

Misery Really Does Love Company:

Oxytocin in the Central Nucleus of the Amygdala Mediates Social Buffering of Fear

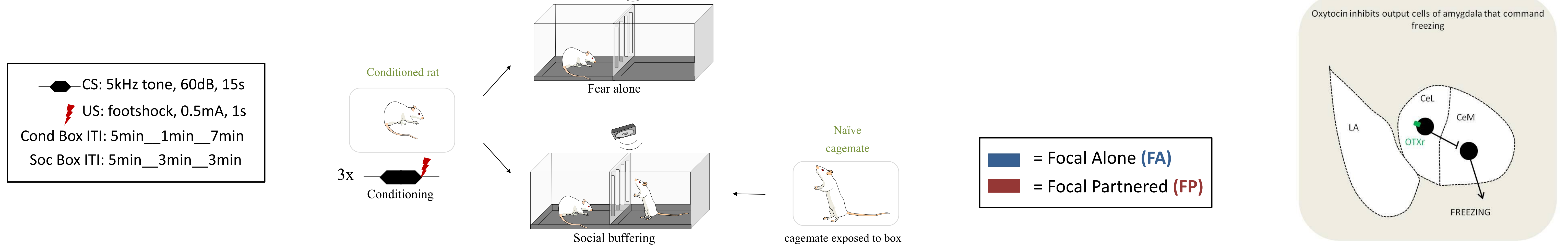
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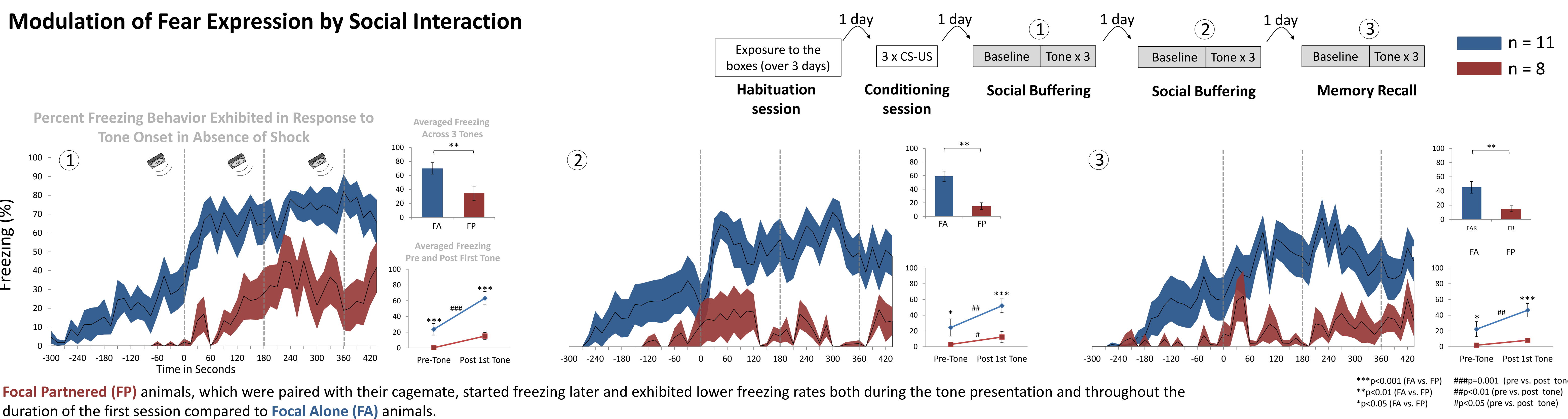


Social interactions can decrease anxiety and fear in a variety of circumstances, a phenomenon known as social buffering. Even though oxytocin has been implicated in this process, its underlying neural mechanisms remain poorly understood. We use auditory fear conditioning, during which an animal can learn to fear a neutral tone when it is paired with aversive footshocks, to test the effect of social buffering on fear conditioned rats. We conditioned rats to fear a tone and the next day, we exposed them to the tone in the presence or absence of their cagemate. We found that rats tested in the presence of their cagemate showed less freezing than if tested alone. In addition, when tested again, now alone, rats that were previously exposed in the presence of their cagemate still froze less than the ones exposed alone showing that social buffering has long lasting effects on fear. Finally, we are currently testing the role of oxytocin in the central nucleus of the amygdala (CeA), a major output station that controls several defense responses. Preliminary data suggests that blocking oxytocin in CeA blocks the immediate and long lasting effect of social buffering on freezing.

