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

Ellie Shuo Jin, MA and Robert Alan Josephs, PhD
The University of Texas at Austin
ellieshuojin@utexas.edu

INTRODUCTION

• Higher levels of endogenous testosterone has been associated with lower levels of anxiety1,2
• 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

1. To investigate the association between testosterone reactivity and acute subjective anxiety during a public speaking challenge; and,
2. To examine potential interactions between testosterone reactivity, sex, and trait 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 Test4 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)

DISCUSSION

• Anxiolytic effects of testosterone may be due to fear-reducing properties in the brain.
• fMRI study showed increased activation of suprachiasmatic and basal lateral amygdala following testosterone administration7
• Testosterone administration also reduces functional coupling of amygdala with orbitofrontal cortex, and enhanced amygdala coupling with the thalamus8
• The 3-way interaction suggests the anxiolytic effects of testosterone are sex dependent.
• Another likely anxiolytic pathway of testosterone involves genomic effects of 5a-reduced metabolites, such as dihydrotestosterone9
• Sex differences in testosterone may be explained in part by the organizational and later activation effects of gonadal hormones
• It is possible that women are less sensitive to the anxiolytic effects of 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

REFERENCES