

Social Contagion: a bottom-up approach of empathy.

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Introduction

- Empathy is defined as a reference to emotional experiences shared between individuals. When an animal elicits a fearful response to a stimulus, another animal may produce an emotional or physiological response similar to the first animal, due to an emotional contagion. (Chen, Panksepp, and Lahvis, 2009).
- Empathy is not exclusive to cortical activity, but encompasses many areas of the brain. More primitive systems such as the limbic system, which includes both the amygdala and hippocampus, become active as well. This may suggest that empathy contributed to genetic fitness in early development. Empathy is often measured from a top-down approach (Meyer-Lindenberg et al, 2011) using humans. Understanding empathy using a bottom-up approach may allow better understanding of the evolutionary advantages of sociality.
- Animals have been known to vocalize when in distress. One way proposed to understand the mechanisms involved in empathy is to use mice and fear learning in a social setting. (Yusufshaq, and Rosenkranz, 2013) Fear has been studied using animal models using freezing, and startle responses to gain quantitative data.
- This study is a continuation of establishing a proper method to study social contagion using an observing mouse, and a demonstrator, using both freezing, startle responses, and ultrasonic vocalizations.

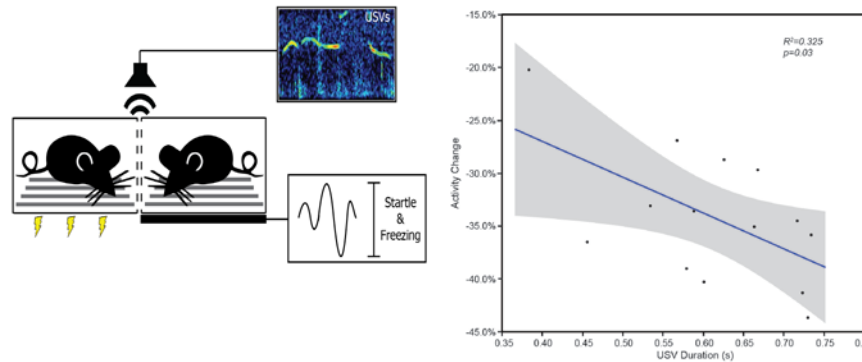


Figure 2. observer activity and demonstrator vocalization duration

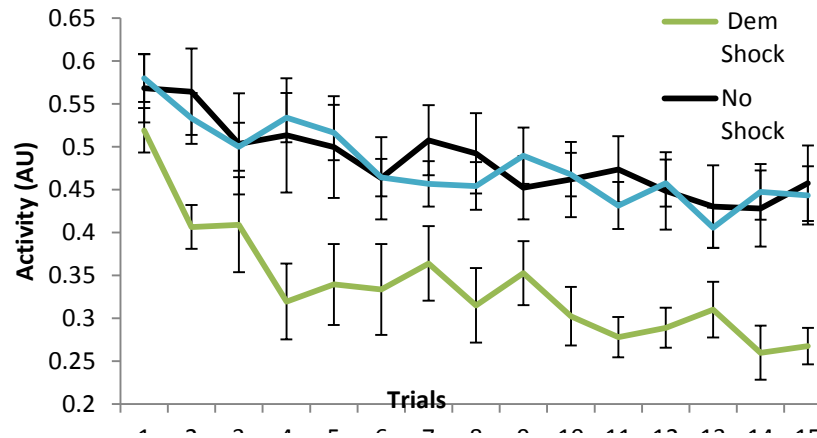


Figure 1. observer activity over demonstrator present, with, and without shock.

Methods (Fig. 1)

7 days of testing – all trials began with 5 min. acclimation period.
Day 1 -3: Acclimation; 75 pseudo-randomized 30-sec trials, 70, 80, 85, 90, 100 and dBs startle stimuli.
Day 4: training: 15 trials, 24, 45-sec ITI, 30sec CS w/ 2 sec rise time. CS Tone co-terminating with 1.5-sec 0.8 mA shock
Day 5: Test Same as acclimation day.

Conclusions

- No difference between observer and demonstrator is seen during baseline.
- Observer show activity decrease (indicative of freezing) when demonstrator is shocked compared to no shock. (Figure 1).
- Observer activity decrease (Freezing) is correlated with demonstrators presence if shocked. (Figure1)
- Increased vocalization duration correlated with increased freezing behavior (figure 2)

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Discussion

Autism is psychological disorder associated with a deficit in empathetic understanding. By continuing this research, we may further the tools used in understanding the underlying mechanisms of this and other psychological disorders.