

Understanding the physiological and biochemical processes of stress



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An example of a biochemical method of the measurement of stress is the study in a Swedish saw mill by Johansson et al (1978). The aim of the study was to identify if stressors at work caused an increase in “ stress-related physiological arousal and stress related illness”. The study used two groups of employees; one group was considered to be high risk their role was “ finishers” the other a low risk group were cleaners. During the study levels of adrenaline and noradrenaline found in the employee’s urine were recorded on work days and days off. The study also recorded incidences of absence from work and stress related illness. Johansson et al (1978) identified that the high risk group produced higher levels of adrenaline and noradrenaline on work days and higher levels than the low risk group. In addition the study identified that the high risk group experienced higher levels of stress related illness and absence from work than the low risk group. The study in the saw mill concluded that work stressors lead to physiological arousal which can lead to an employee experiencing a stress related illness and be absent from work.

The biochemical method of stress testing is advantageous because it provides quantitative data on stress response which is direct, reliable and objective within an individual or group of people.

The method has disadvantages of being expensive to conduct requiring specialist equipment and expertise. It does not take into consideration subjective perceptions of stress (positive stress produces less cortisol). External factors can also affect the recordings taken such as caffeine or anxiety provoked in the subject by carrying out the test this can be particularly related to the taking of blood samples.

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Self report

A self report study of stress measurements was conducted by Holmes and Rahe (1967). The study identified 43 life events which cause a person to make changes to their lives. This list was given to a group of subjects who were asked to rate how much stress each event would cause if getting married had a score of 500, an event perceived as more stressful was given a higher score and a less stressful event was given a lower score. The results were averaged and divided by 10 which provided a score for each event. This produced the Social Readjustment Rating Scale.

Self report methods of stress measurement such as Holmes and Rahe's social readjustment scale (SRRS) measures stress retrospectively or prospectively through the subjects reported amount of life change in different circumstances. The advantage of this method of stress testing is that it provides a relatively quick measure of the subjects response to a variety of stressor stimuli. A disadvantage of the SRRS is through being subjective the results may be unreliable, change overtime and confuse the cause and effect of stress. This method does not take into consideration cultural variations in the experience of stress and cannot be easily translated for use in non western cultures.

Physiological

Research conducted by Geer and Meisel (1973) used a physiological approach to measuring stress levels. The study aimed to identify if perceived control or actual control could reduce stress reactions to distressing stimuli.

Recordings of galvanic skin response (GSR), heart rate and temperature
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were taken from the participants. To conduct the study Geer and Meisel (1973) used 60 psychology undergraduates divided into three groups. Each group was shown a series of photographs of deceased car crash victims under different conditions. Group 1 could control how long they looked at each image for. Group 2 were aware that the photos they saw would be 60 seconds apart and they would be visible for 35 seconds. Group 3 were informed that they would see a series of photos. Neither group 2 or 3 could control the length of time they saw the photos for however group 2 were aware of the timescales involved. Baseline recordings of GSR and from an ECG were taken for each participant before the study was conducted. Geer and Meisel found that the ECG results appeared to be inaccurate following the study. The GSR recordings for Group 2 showed the highest stress level whilst Group 1 showed the least. From this it was concluded being able to control your environment can reduce your stress responses.

The physiological method of stress testing uses machinery, such as heart monitors and skin conductance polygraphs, to measure the changes to the individuals autonomic nervous system in response to certain stimuli.

The advantage of the physiological method is that the results are quantitative, direct, reliable and objective. Disadvantages of the physiological method is that it requires expensive specialist equipment and expertise to interpret the data. The method ignores subjective perceptions of stress and recordings taken can be subject to external factors including caffeine and anxiety.

The most cost effective method of measuring stress within a workforce can be seen as the self report method. This method is relatively quick in providing results and does not require the use of expensive equipment. However the results may not be as reliable as the more expensive physiological and biochemical methods. These two methods have very similar advantages and disadvantages. If the company was to test the stress levels amongst all employees the self report method would be able to provide results quickly with the least expenditure suggesting that this would be the favoured method to use.

Evaluate one physiological and one psychological technique which can be used to control and manage stress

The Stress Inoculation Training (SIT) (Meichenbaum, 1985) is a psychological technique used to control and manage stress. The method is a way of helping an individual to change their thought processes about themselves and their lives. The aim of the method is to alter a person's emotional response and behaviour to stress before they experience severe anxiety or depression.

SIT is a three part process which is worked through with an individual and a therapist. Conceptualisation, the first part, identifies an individual's stressors and how effective their response to these has been. Skill acquisition and rehearsal, the second part, identifies " positive coping statements" the person can use when faced with stressful situations. The final part application and follow through is when the person puts the " coping statements" into practice. Meichenbaum (1985) reported that SIT and " the

power of positive thinking” can successfully bring about a change in behaviour. He identified that this can be useful for helping an individual deal with anxiety related to exams and pain. For the technique to be successful the individual is required to be committed to the process and results can be dependent on how easy the individual finds using the positive coping statements identified.

The advantage of stress inoculation training is the individual is involved in the process of identifying stressors and ways of coping with them. The process is supported by a therapist.

The disadvantage of stress inoculation training is that it is time consuming and requires commitment on the part of the individual who is experiencing stress to be successful. If the individual is unable to use the positive coping statements the success of the technique can be limited.

Medication is a physiological method which can be used in the control and management of stress. The medication would be used to alleviate the feelings of anxiety and depression which are associated with stress. The medication used can belong to one of several groups: benzodiazepines, antidepressants or beta-blockers. Benzodiazepines reduce the symptoms of anxiety by decreasing arousal and muscle tension in the body.

Antidepressants work through increasing levels of serotonin in the brain to reduce feelings of depression. A person may be prescribed beta-blockers if they are experiencing long term stress which can raise blood pressure increasing the risk of the person to strokes and permanent high blood pressure. The beta-blocker group of medications reduce blood pressure by

decreasing the rate and strength of heart contractions. They also reduce the action of the sympathetic nervous system by blocking noradrenalin receptors in the heart which can result in a feeling of calm and relaxation.

Any medication can produce side effects in some people. The long term use of benzodiazepines can lead to dependency whilst in the short term they can cause drowsiness, a degree of memory impairment and depression which is a symptom of stress. Antidepressants can cause the person to experience dizziness gastrointestinal symptoms such as diarrhoea and nausea. Beta-blockers may cause impotence in males and depression. When a course of medication has finished the person may experience a reoccurrence of their symptoms if the underlying cause has not been eliminated. However the use of medication may help the individual to feel able to deal with the cause as their physical symptoms decrease.

The advantage of using medication to control and manage stress is that it can alleviate the physical symptoms associated with stress. With the physical symptoms controlled the individual is better able to work towards alleviating the factors which caused the stress or put coping mechanisms into place.

Medication has disadvantages in that side effects are common, these can prevent the individual from wanting to complete the course if they feel physically worse. When an individual withdraws from prescribed medication the original symptoms may reoccur if the individual has not dealt with the cause.