Differential Oxytocin Response as a Function of Dissociation during Recall of an Interpersonal Stressful Event in an Undergraduate Sample

K. Monde1, M.E. Panero2, J. Kim4, D. Simeon3, V. Luine2,3

1Biopsychology, CUNY Graduate Center, New York, NY. 2Psychology, Boston College, Chestnut Hill, MA. 3Psychology, CUNY Hunter College, New York, NY. 4Psychology, Behavioral Neuroscience, Michigan State University. 5Psychiatry, Mount Sinai School of Medicine, New York, NY

Introduction

Although stress is a prominent daily human life experience, increased levels of stress and traumatic stress may have deleterious effects on both physical and mental health. Social stress has been shown to induce dissociative states and comprises a precipitating factor of dissociative disorders. Additionally, oxytocin (OT), a neurohypophysial hormone, has been associated with relational stress in women (Taylor et al., 2010). In a recent study, oxytocin was strongly correlated to dissociation in pregnant women, and pregnant women with trauma history and concurrent hyperemesis gravidarum had higher levels of dissociation and OT (Deng et al., 2013). Although many studies have found no change in oxytocin in response to stress (Altemus et al., 2001; Heinrichs et al., 2001; Cyparison et al., 2008; Greven and Light, 2010), Pierrehumbert et al. (2010) demonstrated an increase in plasma oxytocin (OT) in response to social stress (trend p < .10) and a significant decrease in OT 20 minutes post-stressor. Similarly, we recently found an increase in OT in response to social stress in a normal control group but not in de-personalized participants (Monda et al., unpublished data).

In the current study, 30 undergraduate students performed the Stressful Event Speech (SES) in which they described a stressful interpersonal event while being video recorded and then watched the video. Salivary oxytocin was assessed before, directly following, and at 20 post-SES. We expected an increase in oxytocin in response to recalling the event and a decrease in oxytocin during a 20 minute recovery period. We also expected the increase in oxytocin during stress would be inversely related to levels of dissociation.

Methods

**PARTICIPANTS:**
18 normal undergraduates (18 female, 10 male)

**BASELINE QUESTIONNAIRES:**
- Beck Anxiety Inventory (BAI), Beck Depression Inventory (BDI)
- Dissociation Scale (CDS)
- Dissociative Experiences Scale (DES) total and subscales: Dissociation, Amnesia, Absorption

**STRESS ASSESSMENT:**
Profile of Mood States (POMS; includes tension subscale used to assess subjective stress)

**SES Procedure:**
- 2 Minute Perparation
- 3 minute Speech
- 3 minute Video viewing

**Results**

![Figure](image.png)

**Correlations between Oxytocin Levels and Dissociation**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Pre-SES OT</th>
<th>OT</th>
<th>SES+20 OT</th>
<th>OT Stress Reactivity</th>
<th>OT Stress Recovery</th>
<th>Total OT Decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Dissociation</td>
<td>.026</td>
<td>-.289</td>
<td>.024</td>
<td>-.427</td>
<td><strong>.35†</strong></td>
<td>-.144</td>
</tr>
<tr>
<td>Depersonalization</td>
<td>-.214</td>
<td>-.491</td>
<td>.110</td>
<td>-.453</td>
<td><strong>.592</strong></td>
<td>.291</td>
</tr>
<tr>
<td>Pre-SES Dissociation</td>
<td>.080</td>
<td>-.172</td>
<td>-.178</td>
<td>-.113</td>
<td>-.049</td>
<td>.146</td>
</tr>
<tr>
<td>Post-SES Dissociation</td>
<td>-.245</td>
<td>-.331</td>
<td>-.201</td>
<td>-.277</td>
<td>-.288</td>
<td>-.326</td>
</tr>
<tr>
<td>Final Dissociation</td>
<td><strong>.448</strong></td>
<td><strong>.503</strong></td>
<td>-.186</td>
<td>-.380</td>
<td><strong>.459</strong></td>
<td><strong>.466</strong></td>
</tr>
<tr>
<td>Dissociation Reactivity</td>
<td>-.196</td>
<td>-.224</td>
<td>.087</td>
<td>-.207</td>
<td>.261</td>
<td>.236</td>
</tr>
<tr>
<td>Dissociation Recovery</td>
<td>.078</td>
<td>.033</td>
<td>-.065</td>
<td>-.059</td>
<td>.044</td>
<td>.011</td>
</tr>
</tbody>
</table>

*p < .05, ** p < .01. Stress Reactivity: Post-SES levels - Pre-SES levels. Stress Recovery: Post-SES levels - Final SES levels.

**Discussion**

- To our knowledge, this is the first study to test stress reactivity to the Stressful Event Speech.
- Consistent with the results of Pierrehumbert et al. (2010), we found a significant decrease in oxytocin in stress recovery.
- Our failure to find a decrease in OT during stress may be due to the duration of the stress task: The Social Stress Test used by Pierrehumbert et al. lasts 15 minutes while the SES lasts 8 minutes.
- The decrease in oxytocin during social stress which was associated with dissociative states may indicate a tendency for trauma-exposed individuals to withdraw from stressful stimuli thereby emitting a differential physiological response.
- Failure of other studies to find a relationship between acute psychosocial stress and oxytocin may be due to inclusion of heterogeneous samples comprising trauma exposed and/or dissociated individuals who counter the OT response of non-traumatized/non-dissociated individuals.
- Additionally, the effects of oxytocin may occur earlier in the stress response. While most studies measure final OT levels 30 minutes or 60 minutes post-stressor, our study and that of Pierrehumbert demonstrate a relationship between stress and oxytocin much earlier: 20 minutes post-stressor.

Future studies should consider dissociation levels in relationship to OT response.

**References**


