

## Gender on Testosterone-Stress Reactivity to the Trier Social Stress Test

Brandon Gaudet  
*University of New Orleans*

Follow this and additional works at: <https://scholarworks.uno.edu/innovate>

---

Gaudet, Brandon, "Gender on Testosterone-Stress Reactivity to the Trier Social Stress Test" (2013).  
*Innovate UNO*. 5.  
<https://scholarworks.uno.edu/innovate/2013/posters/5>

This Poster is brought to you for free and open access by the Undergraduate Showcase at ScholarWorks@UNO. It has been accepted for inclusion in Innovate UNO by an authorized administrator of ScholarWorks@UNO. For more information, please contact [scholarworks@uno.edu](mailto:scholarworks@uno.edu).



## Abstract

The number of studies on the effects of stress on testosterone is limited. Through a controlled laboratory stressor and analysis of salivary testosterone, we investigated the role of stress on testosterone reactivity. We focus on gender differences in testosterone reactivity in order to better understand how stress impacts testosterone, differently in males and females.

A total of 66 participants provided repeated salivary samples (N=626) before and after the Trier Social Stress Test (TSST) and on a baseline comparison day. Testosterone levels were the outcome in a Hierarchical Linear Model which separated within individual variation (level 1) from between individual variation in testosterone (level 2).

We found that testosterone levels rise from the start of the session,  $B=.076$ ,  $p<.007$ , until participants achieved a peak in testosterone after the stressor,  $B=4.58$ ,  $p<.001$ . After testosterone peaked, levels dropped significantly,  $B=-.29$ ,  $p<.0001$ . In addition to this testosterone reactivity, we found a transient drop in testosterone in anticipation for the TSST,  $B=-.24$ ,  $p<.001$ , and that testosterone was lower on the baseline day compared to the TSST day,  $B=-.24$ ,  $p<.0001$ . Overall, males had higher testosterone levels than females,  $B=-.846$ ,  $p<.001$ , especially when interacting primarily with male confederates,  $B=-1.07$ ,  $p=.087$ .

