



Motivation counteracts aversive processing in the amygdala and visual cortex

Mihai Sirbu¹, Sandra J.E. Langeslag^{1,2}, Srikanth Padmala¹, & Luiz Pessoa¹

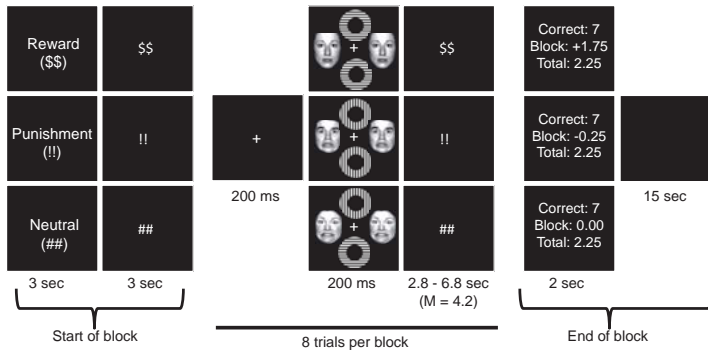
¹University of Maryland – College Park; ²University of Missouri – St. Louis



Introduction

- Rewards reduce interference effects of task-irrelevant aversive stimuli (Padmala & Pessoa, 2014)
- Purpose of this study:
 - Understand the neural basis of this effect in the amygdala and visual cortex
 - Examine how individual differences in anxiety and reward sensitivity relate to this effect
 - Examine whether punishments reduce interference effects of task-irrelevant aversive stimuli in the amygdala and visual cortex

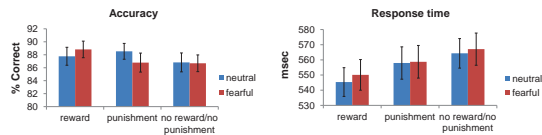
Main Task Structure



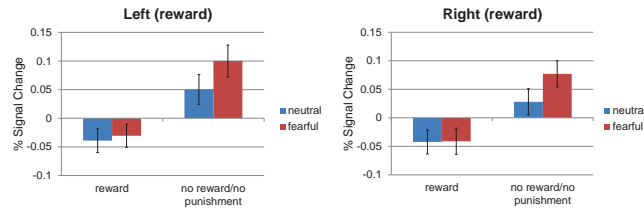
Study Methods & Analysis

- 38 participants (15 male, age range: 18 – 34 years)
- Task: 6 conditioning runs interleaved with 6 main runs
- Scanner, Parameters, & Software:
 - Siemens 3.0T Trio, 32 Channel
 - TR = 2.5 s, TE = 25 ms, FOV = 192 mm, 3 mm isotropic
 - All fMRI data preprocessed using AFNI & SPM
- ROI Analysis of Amygdala and Fusiform gyrus**
 - Created Amygdala ROI (Desikan et al., 2006) & Fusiform gyrus ROI (Sabatinelli et al., 2011)
 - Multiple regression analysis with canonical hemodynamic response function
 - 6 main regressors (no reward/no punishment, reward, punishment x neutral, fear)

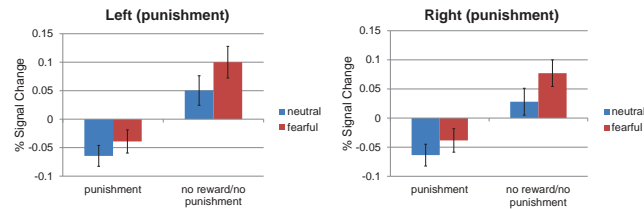
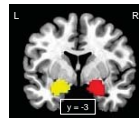
Behavioral Results



Amygdala ROI Results

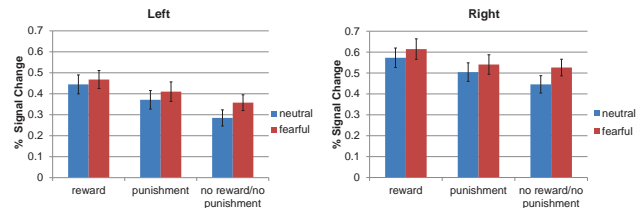


Reward x Emotion ANOVA		
	Left	Right
Main effect of Reward	$F(1,37) = 30.1; p < .001$	$F(1,37) = 18.3; p < .001$
Main effect of Emotion	$F(1,37) = 4.8; p < .05$	$F(1,37) = 3.6; p = .064$
Reward x Emotion	$F(1,37) = 4.2; p < .05$	$F(1,37) = 3.8; p = .059$



