

CIB #1: Freeze-Flight-Fight or Tonic Immobility

Why didn't the victim fight off their assailant? The CIB expert will tend to testify:

- Fear, frozen, or terror (*Freeze-Flight-Fight-Faint*)
- *Tonic Immobility* - an involuntary "defensive strategy" seen in animals when unavoidable threat is perceived.
- Disbelief that this is happening
- Belief that it will be worse to fight
- Socialization to passivity
- Blames self for being in the situation or encouraging their assailant
- Protection of others
- Greater PTSD associated with elicitation (victims exposed to triggers of past trauma)

Freeze-Flight-Fight Response

The flight or fight response, also called the "*acute stress response*" was first described by Walter Cannon in the 1920s as a theory that animals react to threats with a general discharge of the sympathetic nervous system. The response was later recognized as the first stage of a general adaptation syndrome that regulates stress responses among vertebrates and other organisms.

The onset of a stress response is associated with specific physiological actions in the sympathetic nervous system, primarily caused by release of adrenaline and norepinephrine from the medulla of the adrenal glands. The release is triggered by acetylcholine released from preganglionic sympathetic nerves. These catecholamine hormones facilitate immediate physical reactions by triggering increases in heart rate and breathing, constricting blood vessels and tightening muscles. An abundance of catecholamines at neuroreceptor sites facilitates reliance on spontaneous or intuitive behaviors often related to combat or escape.

Normally, when a person is in a serene, unstimulated state, the "firing" of neurons in the locus ceruleus is minimal. A novel stimulus, once perceived, is relayed from the sensory cortex of the brain through the thalamus to the brain stem. That route of signaling increases the rate of noradrenergic activity in the locus ceruleus, and the person becomes alert and attentive to the environment.

If a stimulus is perceived as a threat, a more intense and prolonged discharge of the locus ceruleus activates the sympathetic division of the autonomic nervous system (Thase & Howland, 1995). The activation of the sympathetic nervous system leads to the release of norepinephrine from nerve endings acting on the heart, blood vessels, respiratory centers, and other sites. The ensuing physiological changes constitute a major part of the acute stress response. The other major player in the acute stress response is the hypothalamic-pituitary-adrenal axis. (*Psychologistworld.com*)

"A term introduced by the US physiologist Walter Bradford Cannon (1871 – 1945), and popularized in his book *The Bodily Changes in Pain, Hunger, Fear and Rage* (1929), for the syndrome of physiological responses of an organism confronted with a situation that evokes fear, pain, or anger, such responses being mobilized by the secretion of adrenaline (epinephrine) from the adrenal medulla, preparing the organism to fight or to flee. It includes increase blood pressure, accelerated heart rate, deep respiration, increased sweating, dilation of the pupils, diversion of blood flow from the digestive tract to the skeletal muscles and cessation of digestive processes, release of sugar from reserves in the liver, and closure of the sphincter of the bladder, leading to retention of urine." (Oxford Dictionary of Psychology, Andrew M. Colman, 2006, p. 283).

Reach out to Dr. Simpson for a description of questions that can be asked on cross of the CIB expert regarding **Freeze-Flight-Fight / Tonic Immobility**.

Research Articles on Freeze-Flight-Fight and/or Tonic Immobility

Fight, flight or freeze: Implications of the passive fear response for anxiety and depression.

Hamilton, Laurie

Phobia Practice & Research Journal, Vol 2(1), Spr-Sum 1989. pp. 17-27.

Abstract:

Introduces the General Inhibition Syndrome (GIS) as a stress response that is as important as the General Adaptation Syndrome (GAS) in its relationship to anxiety and depression. GIS is a reaction to psychobiological stress that leads to a fugue state, either for a period of recuperation, or as a passive fear response (PFR). PFR involves the cessation of movement, bradycardia, and depression of the metabolism in response to threat. Animal telemetry studies indicate that perception of helplessness, defensive capabilities, proximity of a safe place, and the perception of danger predicate whether an animal will have a passive (GIS) or active (GAS) fear response. Treatment implications of PFR are discussed.

Brain systems that mediate both emotion and cognition.

