Fear in action: Pavlovian threat learning shapes corticospinal excitability

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Environmental stimuli may acquire fear-related properties through pairing with an aversive event, but the extent to which threat learning shapes the motor system response remains largely unexplored. In the present study, during Pavlovian threat learning, two different neutral stimuli (i.e., colored dots) acquired threat-related value by predicting an aversive shock to either the left (i.e., conditioned stimulus left, CS+L) or right (CS+R) arm. Another stimulus (i.e., CS-) never predicted shocks. We collected electrodermal activity to characterize changes in psychophysiological arousal between CSs. Additionally, changes in corticospinal excitability (CSE) were assessed by acquiring motor-evoked potentials (MEP) elicited by transcranial magnetic stimulation (TMS) delivered to the participantâ€™s left primary motor cortex. We found increased skin conductance responses (SCRs) for CS+R and CS+L compared to the CS-, which did not distinguish the laterality of the upcoming shock. Conversely, a lateralized inhibitory effect emerged for corticospinal excitability. Indeed, we found a reduction in MEP amplitude for the CS+R, compared to the CS+L and the CS-. Our results show the motor systemâ€™s involvement in threat-related response learning, and highlight the existence of multiple, dissociable learning systems, namely a general non-lateralized autonomic system and a specific lateralized motor one.

References:

Tipo presentazione: ORALE