Abstract

NEURAL HYPERVIGILANCE IN TARUMA-EXPOSED WOMEN

by

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Trauma-exposed people often experience hypervigilance, which is a tonic condition of elevated alertness and excessive scanning for potential threat. A cardinal feature of hypervigilance is that no actual threat is needed to evoke or maintain the over-alertness and heightened affective response. However, most neuroimaging research in trauma to date has only focused on reactivity to an actual threat. Thus, the overarching aim of this dissertation was to investigate neural signatures and salivary markers of post-trauma hypervigilance in the absence of threat that can cause impairment in daily functioning and contribute to developing other trauma-related symptoms such as heightened threat reactivity.

The specific goal of Study 1 was to investigate the mechanisms of neural hypervigilance in trauma-exposed people by testing the association between trauma exposure and a persistent amygdala hyperactivity to affectively information even when it becomes familiar. Trauma-exposed women (n=24) showed persistent amygdala activity to familiar neutral images, whereas no-trauma controls (n=20) showed efficient amygdala habituation. Thus, these data suggest that hypervigilant amygdala response to affectively ambiguous information, even when the information becomes familiar, might be a neural signature of post-trauma hypervigilance.

The specific goal of Study 2 was to investigate the potential role of cingulum and
uncinate fasciculus integrity in trauma-related neural hypervigilance, indexed by less
discrimination between amygdala activation to novel and familiar affective images. Trauma-
exposed women \( n=22 \) showed less discrimination between novel and familiar negative images
in the amygdala compared to no-trauma controls \( n=20 \). In trauma-exposed women, less
amygdala discrimination between novel and familiar affective images was associated with less
structural integrity in the anterior cingulum. Therefore, the anterior cingulum might play an
important role in impaired novelty discrimination for affective information in the amygdala that
might potentially lead to persistent hypervigilance.

The specific goal of Study 3 was to test the utility of salivary alpha amylase and cortisol
as potential biomarkers that predict neural hypervigilance in trauma-exposed people. In trauma
exposed women \( n=20 \), salivary alpha amylase reactivity was associated with neural reactivity
in the salience network in response to negative scenes and neural hypervigilance as indexed by
response to neutral scenes. These results suggest that salivary alpha amylase might serve as a
marker of trauma-related reactivity to threat, and also as a marker of hypervigilance in the
absence of threatening information.

Taken together, these data contribute to our understanding on neural mechanisms of tonic
vigilance and maladaptive affect in trauma survivors, and opens the possibility of using salivary
alpha amylase as a biomarker of hypervigilance.