

Scientists show how adversity dulls our perceptions

May 11 2011

Adversity, we are told, heightens our senses, imprinting sights and sounds precisely in our memories. But new Weizmann Institute research, which appeared in *Nature Neuroscience* this week, suggests the exact opposite may be the case: Perceptions learned in an aversive context are not as sharp as those learned in other circumstances. The findings, which hint that this tendency is rooted in our species' evolution, may help to explain how post-traumatic stress syndrome and other anxiety disorders develop in some people.

To investigate learning in unfavorable situations, Dr. Rony Paz of the Institute's Neurobiology Department, together with his student Jennifer Resnik , had volunteers learn that some tones lead to an offensive outcome (e.g. a very bad odor), whereas other tones are followed by pleasant a outcome, or else by nothing. The volunteers were later tested for their perceptual thresholds – that is, how well they were able to distinguish either the "bad" or "good" tones from other similar tones.

As expected from previous studies, in the neutral or positive conditions, the volunteers became better with practice at discriminating between tones. But surprisingly, when they found themselves exposed to a negative, possibly disturbing stimulus, their performance worsened.

The differences in learning were really very basic differences in [perception](#). After learning that a stimulus is associated with highly unpleasant experience, the subjects could not distinguish it from other similar stimuli, even though they could do so beforehand, or in normal

conditions. In other words, no matter how well they normally learned new things, the subjects receiving the "aversive reinforcement" experienced the two tones as the same.

Paz: "This likely made sense in our evolutionary past: If you've previously heard the sound of a lion attacking, your survival might depend on a similar noise sounding the same to you – and pushing the same emotional buttons. Your instincts, then, will tell you to run, rather than to consider whether that sound was indeed identical to the growl of the lion from the other day."

Paz believes that this tendency might be stronger in people suffering from [post-traumatic stress syndrome](#). As an example, he points to the 9-11 terror attacks in New York. Many of those who witnessed the strikes on the towers developed post-traumatic stress syndrome, which, for many of them, can be triggered by tall buildings. Intellectually, they may know the building before them bears little similarity to the destroyed towers, but on a more fundamental, instinctive level, they might perceive all tall buildings to be the same and thus associate them with terrifying destruction.

The scientific team is now investigating this idea in continuing research, in which they hope, among other things, to identify the areas in the brain that are involved in setting the different levels of perception. Paz: "We think this is a trick of the brain that evolved to help us cope with threats, but is now dysfunctional in many cases. Besides revealing this very basic aspect of our perception, we hope to shed light on the development of such [anxiety disorders](#) as post-traumatic stress syndrome."

Provided by Weizmann Institute of Science

Citation: Scientists show how adversity dulls our perceptions (2011, May 11) retrieved 8 May

2024 from <https://medicalxpress.com/news/2011-05-scientists-adversity-dulls-perceptions.html>

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