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FEAR IN ACTION: HOW PAVLOVIAN FEAR LEARNING SHAPES GOAL-DIRECTED MOTOR RESPONSES

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Grant 47/20

Background: Through fear learning, environmental stimuli may acquire fear-related properties and exert a powerful influence on behavior. Yet, the cognitive and neural mechanisms through which aversive experiences shape future behavior remain debated.

Aims: We aim to re-evaluate the role that the motor system plays in fear learning, as an active contributor to learning itself.

Method: Across multiple experiments, non-invasive brain stimulation (TMS) was used to probe corticospinal excitability track the changes in response of the motor system as participants learned the association between different visual stimuli and specific aversive outcomes, in a series of Pavlovian learning tasks. After learning, kinematic analysis was performed to test changes in motor control as participants performed goal-directed actions on the now feared stimuli.

Preliminary results: A reduction in corticospinal excitability was consistently found during fear learning, indicating motor inhibition. Interestingly, an increase in action vigor was found when participants reached towards the feared stimuli.

Conclusions: These results suggest that changes in the motor system's activity are not just the outcome of learning but are an integral part of the unfolding learning process.

Keywords: Fear, Motor cortex, Pavlovian conditioning, Fear of pain

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