Neural Systems Underlying Successful Emotion Regulation via Social Buffering

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Introduction
Across the mammalian world, the presence of a trusting conspecific is known to have a calming emotional and physiological effect, called social buffering (Hostinar, 2014). Reduction of negative feelings and associated physiological responses due to social buffering are also consistently observed in humans (Eisenberger, 2013; Krahe, 2013). However, beyond imaging studies priming social buffering via pictures or handholding with romantic partners (e.g., Coan, 2006; Eisenberger, 2011), we still know little about the neural systems involved in and affected by social buffering.

The current study aimed to delineate a process model of the neural underpinnings of social buffering.

Which neural systems mediate the effect of social buffering on aversive emotional feelings?

Methods
In a 2×2 design (social buffering x aversive stimulation type), 27 participants underwent fMRI while being exposed to aversive stimuli, including painful electrical stimulation and fearful screams. In the Social condition, a psychotherapist communicated with participants at the start of every trial; she signaled her supportive presence with sentences such as “Don’t worry, I am here.” In reality, videos were used. In the NonSocial condition, participants viewed scrambled versions of the social videos.

Trial structure. First, a video was shown – the psychotherapist (Social condition), or a scrambled social video (NonSocial condition). After a subsequent fixation cross, participants either saw a face or a shape (signalling the type of upcoming aversive stimulation). Then followed either a fearful face together with a scream, or a lighting paired with painful electrical stimulation. Finally, participants rated their feeling on a 7-point rating scale.

Results

Conclusion
- Using mediation analysis, we constructed a process model of social buffering effects on aversive feelings. Two brain systems support the soothing effect of social buffering: first, the ventral and dorsal prefrontal cortex during active social buffering, and secondly the thalamus during aversive stimulus presentation.
- Both brain systems reduce their activity with social buffering, mirroring its soothing/calming effect and perhaps signifying a general reduction of vigilance and stress in the individual.

References

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