Gray, Jeffrey A.

Cognition and Emotion, Vol 4(3), Sep, 1990. Special issue: Development of relationships between emotion and **cognition**. pp. 269-288.

Abstract:

Neurobiological research with animals suggests that the brain systems mediating emotion overlap with those mediating **cognition** to such a degree that it is difficult to maintain any clear distinction between them. Possible reasons for this overlap are discussed, using examples from 2 related fields: behavioral effects of drugs and studies of brain damage. A model of brain systems that simultaneously subserve emotion and **cognition** is presented. The model postulates the existence of 3 fundamental systems of this kind in the mammalian brain: a behavioral approach system, a **fight/flight** system, and a behavioral inhibition system. The neuropsychology of each system is briefly presented.

Freeze, Flight, Fight, Fright, Faint; Adaptationist Perspectives on the Acute Stress Response Spectrum.

Bracha, H. Stefan

CNS Spectrums, Vol 9(9), Sep, 2004. pp. 679-685.

Abstract:

This article reviews the existing evolutionary perspectives on the acute stress response habitual faintness and blood-injection-injury type-specific phobia (BIIITS phobia). In this article, an alternative evolutionary perspective, based on recent advances in evolutionary psychology, is proposed. Specifically, that fear-induced faintness (eg, fainting following the sight of a syringe, blood, or following a trivial skin injury) is a distinct Homo sapiens-specific extreme-stress survival response to an inescapable threat. The article suggests that faintness evolved in response to middle paleolithic infra-group and inter-group violence (of con-specifics) rather than as a pan-mammalian defense response, as is presently assumed. Based on recent literature, freeze, flight, fight, fright, faint provides a more complete description of the human acute stress response sequence than current descriptions. Faintness, one of three primary physiological reactions involved in BIIITS phobia, is extremely rare in other phobias. Since heritability estimates are higher for faintness than for fears or phobias, the author suggests that trait-faintness may be a useful complement to trait-anxiety as an endophenotype in research on the human fear circuitry. Some implications for the forthcoming Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition as well as for clinical, health services, and transcriptomic research are briefly discussed.

Does 'fight or flight' need updating?

Bracha, H. Stefan, Ralston, Tyler C., Matsukawa, Jennifer M., Williams, Andrew E.

Psychosomatics: Journal of Consultation Liaison Psychiatry, Vol 45(5), Oct, 2004. pp. 448-449.

Abstract:

The authors propose the adoption of an expanded and reordered version of W. Cannon's term "fight or flight", coined in 1929. "Fight or flight" mischaracterizes the ordered sequence of responses that mammals exhibit as a threat escalates or approaches. In addition to the omission of the initial freezing response, other important fear responses have remained obscured, in part because of their omission from "fight or flight," and these other fear responses have important clinical implications as well. Tonic immobility is a clinically relevant survival response observed in humans and mammals. More recent research suggests the phrase "freeze, flight, fight, or fright" is a more complete and nuanced alternative to the original "fight or flight".

Tonic immobility as an evolved predator defense: Implications for sexual assault survivors.

Marx, Brian P., Forsyth, John P., Gallup, Gordon G., Fusé, Tiffany, Lexington, Jennifer M.
Clinical Psychology: Science and Practice, Vol 15(1), Mar, 2008. pp. 74-90.

Abstract:

This article reviews research concerning the possible relationship between tonic immobility (TI) and human reactions to sexual assault. This review includes a description of the characteristic features of TI and a discussion of the most widely accepted theoretical explanation for TI. The possibility that humans may exhibit TI is explored and conditions that might elicit TI in humans are identified. In particular, we focus on TI in the context of sexual assault, because this form of trauma often involves elements that are necessary for the induction of TI in nonhuman animals, namely, fear and perceived physical restraint. The important similarities and differences in how TI manifests in humans and nonhuman animals are highlighted, future research directions are offered, and clinical implications are suggested

Differentiating defensive and predatory aggression: Neuropsychological systems and personality in sex differences.

Corr, Philip J., Perkins, Adam M.
Behavioral and Brain Sciences, Vol 32(3-4), Jun-Aug, 2009. pp. 274-275.

