

# Reactivation, modification and reconsolidation of fear memory



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## Introduction

Fear memory is an important target in human memory reconsolidation research. During reconsolidation, stable and consolidated fear memories return to a labile state, in which new information can update the original memory once it has been reactivated. The aim of the present work is to generalize the findings from Schiller et al. (2010) using a similar conditioning procedure but including two differences: the experiment was conducted in one-day session instead of three, and instead of an electric shock, we used a white noise as aversive stimulus. Our prediction was that in spite of these differences, similar effects would be found.

## Method

### Participants:

66 university students: 56 women and 10 men (M= 20.23; SD=2.18).

### Materials and Procedure:

- CS+: 4 s. yellow square. CS-: 4 s. blue square. US: 0.5 s., 105 dB white noise.
- Conditioning: 6 CS+/US trials, 10 CS+/noUS trials and 10 CS- trials.
  - Extinction: 11 CS+ and 11 CS- trials (No Reactivation Group).  
1 CS+ (reactivation), 10 CS+ and 11 CS- trials (Reactivation Group).
  - Re-Extinction: 11 CS+ and 11 CS- trials.

### Main Variables:

IVs: Group (No Reactivation vs. Reactivation) and Time (Extinction vs. Re-Extinction).  
DV: SCR Amplitude ( $\mu$ S).

### Task:

Participants had to pay attention to the stimuli presented on the screen.



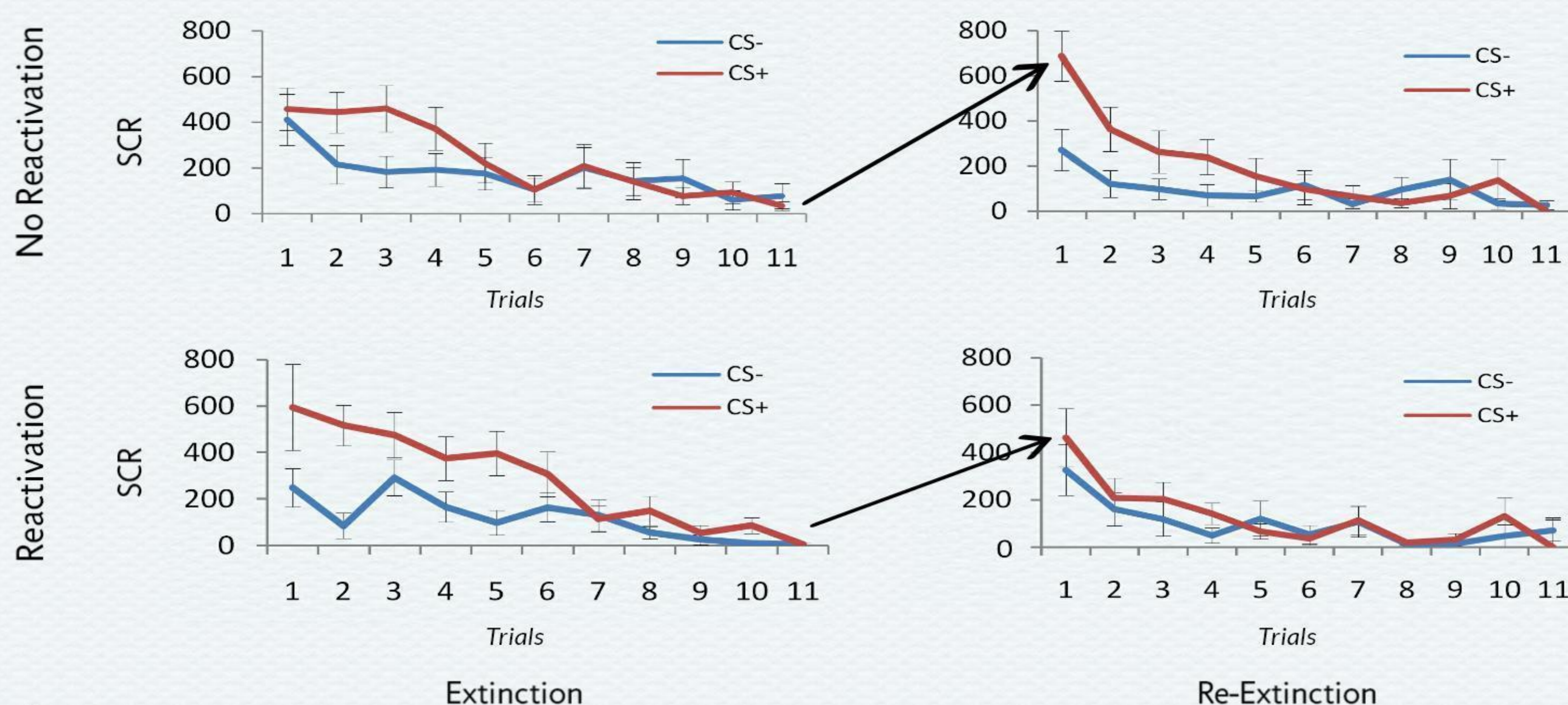
### SCR recording and analyses:

Skin conductance response (SCR) was recorded using two 0.8mm Ag-AgCl electrodes, which were connected to the skin conductance module of a Biopac System.

The electrodes were attached to the first and second fingers of the left hand, in the second phalanges.

SCRs were analyzed using AcqKnowledge 3.9 software (BIOPAC Systems Inc., Goleta, California).

## Results



## Conclusions

- We found Spontaneous Recovery to the CS+ ( $t_{(14)} = -4.22$ ;  $p < .05$ ) in "No Reactivation Group" (between the last trial of Extinction and the first trial of Re-Extinction). There was not Spontaneous Recovery to the CS+ in "Reactivation Group" ( $t_{(15)} = -0.81$ ;  $p > .05$ ).
- We therefore find two possibilities: a) Original and consolidated fear memories were updated. b) The consolidation of the original fear memories was interfered by a delayed extinction, whereas that interference in SCR did not happened when extinction was applied immediately after consolidation phase.
- Furthermore, these results suggest that it is possible to extend Schiller et al.'s (2010) results using a white noise as aversive stimuli, as well as in a different temporal pattern.

## References

- Schiller, D., Monfils, M. H., Raio, C. M., Johnson, D. C, LeDoux, J. E. & Phelps, E. A. (2010). Preventing the return of fear in humans using reconsolidation update mechanisms. *Nature*, 463, 49-53.