through what you are trying to do. The associative phase is when you are starting to be able to remember something but you can′t do it without thinking yet. The third and final phase is the autonomous phase. This is when you remember it completely and you can do whatever it us without thinking about it. During these stages, the muscle fiber nuclei (myonuclei) is increasing. As the myonuclei increases it becomes easier for your muscles to remember whatever the task is. More myonuclei also builds muscle mass which makes it easier to do the task over time.

Hypothesis

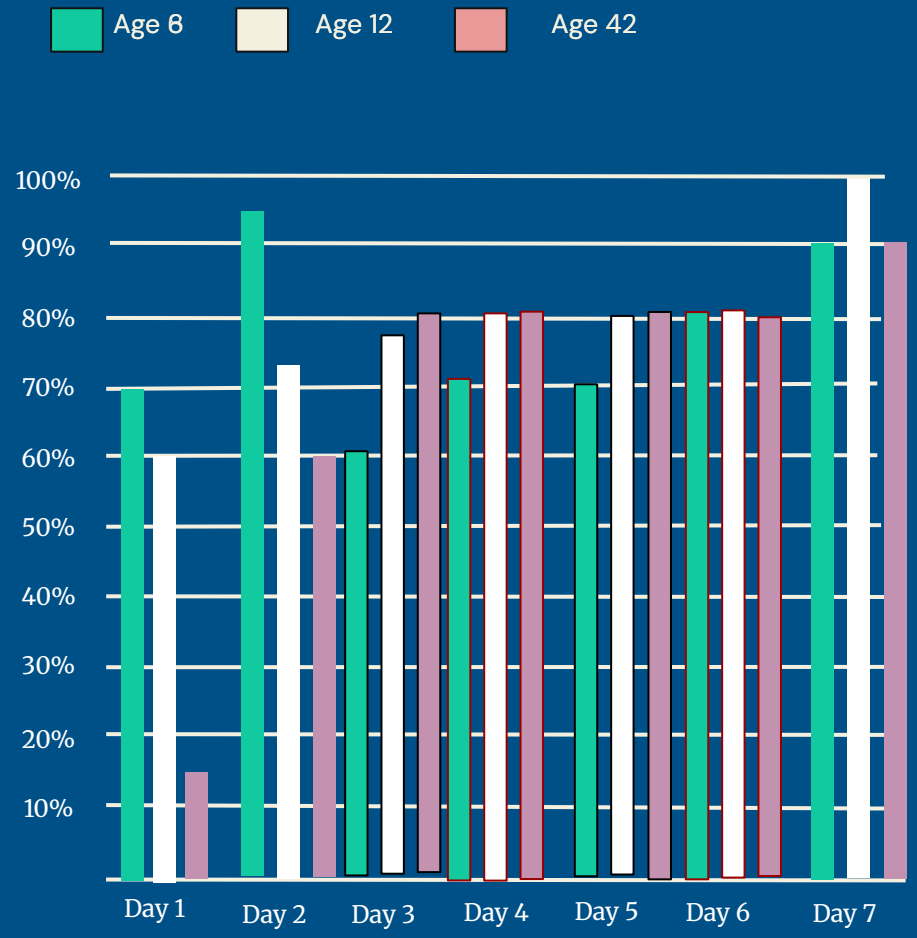
Children are going to develop muscle memory faster with the physical aspect, while teeanagers and adults will develop muscle memory in mental things more quickly.

How the Experiment Works

1. Physical –
    a. Asking them to remember a short dance
    b. Test how long it takes for them to remember it with little to no help over six days.
    c. Then, a week after that, tell them to do it again and see if they can
2. Mental –
    a. Asking them to remember an eight digit number
    b. Test how long it takes for them to remember it over six days
    c. Then, a week later, see if they still remember it due to muscle memory
    d. This is the string of numbers we used: 84629967

