

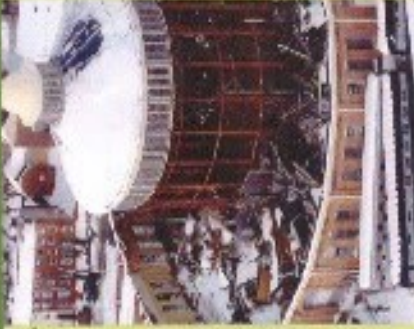
## Roof Collapses and Other Useful Interruptions by Andrew O'Connell

The B&O Railroad Museum's recovery from disaster—the exhibit wrecking collapse of its roof seven years ago—shows that trauma can help an organization in the long run.

Dealing with the collapse (no one was injured) made the staff more nimble, according to an *Organization Science* article by Marlys K. Christianson, Maria T. Farkas, Kathleen M. Sutcliffe,

and Karl E. Weick. A disruption, whether positive or negative, may create a blank sheet on which the organization can reinvent itself, they write.

The museum soon needed to draw on its newfound resilience. After the cave-in, another part of the roof had to be replaced, at an uninsured cost of \$2 million. The organization adeptly handled



the setback, raising funds and plunging into fresh challenges such as hosting large-scale events, expanding educational programs, and establishing a brain-restoration facility.

No one is saying leaders should orchestrate catastrophes, but creating interruptions can bolster an organization's ability to cope with the occasional wallop.

**NEUROSCIENCE** by Scott Brinkne

## Success Gets into Your Head—and Changes It

Neuroscientists have long understood that the brain can rewrite itself in response to experience—a phenomenon known as neuroplasticity. But until recently, they didn't know what causes gray matter to become plastic, to begin changing. Breakthrough research by a team at MIT's Picower Institute for Learning and Memory has documented one type of environmental feedback that triggers plasticity: success. Equally important and somewhat surprising: Its opposite, failure, has no impact.

Earl Miller, the lead researcher on the study (published in the journal *Neuron* last summer), says understanding the link to environmental feedback is crucial to improving how people teach and motivate because it's a big part of how we learn. But we absorb more from success than from failure, according to the study.

Miller's researchers gave monkeys a simple learning task: They presented one of two pictures. If it was Picture A, the monkeys were supposed to look to the left; if Picture B, to the right. When the monkeys looked in the correct direction, they were rewarded with a drop of juice. All the while the team recorded brain function.

"Neurons in the prefrontal cortex and striatum, where the brain tracks success and failure, sharpened their tuning after

success," says Miller. What's more, those changes lingered for several seconds, making brain activity more efficient the next time the monkey did the task. Thereafter, each success was processed more efficiently. That is, the monkey had learned. "But after failure," Miller points out, "there was little change in brain activity." In other



## If you get a reward, the brain remembers what it did right. Failure has no impact.

words, the brain didn't store any information about what went wrong and use it the next time. The monkey just tried, tried again.

Miller says this means that on a neurological level, success is actually a lot more informative than failure. If you get a reward, the brain remembers what it did right. But with failure (unless there is a clear negative consequence, like the shock a child feels when she sticks something in an electrical outlet), the brain isn't sure what to store, so it doesn't change at all.

Does this research confirm the management tenet of focusing on your—and your

team's—strengths and successes? Miller cautions against making too tight a connection between his findings and an environment like the workplace, but he offers this suggestion: "Maybe the lesson is to know that the brain will learn from success, and you don't need to dwell on that. You need to pay more attention to failures and challenge why you fail."

Expect more breakthroughs from Miller's lab that pertain to management. On discerning the complex brain functions used in business requires the ability to record activity in several regions of the brain simultaneously, and his team is being cre-

ated with pushing the technology further than any other research group. Miller has collected data from three regions of the brain at the same time with as many as 50 electrodes.

That number will increase. As neuroscientists use more and more electrodes to record brain activity, they will gain much greater insight into functions such as decision making and attention. In a report in *The Scientist* last fall (in which Miller had the "Hot Paper" of the month, meaning it was cited 50 to 100 times more than the average research paper), a fellow brain researcher called his aggressive use of multiple electrodes "the tool of the future." ■

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