

## Scientists Confirm That In Order To Succeed, You Have To First Fail

By Avery Elizabeth Hurt on December 9, 2014

If you have ever tried a new sport or attempted learning a musical instrument, you are well aware that the hardest part is getting started. Once you figure out the technique, the skills return fairly easily, even if they are not used for long periods of time. Most experts **attribute** this to "muscle memory," which means the brain remembers the action and can recall it when needed. Now some researchers from John Hopkins University believe there is another factor that may be as important in recalling previously learned motor skills - the errors made while learning the task

The study led by Reza Shadmehr, Professor of Biomedical Engineering, involved asking volunteers to play a simple video game: hitting a red target dot with a slightly smaller blue dot, similar to playing **virtual** darts. What the gamers did not know was that as soon as they mastered the game, the researchers **reprogrammed** it by moving the blue dot slightly off-course, thereby forcing them to restart the learning process. What the scientists observed was that though the volunteers did make mistakes every time the game was changed, they got **successively** faster at **mastering** it.



Shadmehr believes that this has to do with the fact that in addition to committing the task to muscle memory, the brain is also critiquing each wrong move and learning how to correct it. He likens it to having a coach that points out the mistakes and makes suggestions on how to improve.

What surprised the scientists, who published their findings in Science Express on August 14th, is that making mistakes not only trains the brain to perform better at a specific task, but also helps it learn faster from errors, even when the mistakes are made while learning a completely different task. The researchers believe that the brain keeps a general **database** of errors and draws on them whenever a new motor skill is being learned, to ensure that mistakes are not repeated. This helps makes **successive** learning processes much faster and probably explains why people who master one sport or musical instrument, are able to pick up others, with relative ease.

While for scientists, these new findings may be a way to help improve **rehabilitation** methods for people with strokes or spinal injuries, for the rest of us it means realizing that making mistakes is a good thing. So the next time you are practicing musical scales, working on your tennis serve, or learning any other motor skill, don't get discouraged by the errors - because that's just what you need to become the next Rafa Nadal or cellist **extraordinaire**, Yo-Yo Ma!

**"I have not failed. I've just found 10,000 ways that won't work."**

Thomas A. Edison

### COMPLETE THE FOLLOWING IN YOUR SCIENCE NOTEBOOK!

**Directions:** Answer the following questions in your notebook in complete sentences.

1. What is the title, author and date of the article?
2. Choose two words bolded in the article that are new, unfamiliar, or interesting to you. Define these two words using a dictionary and context clues.
3. What is muscle memory? What else do the researchers believe is important to learn new motor skills?
4. What experiment did Reza Shadmehr conduct? What did he find out? What surprised him the most about the results?
5. Why is this research important to scientists? To the rest of the world?
6. What do you think was the author's main purpose for writing this article?