Abstract:

Comments on an article by John Archer (see record 2009-17488-001). We draw a distinction between defensive and predatory forms of aggression, and how these forms relate to basic neuropsychological systems, especially the Fight-Flight-Freeze-System (FFFS; putatively related to defensive aggression), and the Behavioral Approach System (BAS; putatively related to predatory aggression). These systems may help further to account for proximal brain processes and personality influences in the context of sex differences.

Dissociation following traumatic stress: Etiology and treatment.

Schauer, Maggie and Elbert, Thomas
Zeitschrift für Psychologie/Journal of Psychology, Vol 218(2), 2010. pp. 109-127.

Abstract:

We postulate that the cascade 'Freeze-Flight-Fight-Fright-Flag-Faint' is a coherent sequence of six fear responses that escalate as a function of defense possibilities and proximity to danger during life-threat. The actual sequence of trauma-related response dispositions acted out in an extremely dangerous situation therefore depends on the appraisal of the threat by the organism in relation to her/his own power to act (e.g., age and gender) as well as the perceived characteristics of threat and perpetrator. These reaction patterns provide optimal adaption for particular stages of imminence. Subsequent to the traumatic threats, portions of the experience may be replayed. The actual individual cascade of defense stages a survivor has gone through during the traumatic event will repeat itself every time the fear network, which has evolved peritraumatically, is activated again (i.e., through internal or external triggers or, e.g., during exposure therapy). When a parasympathetically dominated "shut-down" was the prominent peri-traumatic response during the traumatic incident, comparable dissociative responses may dominate responding to subsequently experienced threat and may also reappear when the traumatic memory is reactivated. Repeated experience of traumatic stress forms a fear network that can become pathologically detached from contextual cues such as time and location of the danger, a condition which manifests itself as posttraumatic stress disorder (PTSD). Intrusions, for example, can therefore be understood

as repetitive displays of fragments of the event, which would then, depending on the dominant physiological response during the threat, elicit a corresponding combination of hyperarousal and dissociation. We suggest that trauma treatment must therefore differentiate between patients on two dimensions: those with peritraumatic sympathetic activation versus those who went down the whole defense cascade, which leads to parasympathetic dominance during the trauma and a corresponding replay of physiological and dissociative responding, when reminded. The differential management of dissociative stages ('fright' and 'faint') has important treatment implications.

Adult male rape and sexual assault: Prevalence, re-victimization and the tonic immobility response.

Coxell, Adrian W. and King, Michael B.

Sexual and Relationship Therapy, Vol 25(4), Nov, 2010. pp. 372-379.

Abstract:

Fifteen years ago we summarized research on what was known about the sexual assault of men and its effects. Here we present evidence from epidemiological research that demonstrates that the sexual assault of men is observed in many countries—demonstrating the widespread existence of the sexual assault of men and the need for further research. We also present research to show that the association between child sexual abuse and sexual assault in adult females has also been found in a variety of studies on men. Finally, we also consider the phenomenon of tonic immobility as this has important implications for the well-being of victims of sexual assault.

Freeze for action: neurobiological mechanisms in animal and human freezing

Karin Roelofs

Philos Trans R Soc Lond B Biol Sci. 2017 Apr 19; 372(1718): 20160206.

Abstract

Upon increasing levels of threat, animals activate qualitatively different defensive modes, including freezing and active fight-or-flight reactions. Whereas freezing is a form of behavioral inhibition accompanied by parasympathetically dominated heart rate deceleration, fight-or-flight reactions are associated with sympathetically driven heart rate acceleration. Despite the potential relevance of freezing for human stress-coping, its phenomenology and neuro-biological underpinnings remain largely unexplored in humans. Studies in rodents have shown that freezing depends on amygdala projections to the brainstem (periaqueductal grey). Recent neuroimaging studies in humans have indicated that similar brain regions may be involved in human freezing. In addition, flexibly shifting between freezing and active defensive modes is critical for adequate stress-coping and relies on fronto-amygdala connections. This review paper presents a model detailing these neural mechanisms involved in freezing and the shift to fight-or-flight action. **Freezing is not a passive state but rather a parasympathetic brake on the motor system, relevant to perception and action preparation.** Study of these defensive responses in humans may advance insights into human stress-related psychopathologies characterized by rigidity in behavioural stress reactions. The paper therefore concludes with a research agenda to stimulate translational animal–human research in this emerging field of human defensive stress responses. This article is part of the themed issue ‘Movement suppression: brain mechanisms for stopping and stillness’.

