# Chapter 1 Stress, Definitions, Mechanisms, and Effects Outlined

# Lessons from Anxiety

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# References

1.[Selye H. A syndrome produced by diverse nocuous agents.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink1rf0010) *[Nature](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink1rf0010)*[. 1936;138:32.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink1rf0010)

2.[Charney DS. Psychobiological mechanisms of resilience and vulnerability: implications for successful adaptation to extreme stress.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink2rf0015) *[Am J Psychiatry](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink2rf0015)*[. 2004;161:195–216.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink2rf0015)

3.Fink G. Stress: definition and history. In: Squire L, ed-in-chief. *Encyclopedia of Neuroscience*. Oxford: Elsevier Ltd; 2009:549–555.

4.[Fink G. Neural control of the anterior lobe of the pituitary gland (pars distalis). In: Fink G, Pfaff DW, Levine JE, eds.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink3rf0020) *[Handbook of Neuroendocrinology](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink3rf0020)*[. London, Waltham, San Diego: Academic Press, Elsevier; 2012:97–138.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink3rf0020)

5.[Hammen C. Stress and depression.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink4rf0025) *[Annu Rev Clin Psychol](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink4rf0025)*[. 2005;1:293–319.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink4rf0025)

6.[McEwen BS. Glucocorticoids, depression, and mood disorders: structural remodeling in the brain.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink5rf0030) *[Metabolism](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink5rf0030)*[. 2005;54(5 Suppl 1): 20–23.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink5rf0030)

7.[McEwen BS, Eiland L, Hunter RG, Miller MM. Stress and anxiety: structural plasticity and epigenetic regulation as a consequence of stress.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink6rf0035) *[Neuropharmacology](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink6rf0035)*[. 2012;62:3–12.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink6rf0035)

8.[PŒgo JM, Sousa JC, Almeida OF, Sousa N. Stress and the neuroendocrinology of anxiety disorders.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink7rf0040) *[Curr Top Behav Neurosci](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink7rf0040)*[. 2010;2:97–117.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink7rf0040)

9.[Risbrough VB, Stein MB. Role of corticotropin releasing factor in anxiety disorders: a translational research perspective.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink8rf0045) *[Horm Behav](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink8rf0045)*[. 2006;50:550–561.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink8rf0045)

10.[Geschwind DH, Flint J. Genetics and genomics of psychiatric disease.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink9rf0050) *[Science](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink9rf0050)*[. 2015;349:1489–1494.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink9rf0050)

11.[Selye H. Confusion and controversy in the stress field.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink10rf0055) *[J Hum Stress](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink10rf0055)*[. 1975;1:37–44.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink10rf0055)

12.[Kim JJ, Diamond DM. The stressed hippocampus, synaptic plasticity and lost memories.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink11rf0060) *[Nat Rev Neurosci](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink11rf0060)*[. 2002;3:453–462.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink11rf0060)

13.[Pacak K, Palkovits M. Stressor specificity of central neuroendocrine responses: implications for stress-related disorders.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink12rf0065) *[Endocr Rev](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink12rf0065)*[. 2001;22:502–548.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink12rf0065)

14.[Navarro-Oliveira CM, Vassilieff VS, Cordellini S. The sympathetic adrenomedullary system, but not the hypothalamic-pituitary-adrenal axis, participates in aortaadaptive response to stress: nitric oxide involvement.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink13rf0070) *[Auton Neurosci](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink13rf0070)*[. 2000;83:140–147.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink13rf0070)

15.Craske MG, Rauch SL, Ursano R, Prenoveau J, Pine DS, Zinbarg RE. What is an anxiety disorder? *Depress Anxiety*. 2009;26:1066–1085. [http://dx.doi.org/10.1002/da.20633](file:///D:\womat-filecopy\Ed-Reference\0002627047.html#tsLink14).