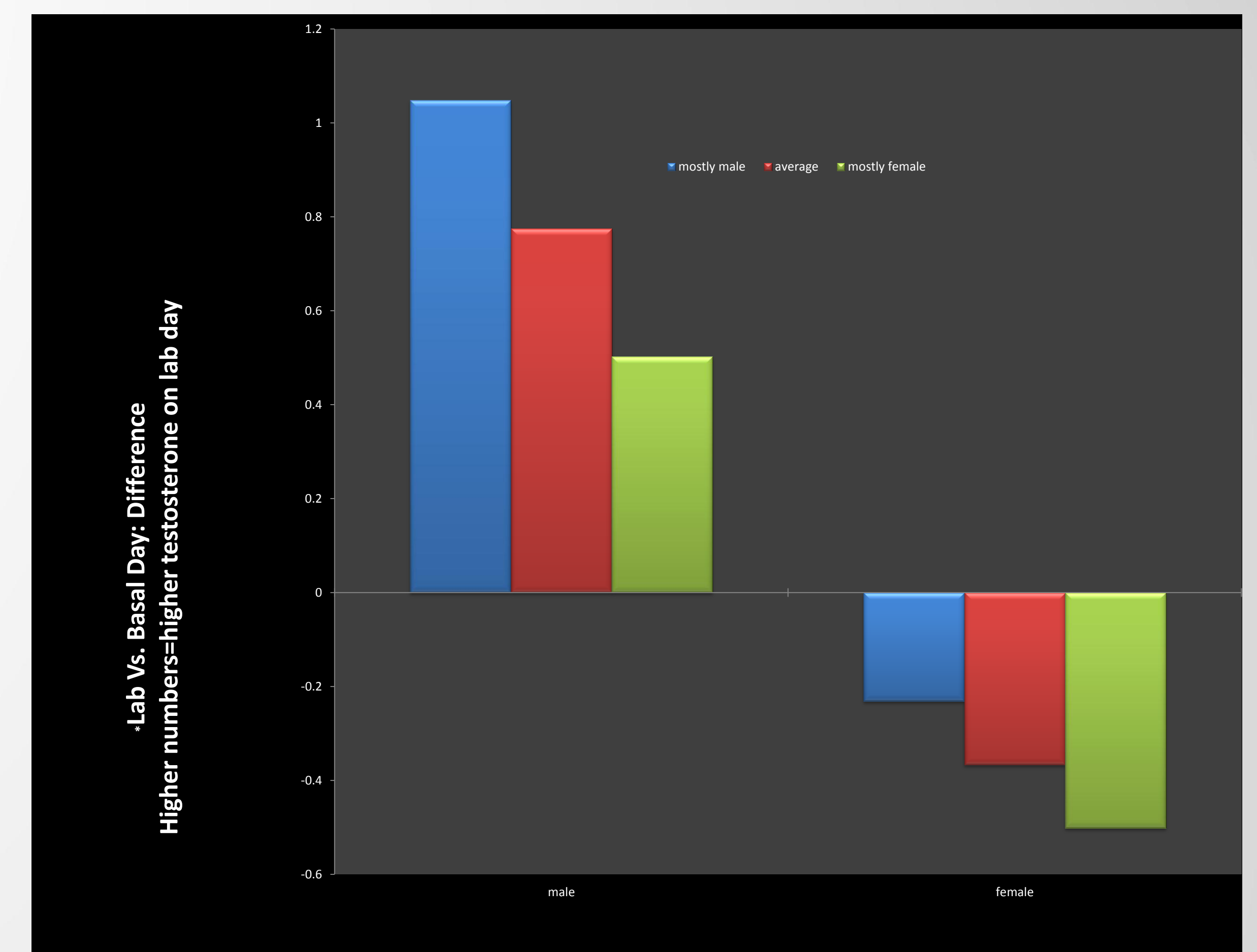
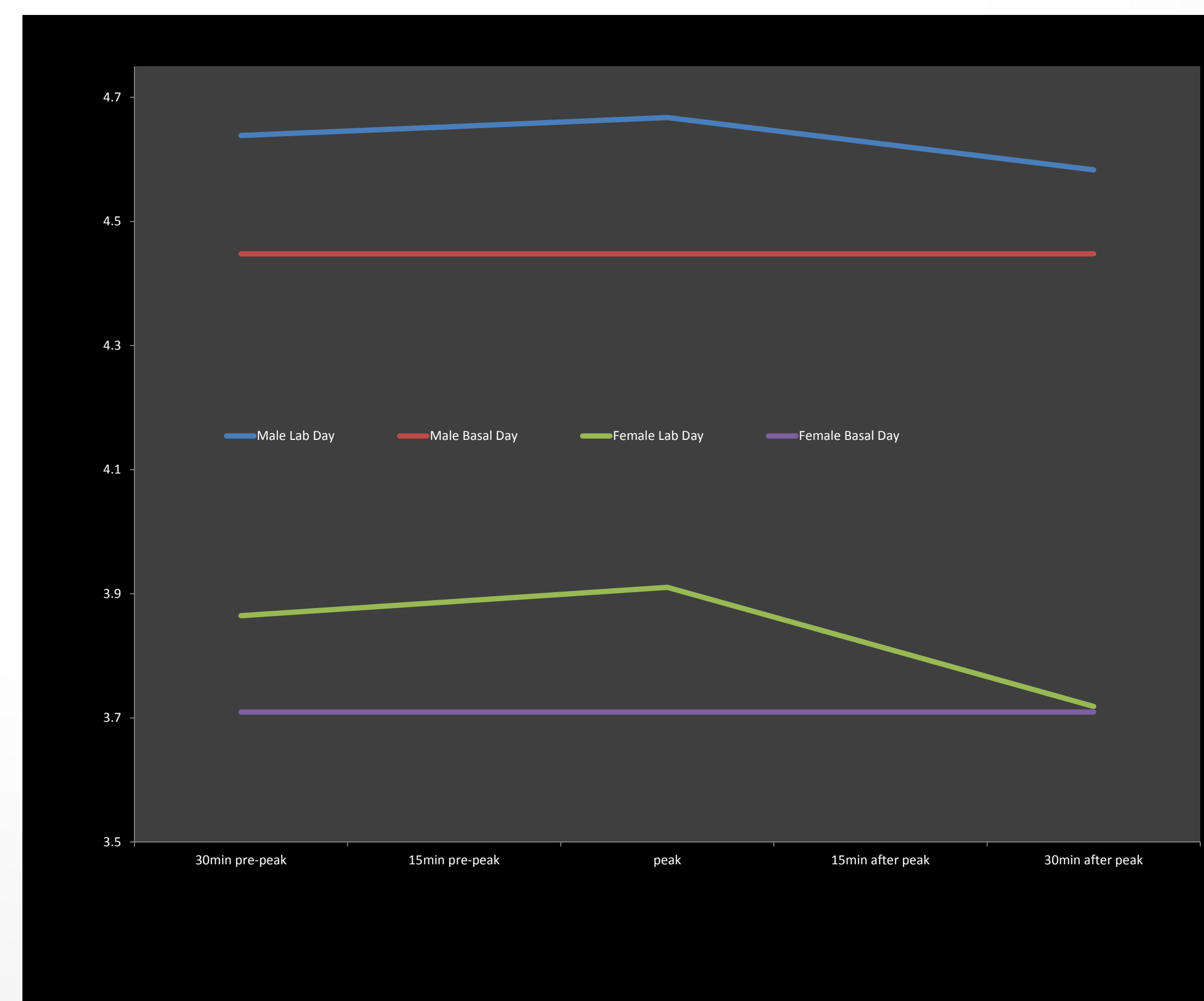
Our results support the notion that testosterone is responsive to salient stressors, and that these effects are observed largely in males. Beyond having higher testosterone overall, testosterone in males may be more reactive to context as well. Furthermore, these effects may be related to challenge as the testosterone reactivity was most evident when males interacted in the laboratory with other males.