Research Articles on Fight/Flight/Freeze and Gender

Gender Differences in Responses to Stress: It Boils Down to a Single Gene

Fight-or-Flight vs Tend-and-Befriend

Psychology Today Online. Posted Mar 17, 2012

You are walking alone in a dark alley late at night when, all of a sudden, you feel the barrel of a gun pressed to the back of your neck and hear a voice saying: "Give me your wallet or I will kill you." What do you do? The answer is: it depends on whether you are a man or a woman. If you are a man, you either run away as quick as you can or you turn around and punch the guy in the face. If you are a woman, you try to talk yourself out of the situation: "Are you sure you want to

do this?" you ask the robber, or "If you put the gun away, we can talk about the situation and I will see what I can do to help you."

According to some psychologists, there is basic difference in the way men and women respond to social stress: for men, it's either "fight or flight" while for women it's "tend and befriend." Physiologist Walter Cannon - a pioneer of research on stress - argued in the 1930s that "fight-or-flight" is a universal physiological response to stress shown not only by all humans, but by animals as well. This response is controlled by the sympathetic nervous system - the part of our nervous system that deals with automatic functions such as breathing. Under stress, this system is activated, increasing heart rate and blood pressure, hastening breathing, and otherwise readying you to face down your enemy or to run. Thousands of studies inspired by Cannon described and documented this response in a variety of species and situations. The vast majority of these studies, however, were conducted with males.

In 2000, UCLA social psychologist Shelley Taylor and her colleagues wrote an influential article in *Psychological Review*, which Taylor later expanded into a book called *The Tending Instinct*, to propose that when it comes to stress, women are different from men. Instead of getting ready to fight or to flee, women become more likely to express affiliative social behavior, either to befriend the enemy - if there is an enemy and is causing the stress - or to seek social support from their family members or friends. Physiologically, instead of releasing large amounts of norepinephrine and cortisol into the bloodstream the way men do, Taylor argued that women respond to stress by secreting more endorphins - neurochemical substances that help alleviate pain and make us feel good about social interactions - and oxytocin, a neurohormone that is linked to the motivation to behave in a friendly manner to children or close social partners.

In support of Taylor's hypothesis, I can tell you from experience that if you put two adult male rhesus monkeys who have never met before in a small cage, they will fight and try to kill each other. In contrast, if you put two females in a cage, they will reduce the tension and awkwardness of the situation by exchanging grooming behavior (grooming is the main form of affiliation in monkeys and is known to cause a release of endorphins and to reduce stress in the receiver - not unlike receiving a body massage from your favorite masseuse).

A new study conducted in Australia suggests that the difference between men and women in their responses to stress may boil down to a single gene. The authors of this study argued that the SRY gene that men have on their Y chromosome - right between the gene for flipping through TV channels with the remote control and the gene for not putting the toilet seat down after peeing - causes their fight-or-flight response, while women use different genetic and physiological mechanisms to deal with stress.

The SRY gene was previously thought to be involved only in the development of male genitalia in the womb, but the proteins produced by this gene have now been found also in the brain and other organs. It turns out that these SRY proteins regulate the secretion of neurotransmitters known as catecholamines, which include norepinephrine, dopamine, and serotonin, and play an important role in neural activity, cardiovascular function, and movement. The SRY gene and its proteins may contribute to the release of large amounts of norepinephrine in the blood stream and the increase in blood pressure and motor activity occurring after stress in men, which in turn, facilitate the expression of the fight-or-flight response. Since women don't have the SRY gene, their responses to stress are regulated by other genes and other physiological changes involving estrogen hormones and, as previously mentioned, oxytocin and endorphins. These physiological changes, in turn, facilitate the expression of the tend-and-befriend response.

