

Read the text about making mistakes. Complete the sentences (1-7) using a maximum of 4 words. Write your answers in the spaces provided on the answer sheet. The first one (0) has been done for you.

Failing and succeeding

Bob Dylan once declared that "there's no success like failure." At first glance, this line makes no sense: Success is the opposite of failure. Or is it?

Mr. Dylan's lyric neatly summarizes an essential principle of education, which is that students learn best when they make mistakes. There's no shortcut around this unpleasant process. But not every failure is created equal. Some people are able to translate their failures into success, while others fail again and again. Why are some people so much more effective at learning from their errors?

In recent years, scientists have discovered that every mistake generates two distinct reactions within the brain. The first reaction is called error-related negativity (ERN). It appears about 50 milliseconds after a screw-up and is mostly involuntary. The second signal, which is known as error positivity (Pe), arrives anywhere between 100 to 500 milliseconds after the failure. This signal occurs when we pay attention to the error, dwelling on the disappointing result. It turns out that subjects learn much more effectively when their brains demonstrate two properties: (1) a larger ERN signal, suggesting a more potent initial response to the mistake, and (2) a more consistent Pe signal, which means that they are focusing on the failure and thus trying to learn from it.

A new study, led by the psychologist Jason Moser at Michigan State University, extends this research by looking at how beliefs about education shape these signals in the brain. He tested a dichotomy first proposed by Carol Dweck, a psychologist at Stanford. In her influential research, Dr. Dweck distinguishes between people with a fixed mindset—they agree with statements such as "You have a certain amount of intelligence and cannot do much to change it"—and those with a growth mindset, who believe that they can get better at almost anything, provided they invest the necessary time and energy. While people with a fixed mindset tend to see failures as purely negative—a sign that they aren't talented enough for the task—those with a growth mindset see mistakes as an essential precursor to knowledge, the engine of education.

Dr. Moser's experiment involved giving subjects a tedious cognitive test in which they had to identify sequences of letters. The tediousness was the point: Dr. Moser wanted subjects to get bored and to make silly mistakes. Subjects with a growth mindset generated a much larger Pe signal following a mistake and became far more accurate over time.

How can we instill the right mindset in students? Dr. Dweck has shown that even seemingly minor cues can have a dramatic influence. She randomly assigned several hundred fifth-graders to two different praise conditions. One group was routinely praised for "being smart." They tended to slip into a fixed mindset, assuming that mistakes were a sign of stupidity, that there was nothing redeeming about failure. By contrast, students praised for their effort tended to pursue a growth model of learning. (Teaching kids about neural plasticity—how the brain changes in response to experience—can also induce this mindset.) They were much less scared of making

mistakes and routinely transformed failure into success. On a standardized test, those praised for effort scored 30% higher after a few months, while the children praised for their smarts saw their scores drop nearly 20%. The wrong mindset had made them regress.

The psychologist David Nussbaum has shown that whether we tend to learn from mistakes or brush them aside, the response is rooted in repairing our self-esteem. Failure is never fun, but success requires that we learn to fight through our frustration and find the upside of error.

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| 0 | A song points out that learners are most successful ____. |
| 1 | Compared to those who benefit from mistakes, there are those who tend to ____. |
| 2 | Brain research shows that every error we make ____. |
| 3 | Our brain's most immediate response to failure ____. (Give <u>one</u> answer.) |
| 4 | In order to acquire knowledge more easily, the brain has to ____. (Give <u>one</u> answer.) |
| 5 | People with an established way of thinking believe that cleverness ____. |
| 6 | One study shows that when faced with a boring task, all of the participants ____. |
| 7 | In an exam, students who were congratulated on being clever ____. |

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| 0 | <i>when they make mistakes</i> |
|---|--------------------------------|
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |

Von der
Lehrperson
auszufüllen

richtig falsch