16.[Munck A, Guyre PM, Holbrook NJ. Physiological functions of glucocorticoids in stress and their relation to pharmacological actions.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink15rf0080) *[Endocr Rev](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink15rf0080)*[. 1984;5:25–44.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink15rf0080)

17.Zhang HN, He YH, Zhang GS, et al. Endogenous glucocorticoids inhibit myocardial inflammation induced by lipopolysaccharide: involvement of regulation of histone deacetylation. *J Cardiovasc Pharmacol*. 2012;60:33–41. [http:// dx.doi.org/10.1097/FJC.0b013e31 82567fef](file:///D:\womat-filecopy\Ed-Reference\0002627047.html#tsLink16).

18.[McEwen BS, Magarinos AM. Stress and hippocampal plasticity: implications for the pathophysiology of affective disorders.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink17rf0090) *[Hum Psychopharmacol](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink17rf0090)*[. 2001;16:S7–S19.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink17rf0090)

19.[Sorrells SF, Caso JR, Munhoz CD, Sapolsky RM. The stressed CNS: when glucocorticoids aggravate inflammation.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink18rf0095) *[Neuron](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink18rf0095)*[. 2009; 64:33–39.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink18rf0095)

20.[Reul JM, de Kloet ER. Two receptor systems for corticosterone in rat brain: microdistribution and differential occupation.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink19rf0100) *[Endocrinology](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink19rf0100)*[. 1985;117:2505–2511.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink19rf0100)

21.[Cerqueira JJ, Almeida OF, Sousa N. The stressed prefrontal cortex. Left? Right!.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink20rf0105) *[Brain Behav Immun](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink20rf0105)*[. 2008;22:630–638.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink20rf0105)

22.[Sapolsky RM, Krey LC, McEwen BS. The neuroendocrinology of stress and aging: the glucocorticoid cascade hypothesis.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink21rf0110) *[Endocr Rev](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink21rf0110)*[. 1986;7:284–301.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink21rf0110)

23.[Sousa N, Cerqueira JJ, Almeida OF. Corticosteroid receptors and neuroplasticity.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink22rf0115) *[Brain Res Rev](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink22rf0115)*[. 2008;57:561–570.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink22rf0115)

24.[McEwen BS. Physiology and neurobiology of stress and adaptation: central role of the brain.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink23rf0120) *[Physiol Rev](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink23rf0120)*[. 2007;87:873–904.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink23rf0120)

25.Yau JL, Noble J, Seckl JR. 11 Beta-hydroxysteroid dehydrogenase type 1 deficiency prevents memory deficits with aging by switching from glucocorticoid receptor to mineralocorticoid receptor-mediated cognitive control. *J Neurosci*. 2011;31:4188–4193. [http://dx.doi.org/10.1523/jneurosci.6145-10.2011](file:///D:\womat-filecopy\Ed-Reference\0002627047.html#tsLink24).

26.[Monder C, White PC. 11 Beta-hydroxysteroid dehydrogenase.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink25rf0130) *[Vitam Horm](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink25rf0130)*[. 1993;47:187–271.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink25rf0130)

27.Seckl JR. 11 Beta-hydroxysteroid dehydrogenase in the brain: a novel regulator of glucocorticoid action? *Front Neuroendocrinol*. 1997;18:49–99. [http://dx.doi.org/10.1006/frne.1996.0143](file:///D:\womat-filecopy\Ed-Reference\0002627047.html#tsLink26).

28.Seckl JR, Walker BR. Minireview: 11 beta-hydroxysteroid dehydrogenase type 1—a tissue-specific amplifier of glucocorticoid action. *Endocrinology*. 2001;142:1371–1376. [http://dx.doi.org/10.1210/en.142.4.1371](file:///D:\womat-filecopy\Ed-Reference\0002627047.html#tsLink27).

29.White PC, Mune T, Agarwal AK. 11 Beta-hydroxysteroid dehydrogenase and the syndrome of apparent mineralocorticoid excess. *Endocr Rev*. 1997;18:135–156. [http://dx.doi.org/10.1210/er.18.1.135. PMID 9034789](file:///D:\womat-filecopy\Ed-Reference\0002627047.html#tsLink28).

