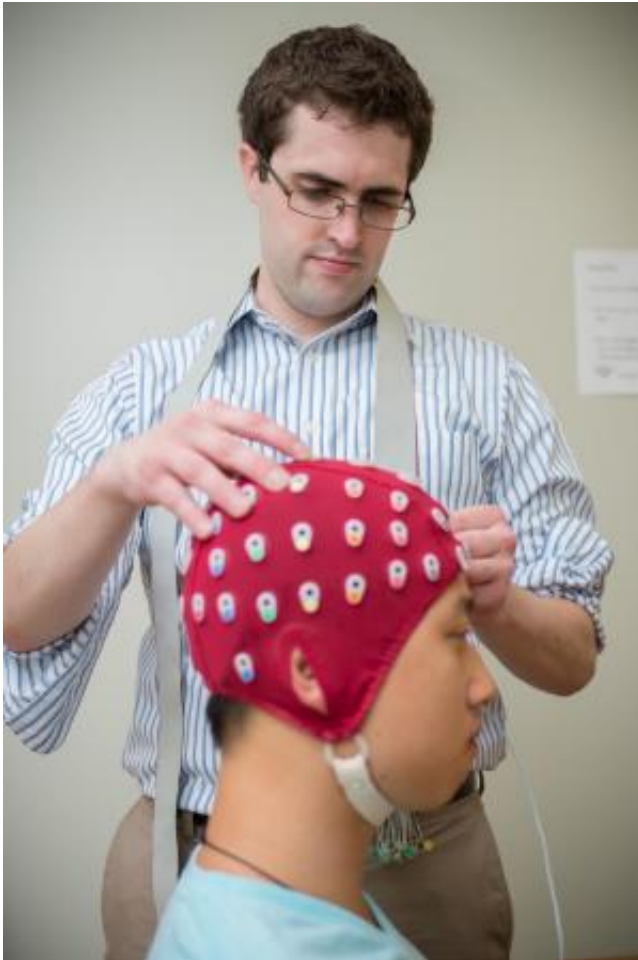


# Nature or nurture? It's all about the message

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A study led by Michigan State University's Hans Schroder, standing, suggests that simply telling people that hard work trumps genetics causes positive changes in the brain and may make them willing to try harder. Credit: Michigan State University

Were Albert Einstein and Leonardo da Vinci born brilliant or did they acquire their intelligence through effort?

No one knows for sure, but telling people the latter – that hard work trumps genes – causes instant changes in the [brain](#) and may make them more willing to strive for success, indicates a new study from Michigan State University.

The findings suggest the [human brain](#) is more receptive to the message that intelligence comes from the environment, regardless of whether it's true. And this simple message, said lead investigator Hans Schroder, may ultimately prompt us to work harder.

"Giving people messages that encourage learning and motivation may promote more efficient performance," said Schroder, a clinical researcher in MSU's Department of Psychology. "In contrast, telling people that intelligence is genetically fixed may inadvertently hamper learning."

In past research by Stanford University psychologist Carol Dweck, elementary students performing a task were either praised for their intelligence ("You're so smart!") or for their effort ("You worked really hard!") after correct responses. As the task became harder, children in the first group performed worse after their mistakes compared to the group that had heard effort was important.

The MSU study, which appears online in the journal *Biological Psychology*, offers what could be the first physiological evidence to support those findings, in the form of a positive brain response. "These subtle messages seem to have a big impact, and now we can see they have an immediate impact on how the brain handles information about performance," Schroder said.

For the study, two groups of participants read different articles. One article reported that intelligence is largely genetic, while the other said the brilliance of da Vinci and Einstein was "probably due to a challenging environment. Their genius had little to do with genetic structure."

Participants were instructed to remember the main points of the article and completed a simple computer task while their brain activity was recorded. The findings, in a nutshell:

- The group that read intelligence was primarily genetic paid more attention to their responses, as if they were more concerned with their performance. This extra attention, however, did not relate to performance on trials after errors, suggesting a disconnect between brain and behavior.
- In contrast, those who had read that intelligence was due to a challenging environment showed a more efficient brain response after they made a mistake, possibly because they believed they could do better on the next trial. The more attention these participants paid to mistakes, the faster their responses were on the next trial.

The study does not weigh in on the age-old "nature vs. nurture" debate, Schroder noted. Rather, it investigates the messages about the nature of abilities people are exposed to on a regular basis, from a teacher comforting a student ("It's OK, not everyone can be a math person") to the sports announcer commenting on a player's skill ("Wow, what a natural!"). These messages are thought to contribute to the attitudes or "mindsets" people hold about their [intelligence](#) and abilities.

Provided by Michigan State University

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