

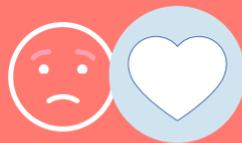
# The Biological Mechanisms underlying Sensitization



Fear reactions experienced during the acute aftermath of a traumatic event followed by repeated re-experiencing of the traumatic memory



A process of sensitization to subtle reminders of traumatic and related memories



Fear Conditioning |  
Stress Sensitization |  
Kindling



A progressive augmentation and kindling of the reactivity of an individual and an associated emergence of general emotion dysregulation, including anger, grief, numbing, and dissociation as well as a generalization of the fear response.

# Sensitization of The Fear and Stress Response

hypothesized to involve  
**complex interactions**  
between the following areas

(Lanius et al., 2010; Yehuda, 2006;  
Yehuda & Antelman, 1993)



The individual's distress

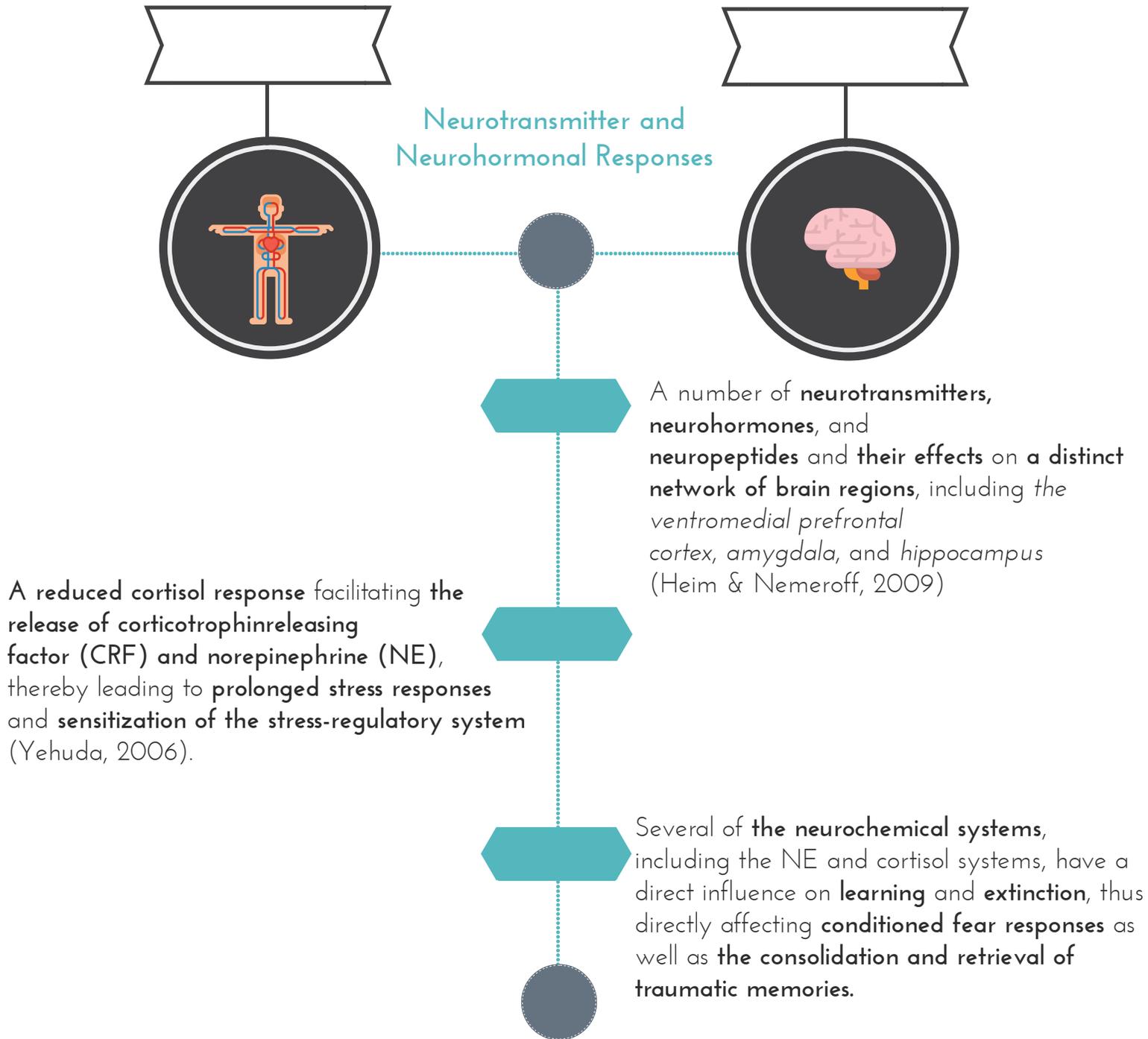
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3

Related neurotransmitter  
and neurohormonal  
responses

2

Psychophysiological  
reactivity



# Fear Conditioning and Failure of Extinction of Conditioned Fear

Emotional undermodulation, proposed to be mediated by failure of prefrontal inhibition of limbic regions, whereas emotional overmodulation may be mediated by prefrontal inhibition of the same limbic regions (Lanius et al., 2010).

PTSD is a dynamic disorder alternating between states of physiological hyperarousal and hypoarousal (emotional numbing, avoidance).



Panksepp (1998; 2009)'s **four highly interactive emotional systems** that are defined by genetically coded neural circuits that, when activated, lead to specific behaviors



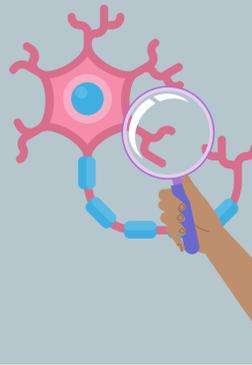
### A fear system:

to minimize the probability of bodily destruction and aids in escaping from dangerous situations; processes related to attachment

Significant overlap in the neural circuitry underlying these emotional systems, and substantial neural interaction at both the higher (e.g., *medial prefrontal cortex, anterior cingulate cortex, and amygdala*) and lower levels of the neuroaxis (e.g., *periaqueductal grey [PAG]*) (Panksepp & Northoff, 2009)

### A rage system:

to mediate anger and aggression



### A seeking system:

underlies goal-directed behaviors and may generate curiosity and intellectual pursuits, thus facilitating learning

A role for the brain structures in **the executive top-down regulatory control of a variety of negative affects and autonomic arousal states** rather than solely in the mediation of fear responses

### A panic system:

plays a key role in the maintenance of social contact by mediating social emotional processes related to attachment

As proposed, **sensitization of the fear circuitry** will ultimately lead to **general emotion dysregulation**