30.[Bale TL, Vale WW. CRF and CRF receptors: role in stress responsivity and other behaviors.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink29rf0150) *[Annu Rev Pharmacol Toxicol](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink29rf0150)*[. 2004;44:525–557.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink29rf0150)

31.[Fink G. Neuroendocrine feedback control systems: an introduction. In: Fink G, Pfaff DW, Levine JE, eds.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink30rf0155) *[Handbook of Neuroendocrinology](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink30rf0155)*[. London, Waltham, San Diego: Academic Press, Elsevier; 2012:55–72.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink30rf0155)

32.[Reul JM, Holsboer F. On the role of corticotropin-releasing hormone receptors in anxiety and depression.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink31rf0160) *[Dialogues Clin Neurosci](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink31rf0160)*[. 2002;4:31–46.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink31rf0160)

33.[Sztainberg Y, Chen A. Neuropeptide regulation of stress-induced behavior: insights from the CRF/urocortin family. In: Fink G, Pfaff DW, Levine JE, eds.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink32rf0165) *[Handbook of Neuroendocrinology](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink32rf0165)*[. London, Waltham, San Diego: Academic Press, Elsevier; 2012:355–376.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink32rf0165)

34.Zorrilla EP, Heilig M, de Wit H, Shaham Y. Behavioral, biological, and chemical perspectives on targeting CRF(1) receptor antagonists to treat alcoholism. *Drug Alcohol Depend*. 2013;128:175–186. [http://dx.doi.org/10.1016/j. drugalcdep.2012.12.017](file:///D:\womat-filecopy\Ed-Reference\0002627047.html#tsLink33).

35.[Maclean PD. The limbic system with respect to self-preservation and the preservation of the species.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink34rf0175) *[J Nerv Ment Dis](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink34rf0175)*[. 1958;127:1–11.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink34rf0175)

36.[Nauta WJ. Limbic system and hypothalamus: anatomical aspects.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink35rf0180) *[Physiol Rev Suppl](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink35rf0180)*[. 1960;4:102–104.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink35rf0180)

37.[Aguilera G. The hypothalamic–pituitary–adrenal axis and neuroendocrine responses to stress. In: Fink G, Pfaff DW, Levine JE, eds.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink36rf0185) *[Handbook of Neuroendocrinology](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink36rf0185)*[. London, Waltham, San Diego: Academic Press, Elsevier; 2012:175–196.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink36rf0185)

38.[Fink G. Stress controversies: posttraumatic stress disorder, hippocampal volume, gastro-duodenal ulceration.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink37rf0190) *[J Neuroendocrinol](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink37rf0190)*[. 2011;23:107–117.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink37rf0190)

39.[Joels M, Baram TZ. The neuro-symphony of stress.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink38rf0195) *[Nat Rev Neurosci](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink38rf0195)*[. 2009;10:459–466.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink38rf0195)

40.Palkovits M. Sympathoadrenal system: neural arm of the stress response. In: Squire L, ed-in-chief. *Encyclopedia of Neuroscience*. Oxford: Elsevier Ltd; 2009:679–684.

41.[Herman JP, Cullinan WE. Neurocircuitry of stress: central control of the hypothalamo-pituitary-adrenocortical axis.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink39rf0200) *[Trends Neurosci](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink39rf0200)*[. 1997;20:78–84.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink39rf0200)

42.[Herman JP, Figueiredo H, Mueller NK, et al. Central mechanisms of stress integration: hierarchical circuitry controlling hypothalamo-pituitary-adrenocortical responsiveness. *Front Neuroendocrinol*. 2003;24:151–180.](file:///D:\womat-filecopy\Ed-Reference\0002627047.html#rfLink40rf0205)

