Reward as a resilience factor: responses to psychosocial stress

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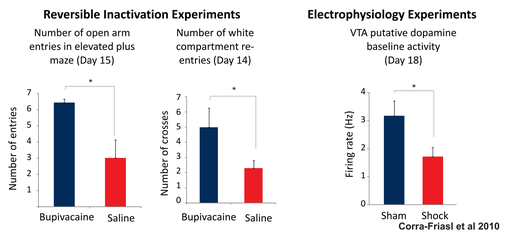
INTRODUCTION

- Only a fraction of people who experience trauma or stress suffer from a subsequent anxiety disorder.
- This suggests that resilience, or the capacity for healthy adaptation to life adversities, is a common response to trauma and stress.
- Charney (2004) hypothesized that greater resilience modulates behavior according to rewarding experiences, **reward sensitivity.**
- We have previously shown that ventral tegmental area neurons undergo long-term physiological changes triggered by a traumatic event and that these neurons are necessary for the appearance of anxiety-like behaviors in a rodent model of Posttraumatic stress disorder.



- This suggests that the ventral tegmental area, crucial for reward processing, is an important part of the circuitry involved in PTSD symptomatology.
- Here we test if psychosocial stress (Trier Social Stress Test, Kirschbaum et al., 1993) affects reward sensitivity (Monetary Incentive Delay Task Knutson et al., 2003) and if reward sensitivity (MID and BAS) predicts resilience as predicited by our animal rodent model of PTSD.

METHODS

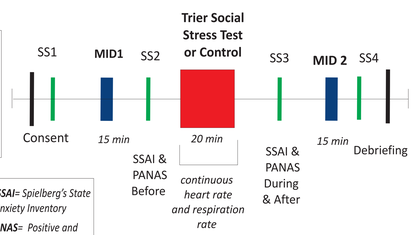
Participants

Participants were 136 students (81 females) with a mean age of 22.9. All participants gave informed consent and the research ethics committee of the University of Arizona approved the study (IRB protocol #11-0154-02)..

Protocol

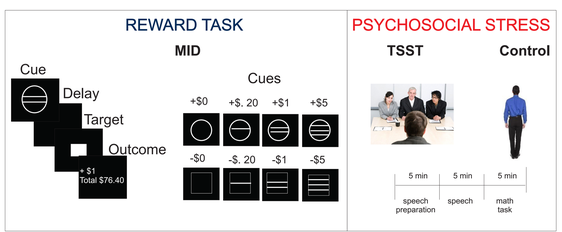
Pre-questionnaires

Beck Anxiety Inventory
Behavioral Activation/ Inhibition Scales (BAS/BIS)
Resilience scale
Demographics



SS= Saliva Sample for cortisol analysis
MID= Monetary Incentive Delay Task
SSAI= Spielberg's State Anxiety Inventory
PANAS= Positive and Negative Affect Scales

Behavior



Salivary cortisol

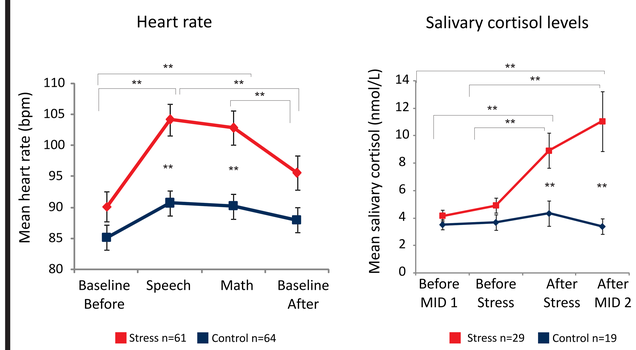
All saliva samples were assayed for cortisol in duplicate with a commercially available Enzyme Linked Immunoassay (ELISA) (Salimetrics, LLC).

Statistics

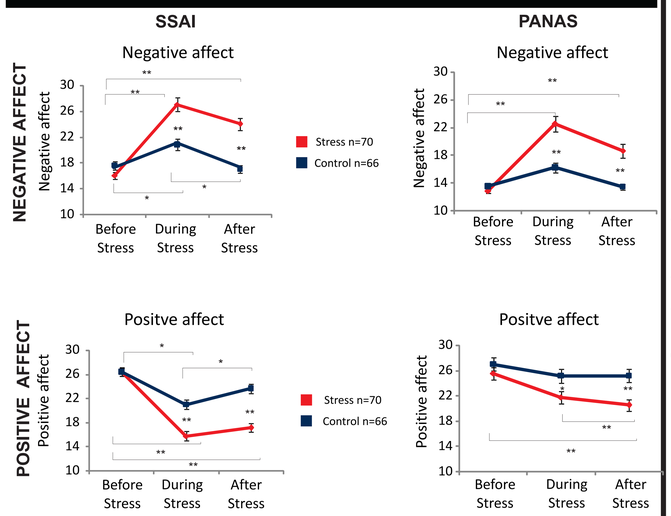
All statistical analyses were conducted using SigmaStat software (SYSTAT, San Jose, California). All error bars are standard errors. A significant difference is indicated by *=p<0.05 or **=p<0.01.

RESULTS

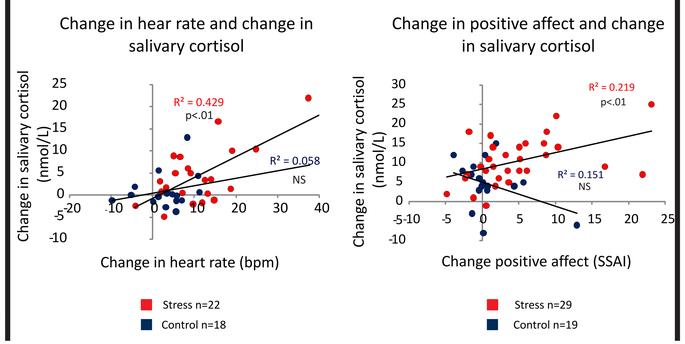
A significant increase in physiological measures of stress was found in the stress but not in the control group.