Obviously, women too show increases in catecholamines and in blood pressure after stress. These physiological processes are controlled by multiple genes, with the result that male and female

physiology are generally more similar than Australian researchers might think. This is true also for other physiological gender differences, where men differ on average from women but there is overlap in the distribution of the trait. For example, although men have, on average, much more testosterone in their body than women, there are women whose testosterone is as high as, or even higher than men's testosterone. Recent studies conducted in Australia have shown that when these high-testosterone women respond to stress, particularly stress caused by men such as being held at gunpoint by a guy in a dark alley, they show the unique and highly effective "kick-the-man-in-the-groin" response.

Taylor, S. E., et al. (2000). Biobehavioral responses to stress in females: tend-and-befriend, not fight-or-flight. *Psychological Review*, 107: 411-429.

Taylor, S. E. (2002). *The Tending Instinct: How Nurturing is Essential to Who We Are and How We Live*. New York: Henry Holt.

Lee, J., Harley, V. (2012). The male fight-flight response: A result of SRY regulation of catecholamines? *BioEssays*, published online on March 8th

Biobehavioral responses to stress in females: Tend-and-befriend, not fight-or-flight.

Authors:

Taylor, Shelley E., et al.

Psychological Review, Vol 107(3), Jul, 2000. pp. 411-429.

Abstract:

The human stress response has been characterized, both physiologically and behaviorally, as 'fight-or-flight.' Although fight-or-flight may characterize the primary physiological responses to stress for both males and females, we propose that, behaviorally, females' responses are more marked by a pattern of 'tend-and-befriend.' Tending involves nurturant activities designed to protect the self and offspring that promote safety and reduce distress; befriending is the creation and maintenance of social networks that may aid in this process. The biobehavioral mechanism that underlies the tend-and-befriend pattern appears to draw on the attachment-caregiving system, and neuroendocrine evidence from animal and human studies suggests that oxytocin, in conjunction with female reproductive hormones and endogenous opioid peptide mechanisms, may be at its core. This previously unexplored stress regulatory system has manifold implications for the study of stress.

Sex differences in cortisol excretion during anticipation of a psychological stressor: Possible support for the tend-and-befriend hypothesis.

Ennis, Michael. Kelly, Kimberly. Lambert, Paul L.

Stress and Health: Journal of the International Society for the Investigation of Stress, Vol 17(4), Jul, 2001. pp. 253-261.

Abstract:

Examined gender differences in the effects of cognitive expectations of anticipated stressors on neuroendocrine responses. Ss were 58 18–44 yr old college students (38 male, 20 female). Hypothalamic-pituitary-adrenal activation was assessed for Ss making a 'threat appraisal' vs a 'challenge appraisal' of an academic examination. Self-reported anxiety in relation to these variables was also examined. Urinary cortisol was assessed at baseline (at least 1 wk before the examination) and at pre-test (immediately before the examination). Results show there was, contrary to hypothesis, an unexpected sex–time interaction that was particularly robust in Ss making a challenge appraisal. Males in the challenge appraisal group had a significant increase in cortisol excretion from baseline to pre-test, with greater reported anxiety than the threat appraisal group. In contrast, females had a decrease in cortisol excretion that was significant only for the challenge appraisal group, although reported anxiety between the challenge and threat groups was not different. Results may suggest that the female stress response has evolved differently than that of males, or they may reflect sex differences in production of corticosteroid-binding globulin.

Sex differences in behavioral and hormonal response to social threat: Commentary on Taylor et al. (2000).

Authors:

Geary, David C., Flinn, Mark V.
Psychological Review, Vol 109(4), Oct, 2002. pp. 745-750.

Abstract:

Taylor and colleagues proposed that women uniquely respond to stressors by tending to children and befriending other women rather than by fighting or fleeing (S. E. Taylor et al., 2000). In this article, the authors expand Taylor et al.'s evolutionary frame and incorporate several unique aspects of human social dynamics. First, humans are characterized by extensive paternal investment, and thus men's tending is predicted and observed in some stressful contexts. Second, the dynamics of women's befriending suggest an evolutionary elaboration of the mechanisms that support reciprocal altruism. Third, coalitional male-male competition indicates that men's befriending is a predicted component of their fight-or-flight response. Finally, men's tending should result in the evolution of female-female competition over this form of parental investment.

