

IGSN - SYMPOSIUM

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Stress and memory accuracy

BENNO ROOZENDAAL

Dept. Cognitive Neuroscience & Donders Institute for Brain, Cognition and Behaviour,
Radboud University Nijmegen, The Netherlands

Stress Hormone Effects on Strength and Accuracy of Memory

Emotional or fearful experiences activate hormonal and brain systems that create strong memories. Extensive evidence indicates that this memory-strengthening effect involves the synergistic action of both norepinephrine and glucocorticoid hormones. It remains unclear, however, how this strengthening might affect the quality of such memories. As strong but less specific or generalized fear memories are believed to be a major risk factor for the development of posttraumatic stress disorders, it is of critical importance to understand how stress hormones affect the accuracy and/or generalization of memory. Human behavioral studies show contradictory results: Some studies indicate that emotional memories are remembered in a generalized manner, resulting in strong gist-based representations of the central theme of an experience. However, other studies report increased accuracy of memory. I will present a novel model, in rodents, which postulates that these two stress hormone systems exert opposite effects on accuracy and generalization of memory. In an episodic-like discrimination task, we found that norepinephrine improves memory accuracy by boosting amygdala-hippocampal connectivity, thereby creating long-lasting hippocampus-dependent episodic-like memories. In contrast, glucocorticoids were found to contribute to memory generalization by promoting integration of new memories into existing neocortical networks, decreasing hippocampal dependence. These findings thus provide evidence that stress hormones not only enhance the strength of emotional memories, but also have an impact on their quality.

Host:

LIANNE WOLSINK

Cognitive Psychology, Faculty of Psychology, Ruhr University Bochum