43.[Chan RK, Brown ER, Ericsson A, KovÆcs KJ, Sawchenko PE. A comparison of two immediate-early genes, c-fos and NGFI-B, as markers for functional activation in stress-related neuroendocrine circuitry.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink41rf0210) *[J Neurosci](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink41rf0210)*[. 1993;13:5126–5138.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink41rf0210)

44.[Cole RL, Sawchenko PE. Neurotransmitter regulation of cellular activation and neuropeptide gene expression in the paraventricular nucleus of the hypothalamus.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink42rf0215) *[J Neurosci](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink42rf0215)*[. 2002;22:959–969.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink42rf0215)

45.[Abercrombie ED, Jacobs BL. Single-unit response of noradrenergic neurons in the locus coeruleus of freely moving cats. II. Adaptation to chronically presented stressful stimuli.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink43rf0220) *[J Neurosci](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink43rf0220)*[. 1987;7: 2844–2848.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink43rf0220)

46.[Cullinan WE, Herman JP, Battaglia DF, Akil H, Watson SJ. Pattern and time course of immediate early gene expression in rat brain following acute stress.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink44rf0225) *[Neuroscience](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink44rf0225)*[. 1995;64:477–505.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink44rf0225)

47.[Gann DS, Ward DG, Baertschi AJ, Carlson DE, Maran JW. Neural control of ACTH release in response to hemorrhage.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink45rf0230) *[Ann N Y Acad Sci](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink45rf0230)*[. 1977;297:477–497.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink45rf0230)

48.[Smith MA, Brady LS, Glowa J, Gold PW, Herkenham M. Effects of stress and adrenalectomy on tyrosine hydroxylase mRNA levels in the locus ceruleus by in situ hybridization. *Brain Res*. 1991; 544:26–32.](file:///D:\womat-filecopy\Ed-Reference\0002627047.html#rfLink46rf0235)

49.[Feldman S, Conforti N, Melamed E. Paraventricular nucleus serotonin mediates neurally stimulated adrenocortical secretion.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink47rf0240) *[Brain Res Bull](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink47rf0240)*[. 1987;18:165–168.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink47rf0240)

50.[Sawchenko PE, Swanson LW, Steinbusch HW, Verhofstad AA. The distribution and cells of origin of serotonergic inputs to the paraventricular and supraoptic nuclei of the rat.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink48rf0245) *[Brain Res](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink48rf0245)*[. 1983;277:355–360.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink48rf0245)

51.[Fink G, Smith JR, Tibballs J. Corticotrophin releasing factor in hypophysial portal blood of rats.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink49rf0250) *[Nature](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink49rf0250)*[. 1971;203:467–468.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink49rf0250)

52.[Vale W, Spiess J, Rivier C, Rivier J. Characterization of a 41 residue ovine hypothalamic peptide that stimulates the secretion of corticotropin and beta-endorphin. *Science*. 1981;213:1394–1397.](file:///D:\womat-filecopy\Ed-Reference\0002627047.html#rfLink50rf0255)

53.[Fink G, Robinson IC, Tannahill LA. Effects of adrenalectomy and glucocorticoids on the peptides CRF-41, AVP and oxytocin in rat hypophysial portal blood.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink51rf0260) *[J Physiol](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink51rf0260)*[. 1988;401:329–345.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink51rf0260)

54.[de Kloet ER, Joºls M, Holsboer F. Stress and the brain: from adaptation to disease.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink52rf0265) *[Nat Rev Neurosci](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink52rf0265)*[. 2005;6:463–475.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink52rf0265)

55.Dahlstrom A. Sympathetic nervous system. In: Squire L, ed-in-chief. *Encyclopedia of Neuroscience*. Oxford: Elsevier Ltd; 2009:663–671.

