# Chapter 9 Effort-Reward Imbalance Model

J. Siegrist

University of Duesseldorf, Duesseldorf, Germany

# References

1.[Siegrist J. Adverse health effects of high effort—low reward conditions at work.](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink1rf0010) *[J Occup Health Psychol](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink1rf0010)*[. 1996;1:27–43.](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink1rf0010)

2.Tricomi E, Rangel A, Camerer CF, O'Doherty JP. Neural evidence for inequality-averse social preferences. *Nature*. 2010;463(7284):1089–1091. [http://dx.doi.org/10.1038/nature08785](file:///D:\womat-filecopy\Ed-Reference\0002570116.html#tsLink2).

3.Gouldner AW. The norm of reciprocity: a preliminary statement. *Am Sociol Rev*. 1960;25(2):161–178. [http://dx.doi. org/10.2307/2092623](file:///D:\womat-filecopy\Ed-Reference\0002570116.html#tsLink3).

4.Chrousos GP. Stress and disorders of the stress system. *Nat Rev Endocrinol*. 2009;5(7):374–381. [http://dx.doi.org/ 10.1038/nrendo.2009.106](file:///D:\womat-filecopy\Ed-Reference\0002570116.html#tsLink4).

5.[McEwen B. Protective and damaging effects of stress mediators.](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink5rf0030) *[N Engl J Med](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink5rf0030)*[. 1998;338:171–179.](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink5rf0030)

6.[Schultz W. Behavioral theories and the neurophysiology of reward.](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink6rf0035) *[Annu Rev Psychol](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink6rf0035)*[. 2006;57:87–115.](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink6rf0035)

7.[Singer T, Seymour B, O'Doherty J, Kaube H, Dolan R, Frith CD. Empathy for pain involves the affective but not sensory components of pain.](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink7rf0040) *[Science](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink7rf0040)*[. 2004;303:1157–1162.](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink7rf0040)

8.[Baumgartner T, Fischbacher U, Feierabend A, Lutz K, Fehr E. The neural circuitry of a broken promise.](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink8rf0045) *[Neuron](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink8rf0045)*[. 2009;64:756–770.](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink8rf0045)

9.Hernandez Lallement J, Kuss K, Trautner P, Weber B, Falk A, Fliessbach K. Effort increases sensitivity to reward and loss magnitude in the human brain. *Soc Cogn Affect Neurosci*. 2014;9(3):342–349. [http://dx.doi.org/10.1093/ scan/nss147](file:///D:\womat-filecopy\Ed-Reference\0002570116.html#tsLink9).

10.[Karasek R, Theorell T.](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink10rf0055) *[Healthy Work: Stress, Productivity, and the Reconstruction of Working Life.](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink10rf0055)* [New York, NY: Basic Books; 1990.](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink10rf0055)

11.Steptoe A, Kivimaki M. Stress and cardiovascular disease. *Nat Rev Cardiol*. 2012;9(6):360–370. [http://dx.doi.org/ 10.1038/nrcardio.2012.45](file:///D:\womat-filecopy\Ed-Reference\0002570116.html#tsLink11).

12.Siegrist J. Job control and reward: effects on well-being. In: Cartwright S, Cooper CL, eds. *The Oxford Handbook of Organizational Well-Being*. Oxford u.a: Oxford University Press; 2009:109–132. <http://www.loc.gov/catdir/enhancements/fy0907/2008024470-b.html>.

13.[Greenberg J. Organizational injustice as an occupational health risk.](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink13rf0070) *[Acad Manag Ann](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink13rf0070)*[. 2010;4:205–243.](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink13rf0070)

14.[Adams JS. Inequity in social exchange. In: Berkowitz L, ed.](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink14rf0075) *[Advances in Experimental Social Psychology](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink14rf0075)*[; vol. 2. New York: Academic Press; 1965:267–299.](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink14rf0075)

15.Rugulies R, Aust B, Madsen IEH, Burr H, Siegrist J, Bultmann U. Adverse psychosocial working conditions and risk of severe depressive symptoms. Do effects differ by occupational grade? *Eur J Public Health*. 2013;23:415–420. [http://dx.doi.org/10.1093/eurpub/cks071](file:///D:\womat-filecopy\Ed-Reference\0002570116.html#tsLink15).

16.Siegrist J, Lunau T, Wahrendorf M, Dragano N. Depressive symptoms and psychosocial stress at work among older employees in three continents. *Glob Health*. 2012;8(1):27. [http://dx.doi.org/10.1186/1744-8603-8-27](file:///D:\womat-filecopy\Ed-Reference\0002570116.html#tsLink16).

17.BackØ E, Seidler A, Latza U, Rossnagel K, Schumann B. The role of psychosocial stress at work for the development of cardiovascular diseases: a systematic review. *Int Arch Occup Environ Health*. 2012;85(1):67–79. [http://dx.doi. org/10.1007/s00420-011-0643-6](file:///D:\womat-filecopy\Ed-Reference\0002570116.html#tsLink17).

18.Gilbert-Ouimet M, Trudel X, Brisson C, Milot A, VØzina M. Adverse effects of psychosocial work factors on blood pressure: systematic review of studies on demand-control-support and effort-reward imbalance models. *Scand J Work Environ Health*. 2014;40(2):109–132. [http://dx.doi.org/10.5271/sjweh.3390](file:///D:\womat-filecopy\Ed-Reference\0002570116.html#tsLink18).

