

Greater testosterone reactivity associated with lower subjective anxiety in response to social stressor



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INTRODUCTION

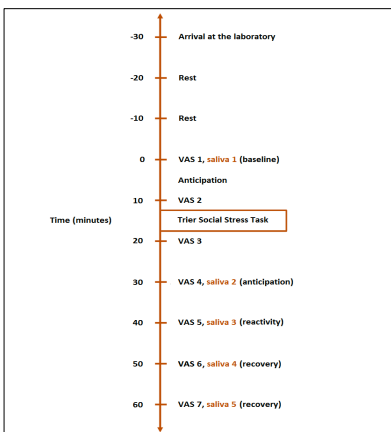
- Higher levels of endogenous **testosterone** has been associated with lower levels of **anxiety**^{1,2}
- Testosterone reactivity is associated with **benefits during social challenges**, such as increased self-efficacy, persistence, enhanced learning, and better performance³
- Although consistent with the idea that greater testosterone reactivity may be helpful when facing social challenges, no study has directly tested whether **testosterone reactivity is associated with lower subjective anxiety** in response to a social stressor

STUDY AIMS

- To investigate the association between testosterone reactivity and acute subjective anxiety during a public speaking challenge; and,
- To examine potential interactions between testosterone reactivity, sex, and trait speech anxiety in predicting acute subjective anxiety.

METHOD

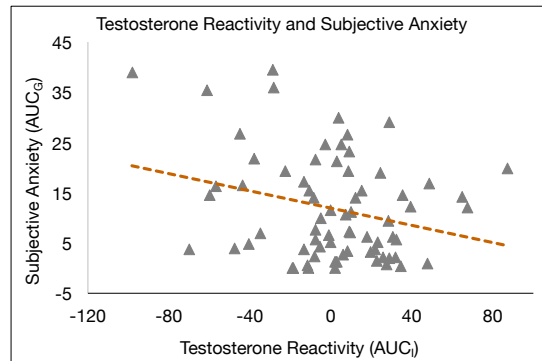
- Participants
 - Sample: **71 students** (40.8% female) from The University of Texas at Austin
 - Age: **19.2 ± 1.3 years**
 - BMI: **23.7 ± 4.36 kg/m²**
- Procedures
 - All participants completed the **Trier Social Stress Test**⁴ and provided subjective anxiety ratings and saliva samples throughout the procedure



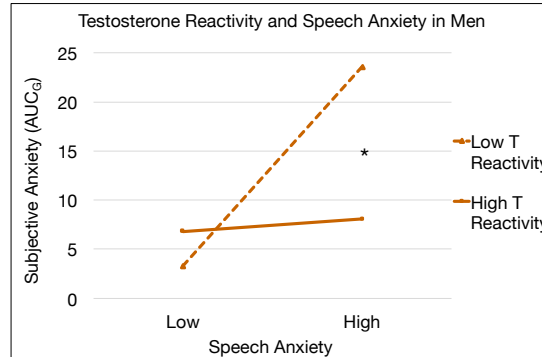
- Measures
 - Speech Anxiety Thoughts Inventory⁵
 - Visual Analogue Scales (7x)
 - Salivary testosterone samples (5x) using commercial ELISA kits (DRG International)

RESULTS

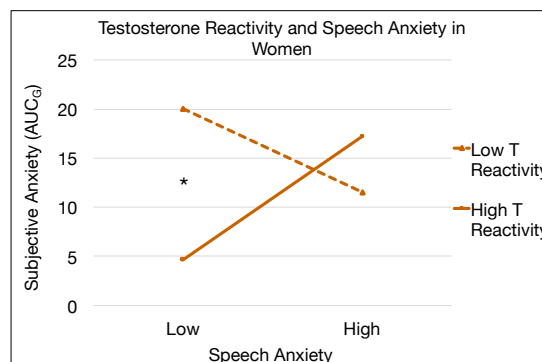
- There is a significant negative association between testosterone reactivity and subjective anxiety ($r = -0.27, p = 0.02$)



- There is a significant 3-way interaction between sex, trait speech anxiety, and testosterone reactivity in predicting cumulative subjective anxiety (AUCG) in response to the public speaking challenge ($F(6, 64) = 4.791, p < .000, R^2 = 0.3$)



- There is a significant interaction between speech anxiety and testosterone reactivity for men ($F(3,28) = 7.615, p < .001$).



- There is a significant interaction between speech anxiety and testosterone reactivity for women ($F(3,25) = 3.41, p = 0.03$).

DISCUSSION

- Anxiolytic effects of testosterone may be due to **fear-reducing properties** in the brain.
- fMRI study showed increased activation of superficial and basolateral amygdala following testosterone administration⁶
- Testosterone administration also **reduces functional coupling of amygdala with orbitofrontal cortex**, and enhanced amygdala coupling with the thalamus⁷
- The 3-way interaction suggests the **anxiolytic effects of testosterone are sex dependent**
- Another likely anxiolytic pathway of testosterone involves **genomic effects of 5 α -reduced metabolites**, such as dihydrotestosterone⁸
- Sex differences in testosterone may be explained in part by the **organizational** and later **activational** effects of gonadal hormones
- It is possible that **women** are less sensitive to the anxiolytic effects testosterone due to **fewer number of androgen receptors** in the hippocampus⁹
- Experimental manipulation of testosterone needed to substantiate these endogenous findings

CONCLUSIONS

- The present findings demonstrate the anxiolytic effects of testosterone in response to a psychological stressor, and suggest that its protective effects are sex dependent
- These findings contribute to a better understanding of potential mechanisms associated with the development and maintenance of anxiety symptoms, and may help inform more efficacious treatments

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