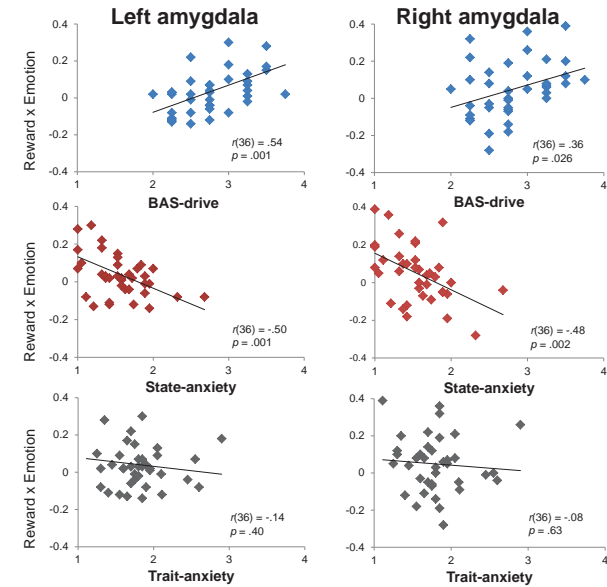
Punishment x Emotion ANOVA		
	Left	Right
Main effect of Punishment	$F(1,37) = 29.5; p < .001$	$F(1,37) = 28.9; p < .001$
Main effect of Emotion	$F(1,37) = 5.7; p < .05$	$F(1,37) = 6.5; p < .05$
Punishment x Emotion	$F(1,37) = 1.1; p = .31$	$F(1,37) = 1.2; p = .28$

Fusiform gyrus ROI Results

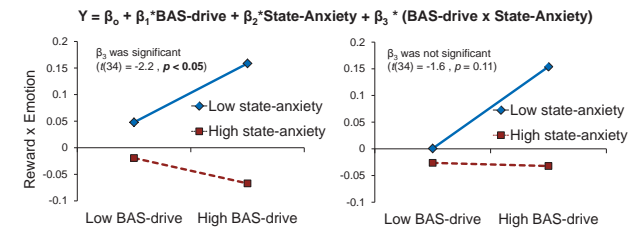


ANOVA	Reward x Emotion ANOVA		Punishment x Emotion ANOVA	
	Left	Right	Left	Right
Main effect of Motivation	$F(1,37) = 27.6; p < .001$	$F(1,37) = 14.1; p < .005$	$F(1,37) = 5.3; p < .05$	$F(1,37) = 1.4; p = .25$
Main effect of Emotion	$F(1,37) = 10.4; p < .005$	$F(1,37) = 16.2; p < .001$	$F(1,37) = 17.3; p < .001$	$F(1,37) = 21; p < .001$
Motivation x Emotion	$F(1,37) = 3.1; p = .084$	$F(1,37) = 2.0; p = .16$	$F(1,37) = 2.7; p = .11$	$F(1,37) = 3.5; p = .07$

Individual Differences



Moderation Analysis



Conclusions

- Rewards reduce the negative distractor processing in the amygdala
- Individual differences in anxiety and reward sensitivity are related to reward x emotion interaction in the amygdala
- Punishments did not reduce the negative distractor processing in the amygdala

Acknowledgments

This research was supported by National Institute of Mental Health (1R01 MH071589)

References

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Contact

Mihai Sirbu (msirbu@terpmail.umd.edu); Sandra Langeslag (langeslags@umsl.edu)

ANOVA	Reward x Emotion ANOVA		Punishment x Emotion ANOVA	
	Accuracy	RT	Accuracy	RT
Main effect of Motivation	$F(1,37) = 3.25, p = .079$	$F(1,37) = 51.0; p < .001$	$F(1,37) = 1.77; p = .19$	$F(1,37) = 13.4; p < .005$
Main effect of Emotion	$F(1,37) < 1; ns$	$F(1,37) = 4.5; p < .05$	$F(1,37) = 2.45; p = .13$	$F(1,37) < 1; ns$
Motivation x Emotion	$F(1,37) < 1; ns$	$F(1,37) < 1; ns$	$F(1,37) < 1; p = ns$	$F(1,37) = 1.2; p = .28$