Tend and Befriend Versus Fight or Flight: Gender Differences in Behavioral Response to Stress Among University Students.

Turton, S., Campbell, Carol.

Journal of Applied Biobehavioral Research, Vol 10(4), 2005. pp. 209-232.

Abstract:

Taylor et al. (2000) proposed that female behavioral responses to stress are characterized better as 'tend and befriend' than 'fight or flight.' Q methodology was adopted to investigate different responses to stress. A Q set of 61 statements was sorted by 40 participants (18 male, 22 female) using principal components factor analysis. Four factors were extracted, accounting for 53.5% of the total variance. The 4 factors corresponded with fight, flight, tend, and befriend stress responses. Females were more likely to portray a tend-and-befriend response to stress. The implications of these findings are discussed in relation to past research that has been conducted with participants, predominantly of a single gender and for future stress research studies.

Tend and Befriend: Biobehavioral Bases of Affiliation Under Stress.

Taylor, Shelley E.

Current Directions in Psychological Science, Vol 15(6), Dec, 2006. pp. 273-277.

Abstract:

In addition to fight-or-flight, humans demonstrate tending and befriending responses to stress--responses underpinned by the hormone oxytocin, by opioids, and by dopaminergic pathways. A working model of affiliation under stress suggests that oxytocin may be a biomarker of social distress that accompanies gaps or problems with social relationships and that may provide an impetus for affiliation. Oxytocin is implicated in the seeking of affiliative contact in response to stress, and, in conjunction with opioids, it also modulates stress responses. Specifically, in conjunction with positive affiliative contacts, oxytocin attenuates psychological and biological stress responses, but in conjunction with hostile and unsupportive contacts, oxytocin may exacerbate psychological and biological stress responses. Although significant paradoxes remain to be resolved, a mechanism that may underlie oxytocin's relation to the health benefits of social support may be in view.

Effects of sexual assaults on men: Physical, mental and sexual consequences.

Tewksbury, Richard

International Journal of Men's Health, Vol 6(1), Spr, 2007. pp. 22-35.

Abstract:

Research addressing the sexual assault of men is a fairly recent development in the medical, health care, psychological and sociological literature. Research in both community and institutionalized populations has focused on documenting the existence of this phenomenon and establishing prevalence or incidence rates, however, understandings of effects on male victims lag behind those regarding women. Only recently have the consequences of sexual assault victimization for men been thoroughly addressed. This review summarizes the research literature concerning the physical, mental health, and sexual consequences of sexual assault victimization for men. The literature

suggests a range of possible/occasional consequences, but no well-established patterns of injuries, psychological/emotional reactions or sexual responses/adjustments for male sexual assault victims.

Adult male rape and sexual assault: Prevalence, re-victimization and the tonic immobility response.

Coxell, Adrian W. and King, Michael B.

Sexual and Relationship Therapy, Vol 25(4), Nov, 2010. pp. 372-379.

Abstract:

Fifteen years ago we summarised research on what was known about the sexual assault of men and its effects. Here we present evidence from epidemiological research that demonstrates that the sexual assault of men is observed in many countries—demonstrating the widespread existence of the sexual assault of men and the need for further research. We also present research to show that the association between child sexual abuse and sexual assault in adult females has also been found in a variety of studies on men. Finally, we also consider the phenomenon of tonic immobility as this has important implications for the well-being of victims of sexual assault.

Gender differences in stress response: Role of developmental and biological determinants

Industrial Psychiatry J. 2011 Jan-Jun; 20(1): 4–10.

Rohit Verma, Yatan Pal Singh Balhara, and Chandra Shekhar Gupta

Abstract

Peritraumatic tonic immobility in a large representative sample of the general population: Association with posttraumatic stress disorder and female gender.