56.[LeDoux JE. Emotion, memory and the brain.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink53rf0270) *[Sci Am](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink53rf0270)*[. 1994;270:50–57.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink53rf0270)

57.[LeDoux JE, Sakaguchi A, Reis DJ. Subcortical efferent projections of the medial geniculate nucleus mediate emotional responses conditioned to acoustic stimuli.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink54rf0275) *[J Neurosci](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink54rf0275)*[. 1984;4:683–698.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink54rf0275)

58.[Schiller D, Levy I, Niv Y, LeDoux JE, Phelps EA. From fear to safety and back: reversal of fear in the human brain.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink55rf0280) *[J Neurosci](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink55rf0280)*[. 2008;28:11517–11525.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink55rf0280)

59.[Büchel C, Morris J, Dolan RJ, Friston KJ. Brain systems mediating aversive conditioning: an event-related fMRI study.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink56rf0285) *[Neuron](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink56rf0285)*[. 1998;20:947–957.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink56rf0285)

60.[LaBar KS, Gatenby JC, Gore JC, LeDoux JE, Phelps EA. Human amygdala activation during conditioned fear acquisition and extinction: a mixed-trial fMRI study.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink57rf0290) *[Neuron](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink57rf0290)*[. 1998;20:937–945.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink57rf0290)

61.[Phelps EA, Delgado MR, Nearing KI, LeDoux JE. Extinction learning in humans: role of the amygdala and vmPFC.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink58rf0295) *[Neuron](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink58rf0295)*[. 2004;43:897–905.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink58rf0295)

62.[Morris JS, Ohman A, Dolan RJ. Conscious and unconscious emotional learning in the human amygdala.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink59rf0300) *[Nature](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink59rf0300)*[. 1998;393:467–470.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink59rf0300)

63.[Bechara A, Tranel D, Damasio H, Adolphs R, Rockland C, Damasio AR. Double dissociation of conditioning and declarative knowledge relative to the amygdala and hippocampus in humans. *Science*. 1995;269:1115–1118.](file:///D:\womat-filecopy\Ed-Reference\0002627047.html#rfLink60rf0305)

64.[LaBar KS, LeDoux JE, Spencer DD, Phelps EA. Impaired fear conditioning following unilateral temporal lobectomy in humans.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink61rf0310) *[J Neurosci](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink61rf0310)*[. 1995;15:6846–6855.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink61rf0310)

65.[LaBar KS, LeDoux JE. Partial disruption of fear conditioning in rats with unilateral amygdala damage: correspondence with unilateral temporal lobectomy in humans.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink62rf0315) *[Behav Neurosci](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink62rf0315)*[. 1996;110:991–997.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink62rf0315)

66.[Amaral DG, Behniea H, Kelly JL. Topographic organization of projections from the amygdala to the visual cortex in the macaque monkey.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink63rf0320) *[Neuroscience](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink63rf0320)*[. 2003;118:1099–1120.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink63rf0320)

67.[Chiba AA, Bucci DJ, Holland PC, Gallagher M. Basal forebrain cholinergic lesions disrupt increments but not decrements in conditioned stimulus processing.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink64rf0325) *[J Neurosci](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink64rf0325)*[. 1995;15:7315–7322.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink64rf0325)

68.[Edeline JM. Learning-induced physiological plasticity in the thalamo-cortical sensory systems: a critical evaluation of receptive field plasticity, map changes and their potential mechanisms.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink65rf0330) *[Prog Neurobiol](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink65rf0330)*[. 1999;57:165–224.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink65rf0330)

69.[Armony JL, LeDoux JE. How the brain processes emotional information.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink66rf0335) *[Ann N Y Acad Sci](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink66rf0335)*[. 1997;821:259–270.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink66rf0335)

70.[Armony JL, Servan-Schreiber D, Cohen JD, Ledoux JE. Computational modeling of emotion: explorations through the anatomy and physiology of fear conditioning.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink67rf0340) *[Trends Cogn Sci](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink67rf0340)*[. 1997;1:28–34.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink67rf0340)

71.[Davis M, Whalen PJ. The amygdala: vigilance and emotion.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink68rf0345) *[Mol Psychiatry](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink68rf0345)*[. 2001;6:13–34.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink68rf0345)

