

# The link between stress and illness



There are many causes of stress, from major life events such as divorce or the death of someone close, to small annoyances or hassles such as losing something or being stuck in traffic. These events or stimuli are called stressors. They produce the stress-response. Any event which is physically or mentally demanding can be classed as a stressor as it triggers the stress response and throws the body out of balance. Major life events obviously occur far less frequently than the daily stresses and strains we encounter.

DeLongis et al (1982) compared a life events scale with their own hassles scale to see which had the greatest impact on health. Uplifts (events which make you feel good) were also considered. Participants were asked to complete four questionnaires every month over the course of a year. The questionnaires included a hassles scale, uplifts scale, life events questionnaire and health status questionnaire.

The findings showed correlation between the frequency and intensity of hassles with the health status of participants. Life events and health, and uplifts and health showed no relationship.

This suggests that daily hassles or stressors have a greater impact in causing stress and ill health than major life events such as death and divorce. However, the study was limited to 100 participants living in the same area aged between 45 and 64. The majority of them were well educated with high incomes. This reduces the validity of the study as it does not take into account other groups of people, for example, people living in poorer conditions with lower incomes, or a younger group of people. Older

people may have less stressors, or respond differently to stressors than younger people.

Daily hassles could be a better measure of stress however, as they occur far more frequently so can be classed as chronic 'ongoing' stressors, whereas major life events tend to be acute one off, albeit major, stressors.

Stressors are also subjective as different people respond in different ways to them. The individual's perception of a stressor determines the effect it has on them.

How our body reacts to a stressor is a physiological response. The body reacts to a stressor by releasing adrenaline and noradrenaline from the adrenal glands into the bloodstream. These cause changes in the body such as an increase in heart rate and rise in blood pressure - this makes it possible for the body to respond to the stress. This is known as the 'fight or flight' response - when you are in danger your body responds so that you can either run away or fight - it is the survival instinct. This is a positive reaction and therefore shows that stress can be a good thing and is at times normal.

Examples of physiological responses are dry mouth, increased breathing and heart rate, headaches, irritability and increased blood sugar levels. Most people experience a physiological response to stress at some time in their life.

Selye's research in the 1950s came up with the general adaptation syndrome (GAS) which are symptoms the body displays in response to

stress. Selye's theory consists of three phases or processes that he observed animals went through in response to a stressor. The three phases are:

Alarm reaction - a stressful event is registered triggering the body to react quickly.

Resistance - if the stressor is not dealt with quickly at the first phase the body tries to readjust to the high levels of adrenaline in the body - the body's stress-response is working hard.

Exhaustion - if the body cannot readjust, eventually it will become exhausted and hormone levels may drop below optimum levels. Illness may result from this.

Selye's theory was based on animal experiments using physical stressors. It therefore assumes that animals and humans are alike whereas in fact there are physiological differences between them. It does not take into account psychological stressors which affect humans more than physical stressors, and it does not account for differences in gender and personality. Different people respond in different ways to stress. Two people will not respond in the same way to the same stressor. This makes Selye's theory a reductionist approach - it is too simplistic and ignores other factors and explanations.

Lazarus looks at the psychological response to stress rather than the physical response. How we think about an event and how we will cope with it may be different to the reality of the situation. If we can change our perception of something then stress may be reduced, in turn our physical response to stress will be changed or halted. The psychological response to

stress may explain why people respond differently to stressors. If they perceive the situation in different ways and also their ability to cope or tackle that situation, then some may not view it as stressful but rather a challenge. Someone else may be all consumed with the situation and the stress it causes.

Lazarus and his colleagues drew up a stress measurement scale in the 1980s called the 'hassles and uplifts scale'. They believed that the daily small things - hassles or uplifts - decide or determine stress levels rather than big life changes or events. Research found that people with high scores on the 'hassles' list e. g. losing keys, sitting in traffic, had symptoms of physical stress such as depression and anxiety.

In the 1970s Friedman and Rosenman studied whether personality type affects stress levels. The study was carried out over nine years and involved 3,200 men. They came up with the 'type A' personality who is typically competitive, a 'workaholic', time-conscious, and who gets easily frustrated with other people. 257 men in the study developed coronary heart disease (CHD). Of these 257 men, 70% had been classed as having 'type A' personalities. This suggests a link between personality and response to stress. However, these types of people are also more likely to engage in risky behaviour such as smoking and drinking so it could be these other factors that led to their heart disease. It is very hard to judge whether or not a certain personality is more or less affected by stress as other factors also play a part and must be accounted for.

Kobasa in the late 70s suggested that certain personality types seem to suffer from less stress-related illnesses - she called these 'hardy personality types'. They seem to have a sense of control over their lives and view life events and changes as challenges rather than stresses. This suggests that having control over one's life is very important when evaluating and treating stress. If an individual can regain some control for their life - whether personally or in their workplace, this could change how they view stressors and ultimately how stress affects them. Kobasa found that people with a hardy personality had control over their lives and were committed to meeting challenges and indeed thrived when faced with challenges. It is hard to measure hardiness however and whether or not this type of person is as a result of not suffering from ill health. If they were ill would their 'hardiness' disappear thus leading them more open to stressors and stress-related illnesses?