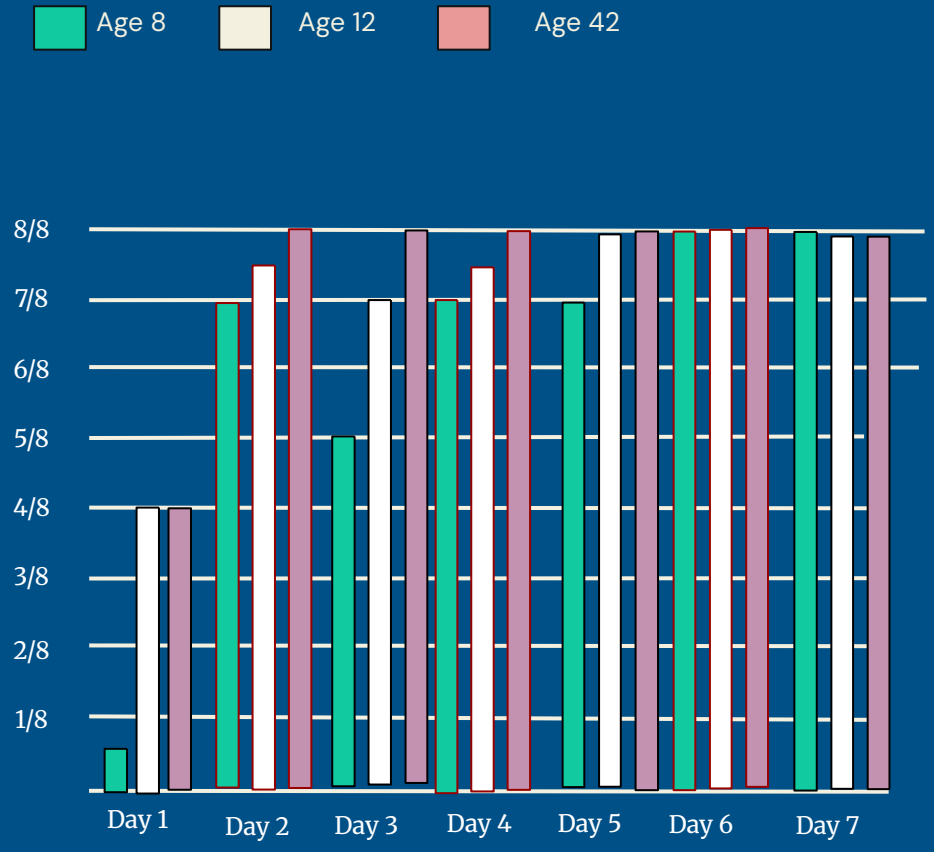
Physical Test Data

We averaged the ages into three groups. For example we had one 10 year-old and one 6 year-old so we averaged them and averaged there percentages into one group. In this experiment we based the scores of the dance on how many moves that the person did correctly, instead of how well they did the moves. For example, an 80% is missing only on of the 5 steps while a 90% is knowing the step just doing it incorrectly, which happened many times during this experiment.



Mental Test Data

We used the same method for the age groups during this experiment. For this data we used the number of digits they got correct in the sequence.



Physical Experiment Video

This is a video of the dance we used for the physical test. It was a five step dance that went along with the lyrics of the song “Teenage Dream” by Katy Perry. The girl in front was one of the twelve year-olds that we experimented on and as you can see she did it perfectly.

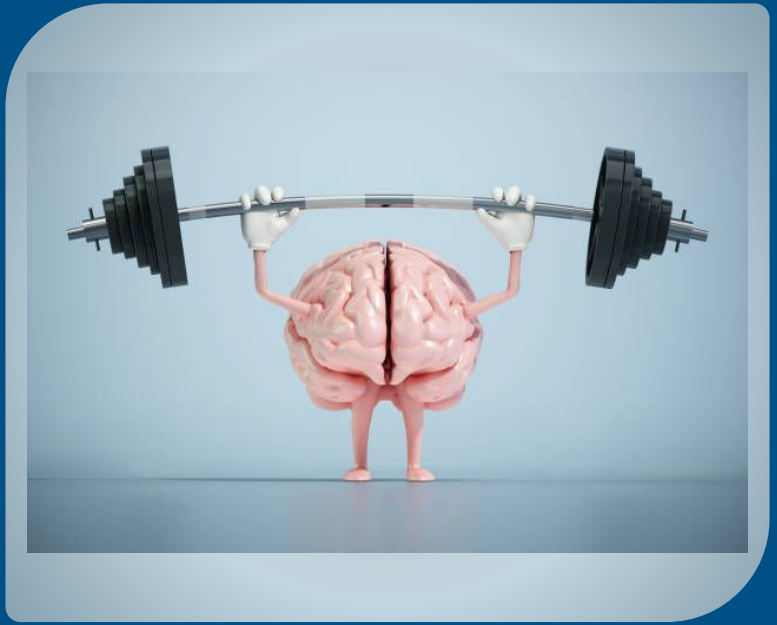
Physical Conclusion

Our original hypothesis was incorrect. For the physical test, we believed that the 6-10 age rage would be the best during this test because they are used to having to learn new things using their bodies. However, the 12 year-olds were the ones who did the best during this experiment.

They did the dance perfectly on the final test proving that they could remember the physical aspect of muscle memory the best. Our conclusion is that when you are a adolescent not only your body is developing but your mind is as well. These two things combined makes the 12 year-olds more likely to develop muscle memory more quickly than other age groups.

Mental Conclusion

We were correct in our hypothesis with the mental tests because the adults were the first to memorize the numbers and the youngest children were last to memorize it. However, we did not think that they would all completely memorize it by the end. This could prove that humans (of all ages) have better muscle memory when evolving remembering something mentally rather than remembering it physically .



If we did this again...

If we were to redo this experiment in the future we would use a larger variety in ages. We would use more test groups with more people in each group. This would give us better accuracy in our results and would help prove our hypotheses in a more accurate way.

Oxford Languages – English

Muscle Memory: What It Is & How It Works

The concept of skeletal muscle memory: Evidence from animal and human studies – PMC

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