

Psychological stress and the human immune system

[Health & Medicine](#), [Stress](#)



Abstract

This essay has been written to seek to undertake analyse and critically evaluate the relationship between the stress and causal mechanisms which have been proved to cause physical illnesses. The research which has examined these phenomena shall be surmised and discussed to seek to ascertain if there are valid and reliable research studies that have proven that there is a causal link between these two factors.

Introduction

In this essay the relationship between the psychological conditions referred to as stress and causal mechanisms which have been proved to cause physical illnesses shall be discussed and the research pertaining to this shall be critically evaluated. The three main mechanisms which will be examined are as follows:

Stress which causes increased heart rate which may lead to coronary heart disease (Friedman & Rosenman, 1974).

Stress which leads to the suppression of the immune system which may lead to an increased occurrence of viral infections such as, colds or flu (Kiecolt-Glaser al., 1984).

Stress which leads to disturbances in the digestive tract that can cause gastric ulcers (Brady, 1958).

Each of these shall now be discussed and critically evaluated in turn.

Mechanisms which explain the relationship between the occurrence of stress and illness.

Stress which causes increased heart rate which may lead to coronary heart disease

Friedman & Rosenman (1974) undertook a longitudinal study which sought to identify basic types of behaviour. Their study consisted of asking 3, 200 male respondents to complete a questionnaire. Then from the results of this based on the respondent's response and their manner each respondent was placed into one of three types (Friedman & Rosenman, 1974). They identified three types, which are referred as A, B and C. Individuals that exhibit Type A behaviours often have a desire to achieve their goals, a tendency to be competitive, desire recognition for their work and have a tendency to rush their work tasks. Comparatively, those who exhibit Type B behavioural traits have no drive, ambition, sense to compete or urgency. Those that exhibited Type C behaviours were considered to be hardworking and nice (Friedman & Rosenman, 1974). Eight years after they have carried out this research, 257 of the respondents that had taken part in the study had developed coronary heart disease. Overall, out of the 257 respondents 70% had been classified as having Type A behavioural traits (Friedman & Rosenman, 1974). This indicates that one of the mechanisms that may lead to the development of coronary heart disease in men is the types of behaviour that they exhibit

However, though there are close correlations between Friedman & Rosenman's (1974) study and the occurrence of coronary heart disease in those with Type A behavioural traits this does not fully explain the

occurrence of this phenomena. This is because the evidence that this is based on does not consider a number of other factors which may have led to these respondents developing coronary heart disease such as, the lifestyle choices that they may have chosen. In addition, to this these findings cannot be generalised to wider populations as they are based on a small sample of men. Additionally there is no information pertaining to the respondent's general state of health, age or circumstances at the time at which they undertook part in the research study, so it is impossible to ascertain if their coronary heart disease was caused by their behavioural type. Therefore, though this study suggested that there may be a correlation between these two factors the evidence to support this hypothesis is lacking. This is also true of similar studies that have been undertaken to examine these phenomena (Chandoda et. al., 2008; House, 1974).

Stress which leads to the suppression of the immune system

Further to, Friedman & Rosenman's (1974) study, Kiecolt-Glaser et. al. (1984) concluded that stress may lead to the suppression of the immune system. This suppression may cause the increased occurrence of viral infections such as, colds or flu. Kiecolt-Glaser et. al. (1984) took blood samples from 75 student volunteers one month (control reading) before and on the first day of their exams (stress reading). They also asked the volunteers to complete questionnaires which were designed to evaluate their psychiatric state of mind, their loneliness and ascertain if any other life events had occurred. From these they discovered that on the first day of their exams many of the students had lower levels of natural cells which are

used to fight infections. They also ascertained that other problems such as, loneliness and depression was all associated with a weakened immune system (Kiecolt-Glaser et. al., 1984).

This research shows that there may be a correlation between the occurrence of stress and a weakened immune system (Kiecolt-Glaser et. al., 1984). The study was undertaken at a time when the students were naturally exposed to stress as they were sitting their final examinations and this means that the study's results are valid (Kiecolt-Glaser et. al., 1984). However, because this was a natural study, other variable which may have affected the results of the research were difficult to control, therefore we cannot be sure that stress automatically leads to a weakened immune system. However, a number of other studies have found that stress may lead to a weakened immune response (as an example see: Cohen et. al. 1991; Kimzey, 1975; Riley, 1981). Therefore, though the results from the Kiecolt-Glaser et. al. (1984) study may have been accurate after all.