Holmes and Rahe developed the 'social readjustment rating scale' (SRRS) in 1967 which tries to quantify life events and changes that may cause stress. Studies have found that scores over 300 (high life changes) do relate to illness and accidents therefore suggesting that some life changes are serious stressors and are linked to illness. These events include pregnancy, divorce, death of a spouse and holidays and Christmas. Further research in the 1990s also showed a link between lots of negative life events and increased vulnerability to colds.

The SRRS does not however account for individual differences and perceptions of stressors. How one person reacts to a major life event may be totally different to how another person reacts to it. An example of this is

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divorce. One person may be totally distraught and stressed by this experience whereas to another person it is a relief and signals the end of a lot of stress.

In the 1950s Brady conducted an experiment on monkeys to see if 'executive stress' was related to being in control or lack of control of a situation. The monkeys who were classed as 'executive monkeys' had control for giving electric shocks to the other monkeys. Brady found that they developed more stomach ulcers than the other 'passive monkeys' even though they both experienced the same number of shocks. This shows the relationship between stress and illness in that stomach ulcers developed, but it also shows that being responsible for others receiving shocks added to the stress and was in itself a stressor.

There are obviously many limitations to this type of experiment and ethically it is very unsound. Animals and humans are different both physically and psychologically and these factors are not accounted for in such an experiment.

When Weiss repeated the study using rats he altered it adding in a warning bell so that the rats knew to expect a shock - this reduced stress-related symptoms. This suggests that as the rats had some control they coped better with the stress leading to the conclusion that having some control of a situation reduces stress and the effects of stressors.

Many studies have looked at and linked stress and illness. The body's immune system is easily affected by stress and from a physiological aspect

studies have shown that many illnesses, from headaches and colds to stomach ulcers and cancer can be attributed to stress.

When the body is under stress or when an individual perceives a stressful stimuli or stressor the fight or flight response is triggered. The hypothalamus in the brain tells the adrenal medulla to release adrenaline into the blood stream. This adrenaline causes the heart and breathing rate to increase so making the body able to run or fight as necessary. This is known as acute stress and is short term - the body returns to normal quickly after the stressful event is over.

However, when the stressor lasts for a long time and is not dealt with, chronic stress occurs. The hypothalamus causes the release of adrenocorticotrophic hormone (ACTH) which activates the adrenal cortex to release corticosteroids which in turn inhibit the immune system. Studies have found that corticosteroids do suppress the immune system's activity and therefore leave the body at greater risk of infection. A study by Cohen et al in 1993 found that when participants were infected with a cold virus, those who had been through stressful life events in the past year and therefore had experienced high levels of stress were more likely to develop colds.

Seegerstrom and Miller have done numerous studies which support the theory that long-term stress does suppress the immune system. Cortisol also causes the liver to release glucose and fatty acids and this, along with increased heart rate and blood pressure, can cause blood vessels to become blocked, increasing the chance of heart disease. Digestive hormones also increase, causing acidity levels in the stomach to rise.



As Selye found, once the body's resources have become depleted so that it cannot keep up with the stressor, the body is at greater risk of illness. When ACTH and cortisol are in the bloodstream, the adrenal glands stop producing any more. Blood glucose levels can drop dangerously which can cause death. Disorders such as asthma and peptic ulcers can result from such long term stress on the body.

Brady's experiment on monkeys found that their ulcers were created by stress and not the shocks that they received. The stomach acidity in the executive monkeys was highest when they were resting and not receiving shocks. That is when the initial fight/flight response stops and the ACTH and corticosteroids in the blood stream cause digestive hormones to flood the stomach.

Another study by Kiecolt-Glaser (1984) looked at human responses to stress during the exam process in medical students. 75 first year students (49 males and 26 females) volunteered to have their blood tested one month before their final exam and on the actual day of their final exam - this was after they had already sat two of the exams. It was presumed that the students' stress levels would be highest on this day.

The researchers discovered that natural killer cell activity dropped between the first and second blood test, showing that the immune response had reduced with increased stress levels. This study has some strength to it as exams are a natural occurrence, especially for students; therefore the stress was not artificially induced, as it was in Brady's study on monkeys. Ethically the experiment was much sounder as humans were used rather than animals

and no force was used. However the study has limitations as the group used were medical students so its findings cannot be generalised to include other groups.