## Introduction

- While the sex hormone testosterone appears responsive to competition, relatively little research has examined whether testosterone is reactive to interpersonal stressors where social signals are evaluative rather than competitive
- Research on testosterone reactivity has demonstrated consistent gender differences in testosterone responses, consistent with this hormone's masculinizing role
- Testosterone levels are generally higher in males than in females, a dichotomy which may transpire over to stress reactivity as well
- The focus of the present study is to examine testosterone reactivity to a controlled stressor in a laboratory setting to determine the impact stress has on testosterone; to explore the role which gender plays in testosterone-stress reactivity, and whether this reactivity is more prominently marked in males

## Methods

- Young adults (aged 18-48;  $M=22.38$ ;  $SD=4.34$ ; female=37) were recruited from the University of New Orleans and within the community.
- A total of 66 participants completed the Trier Social Stress Test (TSST), a standard laboratory stressor which involves evaluation by a mixed-gender panel of evaluative confederates; participants prepare a speech about their dream job followed by an arithmetic task, all being under specific time constraints.
- Participants provided saliva samples at timed intervals throughout the TSST. Saliva samples were at matched times of day for monitoring of basal hormone levels. With each sample collection, participants completed "diary" packets
- All ten samples per participant were analyzed in the SPIT lab for testosterone using a highly reliable enzyme immunoassay ([www.salimetrics.com](http://www.salimetrics.com)). Samples were assayed in duplicate, and repeat tested if duplicate CVs>7%.



## Results

- 19% of the total variance in testosterone is captured by within-person variances and 81% is explained by person-to-person differences. It is important that between individual differences in testosterone is large as gender is a between-individual predictor.
- Testosterone is reactive to the TSST, ( $\beta=.076$ ,  $p<.007$ ) but this did not show a gender difference ( $\beta=.034$ ,  $p=.544$ )
- After achieving peak testosterone ( $\beta=4.58$ ,  $p<.001$ ), testosterone levels decline ( $\beta=-.29$ ,  $p<.0001$ ). Females show a stronger decline at the after peak time point ( $\beta=-.216$ ,  $p=.017$ ) compared to males. Figure 1 illustrates that by 30 minutes after the peak, female testosterone levels had returned to basal levels, but male levels degrade at a much slower pace
- Testosterone levels were higher on lab day ( $\beta=.210$ ,  $p=.006$ ) compared to baseline day, overall.
- This lab-day effect showed a trend for a gender difference based on the gender of the confederates ( $\beta=-1.074$ ,  $p=.087$ ). Figure 2 illustrates that when females interacted with a preponderance of male confederates, they had lower testosterone levels. When males interacted with mostly male confederates, they exhibited higher testosterone levels in the lab.

## Conclusions

- Gender differences can play an integral part in testosterone reactivity founded upon stress
- Male testosterone levels are greater in situations of social stress which are male dominated, as do females in situations of social stress which are female dominated, but both show minimal response when there is a preponderance of the opposing gender
- Males tend to return to basal testosterone levels at a much slower rate than females, which may shed some light on increased male aggressiveness in stressful situation with regards to male-male conflict
- Further research is needed to explore the implications of testosterone with regards to whether or not stress can motivate aggressive behavior, and what role the dynamics of gender may play in such scenarios