Kalaf, Juliana., Vilete, Liliane Maria Pereira., Volchan, Eliane., Fiszman, Adriana., Coutinho, Evandro Silva Freire., Andreoli, Sergio Baxter., Quintana, Maria Inês., de Jesus Mari, Jair., Figueira, Ivan
Comprehensive Psychiatry, Apr 9, 2015.

Abstract:

BACKGROUND: Tonic immobility is an involuntary response to inescapable life-threatening events. Peritraumatic tonic immobility has been reported in convenience samples of female victims of sexual assault and in mixed-gender victims of different types of trauma. This study evaluated peritraumatic tonic immobility in a representative general population sample and its association with posttraumatic stress disorder (PTSD) and gender. **METHODS:** 3231 victims of traumatic events aged 15–75 years responded to the Tonic Immobility Scale. PTSD and traumatic events were assessed using the Composite International Diagnostic Interview (CIDI 2.1). We calculated the means and the standard deviations of Tonic Immobility Scale scores stratified by PTSD and gender. The association between tonic immobility scores and gender was explored controlling for potential confounders through a multiple linear regression model. **RESULTS:** Tonic immobility scores were more than double in those who met criteria for PTSD and were almost four points higher in women. Gender differences remained statistically significant even after adjustment for confounding variables. **LIMITATIONS:** The cross-sectional and retrospective design may have given rise to recall bias. Results presented here may not apply to small and medium rural areas and the CIDI 2.1 can lead to a certain degree of misclassification. **CONCLUSIONS:** We have expanded the scope of previous investigations on peritraumatic tonic immobility which were based on convenience samples only, showing its occurrence in victims of traumatic events using a large representative sample of the general population. Furthermore, we confirmed in an unbiased sample the association between peritraumatic tonic immobility and PTSD and female gender.

Cortisol modulates men's affiliative responses to acute social stress.

Berger, Justus, et al.

Psychoneuroendocrinology, Vol 63, Jan, 2016. pp. 1-9.

Abstract:

The dominant characterization of the physiological and behavioral human stress reaction is the fight-or-flight response. On the other hand, it has been suggested that social affiliation during stressful times (*tend-and-befriend*) also represents a common adaptive response to stress,

particularly for women. In the current study, we investigate the extent to which men may also show affiliative responses following acute stress. In addition, we examine a potential neuroendocrine modulator of the hypothesized affiliative response. Eighty male students (forty dyads) were recruited to undergo either the Trier Social Stress Test for Groups (TSST-G) or a non-stressful control situation. Subsequently, participants completed a dyadic interaction task and were then asked to report their feelings of psychological closeness to their interaction partner. Although participants assigned to the stress condition did not differ overall on psychological closeness from participants assigned to the control condition, participants with high cortisol responses to the stressor showed significantly higher ratings of psychological closeness to their interaction partner than participants with low cortisol responses. Our findings suggest that men may form closer temporary bonds following stressful situations that are accompanied by a significant cortisol response. We suggest that the traditional characterization of the male stress response in terms of 'fight-or-flight' may be incomplete, and that social affiliation may in fact represent a common, adaptive response to stress in men.

Sex differences in the effects of acute stress on behavior in the ultimatum game.

Youssef, Farid F., et al.

Psychoneuroendocrinology, Vol 96, Oct, 2018. pp. 126-131.

Abstract:

Acute stress affects human decision making. It has been argued that there are systematic sex differences in behavioral responses to acute stress, with males showing a 'fight or flight' and females showing a 'tend and befriend' response. A 'tend and befriend' response would suggest that women become more cooperative under acute stress, while men do not. We investigated the effects of acute stress on social behavior. We induced stress via the Trier Social Stress Test (TSST) and then immediately after measured how participants reacted to offers made in the ultimatum game by a male proposer. We found that female participants were less likely to reject offers under stress ($n = 25$) vs. no stress ($n = 37$), $p = 0.009$, independent of how fair these offers were, cooperative behavior consistent with the 'tend and befriend' hypothesis. Male participants when stressed ($n = 30$) did not show differences in rejection rates compared to the control condition ($n = 26$), $p = 0.41$. Our results provide support for a qualitatively different behavioral response to acute stress among men and women.