Previous research has been mixed regarding the relationship between cortisol and anxiety. Cortisol is a stress hormone secreted by the hypothalamic-pituitary-adrenal (HPA) axis in response to stress. When released cortisol is detected by the hypothalamus, further release of cortisol is inhibited in a negative feedback loop. Sex differences have been found in cortisol reactivity (Kudielka & Kirschbaum, 2005). Sex has been found to have a moderating effect on the relationship between cortisol reactivity and neuroticism (DeSoto & Salinas, 2015). Estradiol is thought to play a role in regulating cortisol through the negative feedback loop, increasing negative feedback (Sharma et al., 2014). The present study seeks to investigate how sex and sex hormones affect the relationship between cortisol reactivity and anxiety.

### PURPOSE
- Previous research has been mixed regarding the relationship between cortisol and anxiety.
- Cortisol is a stress hormone secreted by the hypothalamic-pituitary-adrenal (HPA) axis in response to stress.
- When released cortisol is detected by the hypothalamus, further release of cortisol is inhibited in a negative feedback loop.
- Sex differences have been found in cortisol reactivity (Kudielka & Kirschbaum, 2005).
- Sex has been found to have a moderating effect on the relationship between cortisol reactivity and neuroticism (DeSoto & Salinas, 2015).
- Estradiol is thought to play a role in regulating cortisol through the negative feedback loop, increasing negative feedback (Sharma et al., 2014).
- The present study seeks to investigate how sex and sex hormones affect the relationship between cortisol reactivity and anxiety.

### ABSTRACT
Cortisol, a hormone released in response to stress, is often assumed to be related to anxiety. However, previous research on the relationship between cortisol and anxiety is mixed. Moreover, the relationship between cortisol and neuroticism varies by gender and estrogen may affect cortisol reactivity via HPA’s negative feedback loop. The present research examines the moderating effects of sex and estrogen on the relationship between cortisol reactivity and anxiety. Participants (n=55) completed a stressor task and measures of anxiety. Assays for cortisol and estradiol were conducted. We predict that sex and estradiol will moderate the relationship between cortisol and anxiety.

### METHOD
- Participants were 55 college students (31 women, 24 men), who received credit for participation through their introductory psychology courses.
- Participants completed measures for anxiety and demographics.
- Participants completed the Trier Social Stress Test (TSST; Kirschbaum et al., 1993). See Table 1 for procedure.
- Participants gave saliva samples before and after participating in the TSST.
- Anxiety was measured using the SCL-90 and the Spielberger State-Trait Anxiety Inventory.
- Immunosorbant assays for estradiol and cortisol were completed.

### HYPOTHESES
- It is hypothesized that:
  - Men will exhibit greater cortisol reactivity in response to stress than women.
  - There will be a negative correlation between cortisol reactivity and trait anxiety for women.
  - There will be a positive correlation between cortisol reactivity and trait anxiety for men.
  - Sex will moderate the relationship between cortisol reactivity and anxiety.
  - Estradiol levels will moderate the relationship between cortisol reactivity and anxiety.

### TABLE 1 - Trier Social Stress Test Procedure

<table>
<thead>
<tr>
<th>Task</th>
<th>Time</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speech preparation</td>
<td>10 minutes</td>
<td>Participants prepare a speech describing their qualifications for their ideal job</td>
</tr>
<tr>
<td>Speech</td>
<td>5 minutes</td>
<td>Participants speak for 5 minutes in front of a camera that is not recording</td>
</tr>
<tr>
<td>Mathematics task</td>
<td>5 minutes</td>
<td>Participants repeatedly subtract 13 from 1022</td>
</tr>
</tbody>
</table>

**Estradiol**
Estradiol is an estrogen steroid hormone produced in ovaries and testicles. It is involved in regulation of menstrual cycles. Although it is an important hormone for females, it is also present in much lower levels in males.

**Cortisol**
Cortisol is a hormone secreted by the hypothalamic-pituitary-adrenal (HPA) axis. It is released in response to stress and is affected by circadian rhythms. It affects heart rate, blood pressure, blood sugar, and many other functions.