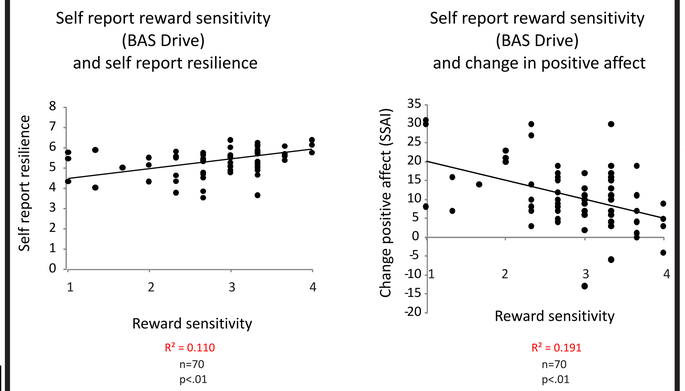
A significant increase in self report stress was found in the stress but not in the control group.



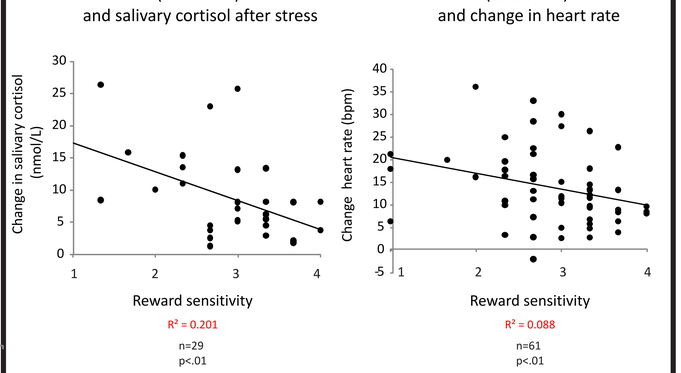
Data show a significant positive relationship between physiological and self report measures of stress.



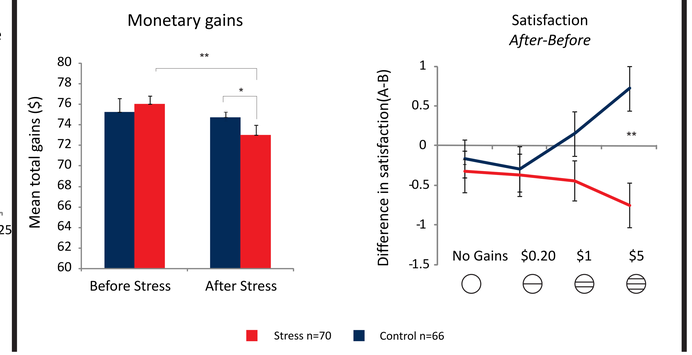
Self report reward sensitivity and self report resilience were positively correlated.



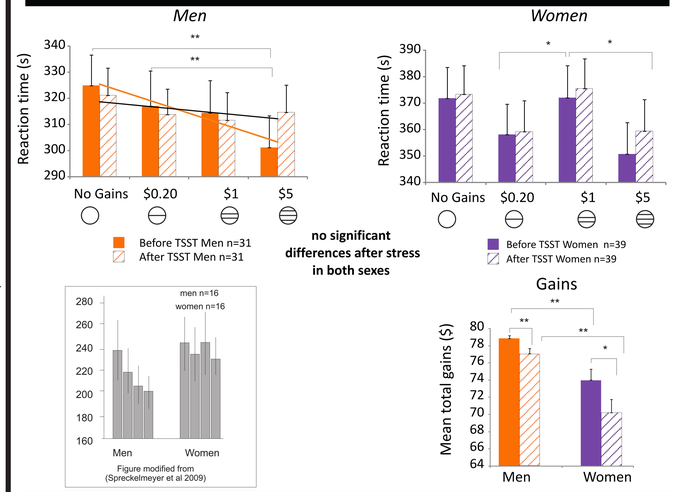
Self report reward sensitivity and physiological changes in response to stress were negatively correlated.



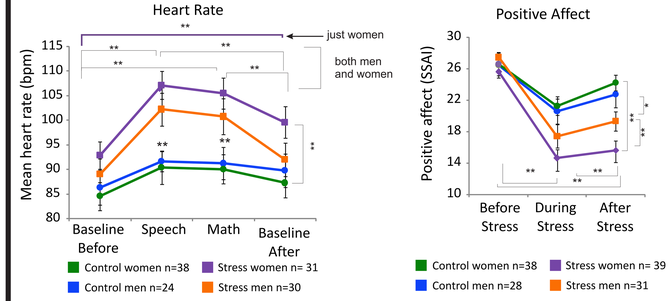
The data show a significant difference in the total gains before and after stress. These differences were not seen in the control group.



The data shows sex differences in both reaction times and total amount of gains in MID task.



The data shows sex differences in both physiological and self report measures of stress.



CONCLUSIONS

- The results show that psychosocial stress significantly increases both physiological and self-reported measures of stress.
- The results indicate that self-reported resilience and self-reported reward sensitivity have a high positive relationship. Moreover, self report reward sensitivity has a negative relationship with stress (salivary cortisol, heart rate and self report).
- The data show that psychosocial stress reduces reward sensitivity (reduced total gains and satisfaction in response MID task).
- The results also show that there are sex differences in both the response to stress and in reward sensitivity.

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