Behavior Paradigm



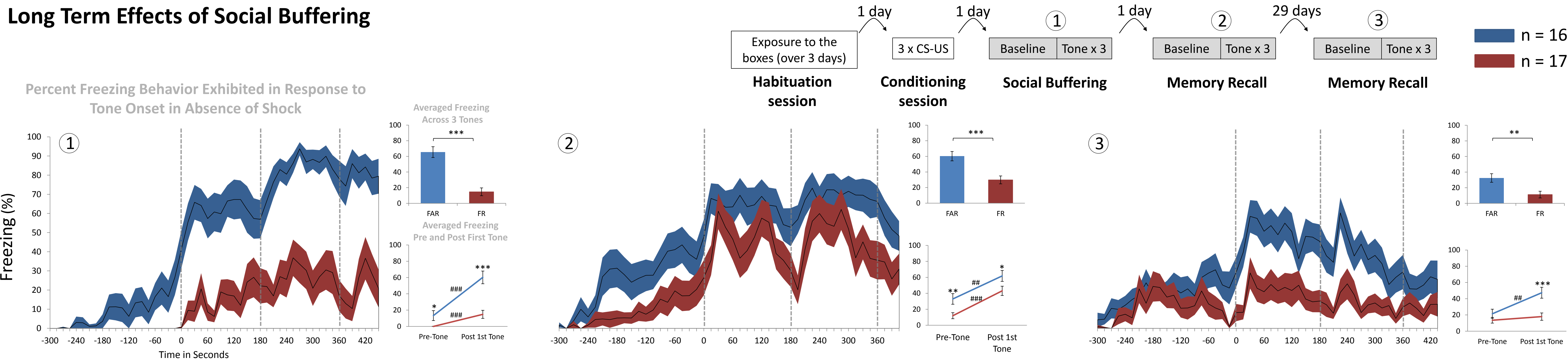
Modulation of Fear Expression by Social Interaction



Focal Partnered (FP) animals, which were paired with their cagemate, started freezing later and exhibited lower freezing rates both during the tone presentation and throughout the duration of the first session compared to Focal Alone (FA) animals.

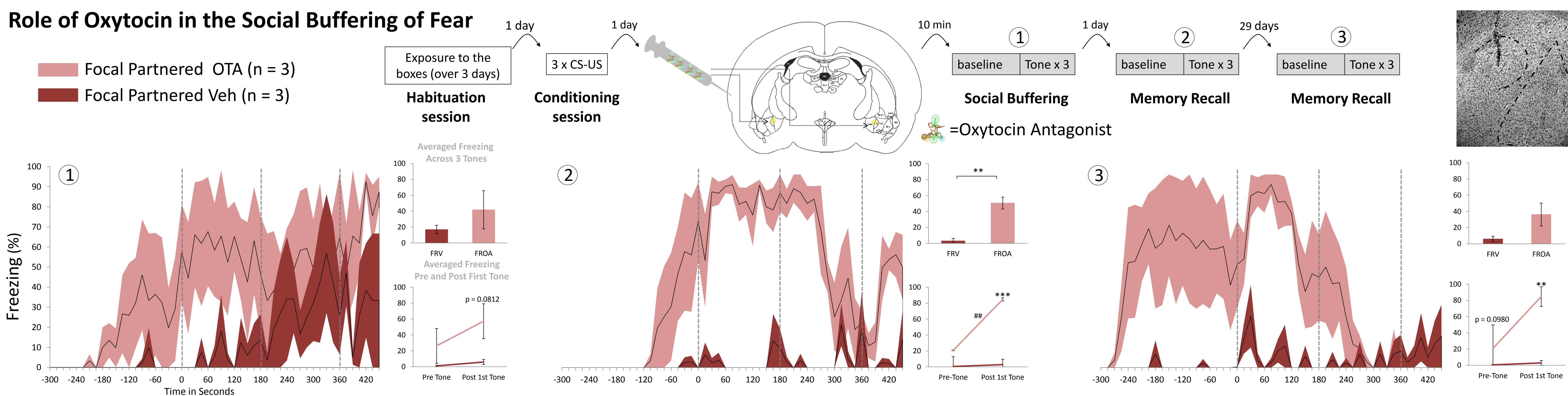
Decreased freezing levels were maintained even in the absence of a conspecific in FP animals compared to FA animals during recall sessions 24 hours after social buffering.

Long Term Effects of Social Buffering



FP animals exhibited much lower freezing rates compared to FA animals. The social buffering effect was robust in both the short and long term (29 days later) even after only one social buffering session.

Role of Oxytocin in the Social Buffering of Fear



OTA infusion into the CeA directly before social interaction blocked the social buffering effect.

Conclusions

- Animals partnered with their cagemate, started freezing later. They exhibited both lower freezing rates and fear response during re-exposure to a conditioned stimulus.
- Decreased freezing levels were maintained even in the absence of a conspecific 24 hours later.
- The social buffering effect was robust in both the short and long term (29 days later) even after only one session in the presence of a cagemate.
- Blocking oxytocin in CeA blocked both the immediate and the long lasting effect of social buffering on freezing.

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