Maastricht University

Faculty of Psychology and Neuroscience

Project title: **The Effects of Acute Stress on Generalization of Fear**

Project leader: Dr. Tom Smeets

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Collaborators:

- Dr. Pauline Dibbets, Assistant Professor, Faculty of Psychology and Neuroscience, Maastricht University (NL)

- Prof. Dr. Tom Beckers, Full Professor, Faculty of Psychology and Educational Sciences, KU Leuven (BEL)

Proposal (250 words):

Introduction: Characteristic of many stress- and anxiety-related disorders is the spreading of fear for the fear-evoking stimuli to related, but initially innocuous cues (i.e. fear overgeneralization). The inability to reliably discriminate between classically conditioned feared cues and generalization stimuli increases over time, such that older fear memories are more likely to result in maladaptive fear generalization. It is also known that stress affects learning and memory in various ways, including the acquisition and extinction of fear, our ability to discriminate between cues, and memory generalization. To the best of our knowledge, only one study (Dunsmoor et al., 2017, PNAS 114(34), 9218-9223) has looked at how acute stress affects the overgeneralization of fear.

Hypothesis and Objectives: The objective is to study under which circumstances acute stress leads to overgeneralization of fear. We expect that (1) stress increases the generalization of fear to harmless cues; (2) that this effect gradually amplifies as the time between initial fear learning and generalization testing increases; and (3) that such overgeneralization is also manifested as an overreliance on maladaptive avoidance behavior.

Setting and Methods: This project employs fear conditioning and generalization paradigms and standard stress protocols, and includes subjective (e.g., US expectancy; subjective distress) and objective (fear-potentiated startle and skin conductance; cortisol) measures.

Impact: Stress is omnipresent is today's society and may be an important pathway through which fear may generalize to harmless stimuli. Examining how stress shapes fear generalization has clear clinical relevance to our understanding of overgeneralization characteristics of stress- and anxiety -related disorders.

Requirements candidate: Highly motivated student with good English communication skills and proactive and resolute attitude. Additionally: knowledge of and interest in human fear conditioning.

Keywords: Emotional Memory; Generalization; Stress; Fear Conditioning; PTSD; Anxiety

Top 5 selected publications:

1. Smeets, T., Cornelisse, S., Quaedflieg, C.W.E.M., Meyer, T., Jelicic, M. & Merckelbach. H. (2012). Introducing the Maastricht Acute Stress Test (MAST): A quick and non-invasive approach to elicit robust autonomic and glucocorticoid responses. *Psychoneuroendocrinology*, 37, 1998-2008. Cited by: 64.

2. Quaedflieg, C.W.E.M., Meyer, T., Smulders, F.T.Y., & Smeets, T. (2015). The functional role of individual-alpha based frontal asymmetry in stress responding. *Biological Psychology, 104*, 75-81. Cited by: 22.

3. Dibbets, P., & Evers, E. A. (2017). The influence of state anxiety on fear discrimination and extinction in females. *Frontiers in Psychology, 8*: 347.

4. Arnaudova, I., Krypotos, A.-M., Effting, M., Kindt, M., & Beckers, T. (2017). Fearing shades of grey: Individual differences in fear responding towards generalisation stimuli. *Cognition & Emotion, 31*, 1181-1196. Cited by: 4.

5. Sevenster, D., Beckers, T., & Kindt, M. (2013). Prediction error governs pharmacologically induced amnesia for learned fear. *Science, 339*, 830-833. Cited by: 138.