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Psychosocial stress induces working memory impairments in an n-back paradigm.

[Schoofs D](#), [Preuss D](#), [Wolf OT](#).

Author information

Abstract

In contrast to the substantial number of studies investigating the effects of stress on declarative memory, effects of stress on working memory have received less attention. We compared working memory (numerical n-back task with single digits) in 40 men exposed either to psychosocial stress (Trier Social Stress Test (TSST)) or a control condition. Task difficulty was varied using two conditions (2-back vs. 3-back). Salivary cortisol (as a marker of hypothalamus-pituitary-adrenal (HPA) activity) and salivary alpha-amylase (sAA as a marker of sympathetic nervous system (SNS) activity) were assessed immediately before and three times after the stress or control condition. As expected stress resulted in an increase in cortisol, sAA, and negative affect. Subjects exposed to stress showed significant working memory impairments in both workload conditions. The analysis of variance indicated a main effect of stress for reaction time as well as accuracy. In addition, for reaction time a stress-block interaction occurred. Follow up tests revealed that only during the first block at each level of difficulty performance was significantly impaired by stress. Thus, the effects of stress became smaller the longer the task was performed. Results provide further evidence for impaired working memory after acute stress and illustrate the time course of this phenomenon.

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