19.Juvani A, Oksanen T, Salo P, et al. Effort-reward imbalance as a risk factor for disability pension: the Finnish Public Sector Study. *Scand J Work Environ Health*. 2014;40(3):266–277. [http://dx.doi.org/10.5271/sjweh.3402](file:///D:\womat-filecopy\Ed-Reference\0002570116.html#tsLink19).

20.[Kumari MHJ, Marmot M. Prospective study of social and other risk factors for incidence of type II diabetes in Whitehall 2 study.](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink20rf0105) *[Ann Intern Med](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink20rf0105)*[. 2004;164:1873–1880.](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink20rf0105)

21.[Head J, Stansfeld S, Siegrist J. Psychosocial work environment and alcohol dependence.](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink21rf0110) *[Occup Environ Med](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink21rf0110)*[. 2004;61:219–224.](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink21rf0110)

22.Hoven H, Siegrist J. Work characteristics, socioeconomic position and health: a systematic review of mediation and moderation effects in prospective studies. *Occup Environ Med*. 2013;70(9):663–669. [http://dx.doi.org/10.1136/ oemed-2012-101331](file:///D:\womat-filecopy\Ed-Reference\0002570116.html#tsLink22).

23.[Xu W, Hang J, Cao T, et al. Job stress and carotid intima-media thickness in Chinese workers. *J Occup Health*. 2010;52 (5):257–262.](file:///D:\womat-filecopy\Ed-Reference\0002570116.html#rfLink23rf0120)

24.[Falk A, Menrath I, Verde P, Siegrist J. *Cardiovascular consequences of unfair pay.* IZA discussion paper no. 5720, 2011.](file:///D:\womat-filecopy\Ed-Reference\0002570116.html#rfLink24rf0125)

25.[Jarczok MN, Jarczok M, Mauss D, et al. Autonomic nervous system activity and workplace stressors—a systematic review. *Neurosci Biobehav Rev*. 2013;37:1810–1823.](file:///D:\womat-filecopy\Ed-Reference\0002570116.html#rfLink25rf0130)

26.[Steptoe A, Siegrist J, Kirschbaum C, Marmot M. Effort-reward imbalance, overcommitment, and measures of cortisol and blood pressure over the working day. *Psychosom Med*. 2004;66:1899–1903.](file:///D:\womat-filecopy\Ed-Reference\0002570116.html#rfLink26rf0135)

27.Nakata A, Takahashi M, Irie M. Effort-reward imbalance, overcommitment, and cellular immune measures among white-collar employees. *Biol Psychol*. 2011;88(2-3):270–279. [http://dx.doi.org/10.1016/j.biopsycho.2011.08.012](file:///D:\womat-filecopy\Ed-Reference\0002570116.html#tsLink27).

28.Bourbonnais R, Brisson C, VØzina M. Long-term effects of an intervention on psychosocial work factors among healthcare professionals in a hospital setting. *Occup Environ Med*. 2011;68(7):479–486. [http://www.scopus.com/inward/record.url?eid=2-s2.0-79958273161&partnerID=40&md5= e325639261a47f41819fd8dd06a752e9](http://www.scopus.com/inward/record.url?eid=2-s2.0-79958273161&partnerID=40&md5=%20e325639261a47f41819fd8dd06a752e9).

29.Limm H, Gündel H, Heinmüller M, et al. Stress management interventions in the workplace improve stress reactivity: a randomised controlled trial. *Occup Environ Med*. 2011;68(2):126–133. [http://dx.doi.org/10.1136/ oem.2009.054148](file:///D:\womat-filecopy\Ed-Reference\0002570116.html#tsLink29).

30.[Schnall PL, Dobson M, Rosskam E.](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink30rf0155) *[Unhealthy Work: Causes, Consequences, Cures.](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink30rf0155)* [Amityville, NY: Baywood Publishing; 2009.](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink30rf0155)

31.Benach J, Muntaner C, Santana V. *Employment conditions and health inequalities.* Final report to the WHO Commission on Social Determinants of Health (CSDH), Geneva, 2007. <www.who.int>. Accessed 04.03.14.

32.[Wahrendorf M, Siegrist J. Proximal and distal determinants of stressful work: framework and analysis of retrospective European data.](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink32rf0165) *[BMC Public Health](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink32rf0165)*[. 2014;14:849.](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink32rf0165)

33.WHO. *Review of social determinants and the health divide in the WHO European Region.* Final report, Copenhagen: WHO; 2014. <www.euro.who.int>.

34.Sperlich S, Peter R, Geyer S. Applying the effort-reward imbalance model to household and family work: a population-based study of German mothers. *BMC Public Health*. 2012;12:12. [http://dx.doi.org/10.1186/1471-2458-12- 12](file:///D:\womat-filecopy\Ed-Reference\0002570116.html#tsLink34).

35.[Li J, Shang L, Wang T, Siegrist J. Measuring effort-reward imbalance in school settings: a novel approach and its association with self-rated health.](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink35rf0180) *[J Epidemiol](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink35rf0180)*[. 2010;20:111–118.](file:///D:\\womat-filecopy\\Ed-Reference\\0002570116.html" \l "rfLink35rf0180)