

# Burnout Leaves its Mark on the Brain

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A rough day at the office is stressful enough, but when long hours and chronic exhaustion become the norm at work it can take a dramatic toll on our health—including our brain functioning.

When stress at work becomes overwhelming, it can turn into burnout. Burnout has many of the same symptoms as depression, including memory and concentration problems, sleeplessness, diffuse aches, profound fatigue, irritability, anxiety, and a nagging feeling of being emotionally drained.

In a recent [study](#), a team led by psychological scientist Amita Golkar and colleagues from the Karolinska Institute in Sweden found evidence that workplace burnout can alter neural circuits in the brain. As part of a vicious cycle, chronic stress seems to dampen people's neurological ability to bounce back from negative situations—causing even more stress.

A group of 40 subjects with formally diagnosed burnout symptoms were recruited from the Stress Research Institute at Stockholm University. All of the participants attributed their symptoms to stressful jobs where they worked over 60 to 70 hours per week continuously for several years. A socio-economically matched control group was made up of 70 healthy volunteers with no history of chronic stress or other illnesses.

Each group of participants completed two test sessions: a task designed to measure their ability to regulate their negative emotions, and an evaluation of their brain's connectivity using a neuroimaging technique called resting state functional MRI (fMRI).

To assess the participants' reactions to stress, the research team showed participants a standardized series of neutral and negative images. After looking at the image for 5 seconds, a set of instructions appeared on the screen directing the participant to either suppress (down-regulate), intensify (up-regulate), or maintain their emotional response to the picture. Immediately following this instruction cue, the same image was presented again for another 5 seconds.

As the participant was focusing on the picture a loud burst of sound would play, startling them. An electrode taped to the participant's cheek recorded their reflex reactions to this stressful stimulus.

The two groups showed similar startle responses when they were instructed to maintain or intensify their emotional reactions. However, when asked to down-regulate their emotional responses to negative images, clear differences between the two groups emerged.

People who were overworked not only felt less able to control their reactions to negative stimuli, their bodies also showed an inability to down-regulate negative emotional reactions. The group suffering from burnout had dramatically stronger reactions to the startling noise than the control group. In addition, they self-reported having a harder time than the control group participants at modulating their negative emotional responses.

On a different day, a subset of the participants came into the lab where they were scanned while sitting quietly. The researchers were interested in looking at activity between several brain areas involved in processing and regulating emotions.

The two groups showed key differences in the amygdala—a brain structure that is critical in emotional reactions including fear and aggression. The amygdala was not only relatively enlarged among participants in the burnout group, but they also appeared to have significantly stronger connections between the amygdala and brain areas linked to emotional distress. The more stressed an individual reported feeling, the stronger the correlations between these brain regions were on the fMRI.

Compared to the control group, the overworked group also showed weaker correlations between activity in the amygdala and the mesial prefrontal cortex, a structure involved in executive function. Weaker connections between these two brain structures could help explain why the burnout group had more difficulty controlling their negative emotions.

“An impairment of the ability to down-regulate negative emotions in subjects suffering from occupational stress may render them more vulnerable to depressive symptoms,” the researchers conclude.

The researchers caution that the small size of the participant pool limited their ability to look at possible gender-related differences in regard to burnout. However, they hope to further explore the link between stress and psychological symptoms in future studies.

## **Reference**

Golkar, A., Johansson, E., Kasahara, M., Osika, W., Perski, A., & Savic, I. (2014). The influence of work-related chronic stress on the regulation of emotion and on functional connectivity in the brain.