Stress which leads to disturbances in the digestive tract that can cause gastric ulcers

Finally, Brady (1958) undertook an experiment which sought to link stress to disturbances in the digestive tract. He attached two monkeys to each other and then every 20 second for six hours at a time he shocked them with electricity. One of the monkeys was classed as an executive and they were able to delay the shocks for 20 seconds at a time. However, they could not stop them completely. This experiment resulted in the monkeys who were

classed as executives, subsequently being diagnosed with stomach ulcers as a result of this they died (Brady, 1958). Brady concluded from these results that as the executive monkey had been in control they had become stressed and developed stomach ulcers which had led to their demise. Therefore, he believed that there was a correlation between stress and the development of stomach ulcers.

When we examine Brady's (1958) study, we can see that there are flaws in his methodology. Weiss (1972) used the same methodology with rats as control subjects and did not find that the executives developed stomach ulcers. Therefore, Brady's (1958) study does not prove conclusively that those suffering from stress will develop stomach ulcers. Other scholars (Bhatia & Tandon, 2005; Yabana & Yachi, 1988) have also sought to link stress to being a casual factor in the development of stomach ulcers however they reached the same conclusions as Weiss (1972).

Each of the three mechanisms that have been discussed above which have been utilised to investigate the causal link between stress and illness have not conclusively proven that there is one. The most viable of these three hypotheses is that there may be a causal link between the onset of stress and the development of a weakened immune system (Cohen et. al., 1991; Kimzey, 1975; Riley, 1981).

Conclusion

This essay sought to investigate the causal relationships between stress and physical illnesses. Three mechanisms that have been explored by scholars

were discussed and critically evaluated (Brady, 1958; Friedman & Rosenman, 1974; Kiecolt-Glaser et. al., 1984). However, the only one of these three mechanisms which may prove that there is a link between stress and the development of physical illnesses is that which identified that stress may lead to a weakened immune response (Cohen et. al., 1991; Kimzey, 1975; Riley, 1981). Therefore, the evidence to prove that stress is a causal factor in the onset of physical illnesses is contradictory and limited due to the limitations of the studies which have been undertaken. That is not to say that all of the studies that have been undertaken to explore this casual link are not valid, but that their methods and results must be carefully analysed before we accept their conclusions as valid.

References

Bhatia, V., & Tandon, R. K. (2005). Stress and the gastrointestinal tract. *Journal of gastroenterology and hepatology*, 20(3), 332-339.

Brady, J. V. (1958). Ulcers in executive monkeys. *Scientific American*, 199 (4), 95-100

Chandola, T., Britton, A., Brunner, E., Hemingway, H., Malik, M., Kumari, M., ... & Marmot, M. (2008). Work stress and coronary heart disease: what are the mechanisms?. *European Heart Journal*, 29(5), 640-648.

Cohen, S., Tyrrell, D. A., & Smith, A. P. (1991). Psychological stress in humans and susceptibility to the common cold. *N. Engl. J. Med.* 325, 606-612.

Friedman, M. and Rosenman, R. H. (1974). Type A Behaviour and Your Heart. New York: Knopf.

House, J. S. (1974). Occupational stress and coronary heart disease: A review and theoretical integration. *Journal of Health and Social Behavior*, 12-27.

Kiecolt-Glaser, J. K., Garner, W., Speicher, C. E., Penn, G., & Glaser, R. (1984). Psychosocial modifiers of immunocompetence in medical students. *Psychosom. Med.* 46, 7-14.

Kimzey, S. L. (1975). The effects of extended spaceflight on hematologic and immunologic systems. *J. Am. Med. Womens Assoc.* 30, 218-232.

Riley, V. (1981). Psychoneuroendocrine influences on immunocompetence and neoplasia. *Science*, 212(4499), 1100-1109.

Weiss, J. M. (1971). Effects of punishing the coping response (conflict) on stress pathology in rats. *Journal of Comparative and Physiological Psychology*, 77(1), 14.

Yabana, T., & Yachi, A. (1988). Stress-induced vascular damage and ulcer. *Digestive diseases and sciences*, 33(6), 751-761