72.[Whalen PJ, Rauch SL, Etcoff NL, McInerney SC, Lee MB, Jenike MA. Masked presentations of emotional facial expressions modulate amygdala activity without explicit knowledge. *J Neurosci*. 1998;18:411–418.](file:///D:\womat-filecopy\Ed-Reference\0002627047.html#rfLink69rf0350)

73.[Anderson AK, Christoff K, Panitz D, De Rosa E, Gabrieli JD. Neural correlates of the automatic processing of threat facial signals. *J Neurosci*. 2003;23:5627–5633.](file:///D:\womat-filecopy\Ed-Reference\0002627047.html#rfLink70rf0355)

74.[Vuilleumier P, Armony JL, Driver J, Dolan RJ. Effects of attention and emotion on face processing in the human brain: an event-related fMRI study.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink71rf0360) *[Neuron](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink71rf0360)*[. 2001;30:829–841.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink71rf0360)

75.[Williams LM, Das P, Liddell B, et al. BOLD, sweat and fears: fMRI and skin conductance distinguish facial fear signals.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink72rf0365) *[Neuroreport](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink72rf0365)*[. 2005;16:49–52.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink72rf0365)

76.[Walker DL, Davis M. Role of the extended amygdala in short-duration versus sustained fear: a tribute to Dr. Lennart Heimer.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink73rf0370) *[Brain Struct Funct](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink73rf0370)*[. 2008;213:29–42.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink73rf0370)

77.[Walker DL, Toufexis DJ, Davis M. Role of the bed nucleus of the stria terminalis versus the amygdala in fear, stress, and anxiety.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink74rf0375) *[Eur J Pharmacol](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink74rf0375)*[. 2003;463:199–216.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink74rf0375)

78.Halladay LR, Zelikowsky M, Blair HT, Fanselow MS. Reinstatement of extinguished fear by an unextinguished conditional stimulus. *Front Behav Neurosci*. 2012;6:18. [http://dx.doi.org/10.3389/fnbeh.2012.00018](file:///D:\womat-filecopy\Ed-Reference\0002627047.html#tsLink75).

79.[DeÎbiec J, Bush DE, LeDoux JE. Noradrenergic enhancement of reconsolidation in the amygdala impairs extinction of conditioned fear in rats—a possible mechanism for the persistence of traumatic memories in PTSD.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink76rf0385) *[Depress Anxiety](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink76rf0385)*[. 2011;28:186–193.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink76rf0385)

80.[Cannon WB.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink77rf0390) *[The Wisdom of the Body.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink77rf0390)* [New York: Norton; 1932.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink77rf0390)

81.[Sterling P, Eyer J. Allostasis: a new paradigm to explain arousal pathology. In: Fisher S, Reason J, eds.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink78rf0395) *[Handbook of Life Stress, Cognition, and Health](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink78rf0395)*[. New York: John Wiley and Sons; 1988: 629–649.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink78rf0395)

82.[McEwen BS. Stress, adaptation, and disease. Allostasis and allostatic load.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink79rf0400) *[Ann N Y Acad Sci](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink79rf0400)*[. 1998;840:33–44.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink79rf0400)

83.[McEwen BS, Stellar E. Stress and the individual. Mechanisms leading to disease.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink80rf0405) *[Arch Intern Med](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink80rf0405)*[. 1993;153:2093–2101.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink80rf0405)

84.[McEwen BS. Protective and damaging effects of stress mediators: central role of the brain.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink81rf0410) *[Dialogues Clin Neurosci](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink81rf0410)*[. 2006;8:367–381.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink81rf0410)

85.[Peters A, McEwen BS. Introduction for the allostatic load special issue.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink82rf0415) *[Physiol Behav](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink82rf0415)*[. 2012;106:1–4.](file:///D:\\womat-filecopy\\Ed-Reference\\0002627047.html" \l "rfLink82rf0415)