Kiecolt-Glaser et al also used behavioural measures alongside biological measures which found that other factors contributed to the students' stress levels. Students who reported a sense of loneliness and who had previous experience of a number of life events (stressors) had lower natural killer cell activity levels than their peers. Therefore measuring the physiological response to stress alone is too simplistic and would be a reductionist approach to evaluating the relationship between stress and illness. Immune functioning is affected by psychological factors as well as physiological factors. Long term stressors may leave individuals more vulnerable to the effects of short term stressors.

The behavioural perspectives of the effects of stress take into account other factors which may lead to stress-related illness. We know that the immune system is compromised by long term stress; however stress may also lead to behaviour that in turn increases the risk of illness. This would make stress an indirect source of illness rather than a direct source.

Stress-related behaviour includes smoking, having an excessive alcohol intake, poor diet and too little or too much exercise. It is well known that smoking, drinking and a poor diet contribute to heart disease so it could be said that stress causes a person to act in a way that then leads to illness.

How an individual responds to stress suggests that particular behaviour patterns or personalities are more vulnerable to stress-related illness than other personalities.

Friedman & Rosenman's 1974 study which looked at the link between coronary heart disease and type A personalities found that twice as many men with type A personalities developed CHD than men with type B personalities. Other similar studies have been undertaken which support these findings, suggesting that there is some correlation between behaviour and stress-related illness.

However, only men were used in this study so it cannot be generalised to other groups. Women may respond differently to stress. Studies also do not take into account that control plays a part in how stress affects an individual.

Many people with type A personalities enjoy the pressure and competitiveness of their lives. These appear to manage stress well as they have high levels of control over their work or personal life. It may well be this level of control that makes them high achievers and thus contributes to the pressure they thrive under. They see life events and changes as a challenge rather than as stressors.

Marmot et al (1997) looked at the link between stress and illness in the workplace. They gave questionnaires to 7,372 civil service employees in London and also assessed them for signs of heart disease. This was followed up with the same checks and questionnaires 5 years later. The research discovered that those in higher grade jobs, with more responsibility, developed less cardiac problems than participants with less job control. This

suggests that heart disease is linked to low control in the workplace, rather than the stress of a high powered position.

The behaviour of the people who had less control needs to be accounted for in this research. Their socio-economic status makes them more likely to lead a risky lifestyle such as smoke, and have a poor diet. This could in fact lead or contribute to their heart disease or cardiovascular problems. It is difficult to assess whether it is lack of control at work, or lifestyle risk factors that contribute to their higher incidence of heart problems - or indeed a combination of both.

As much of the research is based on questionnaires this is a subjective study rather than objective. One person's perception of job control and social support may be different to the next person's.

Kobasa (1985) studied how different personalities coped with stress in relation to physical exercise and social support. Her results showed that having a hardy personality was the most protective factor against stress-related illness. Those with no protective factors suffered greater illness than others. The more protective factors people had correlated with a reduced illness score.

However, Kobasa's work was mainly carried out on male, white-collar workers, so again the results cannot be generalised to other groups such as women, or people in other job groups and other cultures.

Cognitive methods of looking at the effects of stress mainly focus on self-reporting tools such as Cohen's perceived stress scale developed in 1983.

These tools are used today by psychologists to measure people's perceptions of stress. Subjective interpretation is important and highlights that it is not events themselves that are the problem, but how we perceive them and our ability to cope with them. Lazarus et al believe that how someone perceives a situation determines how stressful they then find that event. The cognitive appraisal of stress can be broken down into two phases - primary and secondary. During the primary appraisal a person assesses how important a stressful situation or event is. During the secondary appraisal stage the coping ability to the stressor is evaluated.

Chang and Strunk (1999) looked at the impact depression or dysphoria had on a person's appraisal and ability to cope with a situation. Those people who scored higher on primary appraisals were found to use more coping strategies. Those who scored higher on secondary appraisals had less physical symptoms of stress and reported greater life satisfaction. This supports the theory that people who see a situation or event as a challenge or an opportunity rather than a stress or a threat are more likely to cope with the situation and suffer less from the effects of stress.

If someone sees a situation as being greater than their ability to cope with it then stress will occur. Cognitive therapies focus on treatment that aims to change the way an individual thinks about a problem or event - this then changes their ability to cope with that event.

Sarason et al's 1978 life experiences survey (LES) is an example of a self-reporting measure. It measures subjective feelings of stress by asking questions about positive or negative events in the past year and the

perceived stress that those events brought. Limitations of this are that people change over time. How they perceive a situation may change from month to month depending on other factors. It is also difficult to say whether or not a stressor is responsible for the effects of stress or whether someone under stress perceives a situation as a stressor because they are already suffering from ill health due to stress.

In conclusion, chronic long-term stress can lead to illness. However, other factors that also influence the chances of stress contributing to ill health must not be ignored such as how a person perceives a stressor and their ability to cope with that stressor. Also the fact that stress may make a person behave in a certain way which then may lead to ill health is also an important factor. Having a hardy personality and good social support may decrease the chance of stress causing ill health and the importance of these influences must not be overlooked.