In this lecture we will examine the concept of stress and the different perspectives in this area. We will then look at the two major stress response pathways and the process of stress. We then discuss how stress is related to illness and conclude with an overview of other theories of stress.

Stress is a much studied area in psychology almost over studied. Stress is pervasive and is both an outcome as well as a pathway leading to poor physical and mental health. There is a vast literature in the area as it has been studied since as far back as the 30s.

Numerous definitions of stress vary in their emphasis on the events, responses or individual’s appraisals. However one aspect they all have in common is “The process in which environmental demands tax or exceed the adaptive capacity of an organism, resulting in psychological and biological changes that may place persons at risk of disease.” (Cohen, Kessler & Underwood-Gordon, 1997, pp 3).

There are three perspectives in the literature on stress, the environmental perspective, the psychological perspective and the physiological perspective.

The Environmental Perspective

Adolf Meyer a psychiatrist and a pioneer of the mental hygiene movement. In his work he proposed considering social and situational aspects of psychiatric patient’s lives apart from physiological concerns. He asked physicians to fill out a life chart as part of the medical examination of ill patients (Cohen, Kessler & Underwood Gordon, 1997). Life events were shown to have a causal significance for physical illnesses.

Illnesses are more likely to occur during periods of inordinate demands, frustrations and losses than at other times (Hinkle & Wolff, 1958).

The Social Readjustment Rating Scale (SRRS) was a modified version of scales based on Meyer’s life chart. In the SRRS (Holmes & Masuda, 1974) each event was assigned a standardized weight by a judge’s ratings of the degree of difficulty required to adjust to the event. It is more concerned with the magnitude than the direction of life change. The basic assumption being, the effect of stressful events are cumulative and change is the most important dimension of stressors.

Hassles are minor life events and their cumulative impact tends to wear the person down. Hassles also moderate the relationship between major life events and illness. Misplacing or losing things, troublesome neighbors, trouble with getting stuff fixed, social obligations or traffic, would be considered as hassles. Vulnerability factors or factors that make a person more or less likely to succumb to stress with illness are also being studied.

The Psychological Perspective

Emphasizes the perception or interpretation of the objective environmental experience

When environmental demands are perceived to exceed their abilities to cope – individuals label themselves as stressed.

Lazarus’s Appraisal Model (Lazarus, 1991)

Lazarus specifies two forms of appraisal, primary and secondary.

Primary Appraisal occurs between stimulus presentation and stress reaction – it is an appraisal of a stimulus as threatening or benign.

This appraisal depends on 2 classes of conditions

- the stimulus situation,
- the psychological structure of the individual
The Stimulus Situation is characterized by
- Imminence of the confrontation
- Magnitude/intensity of the stimulus
- Duration of the stimulus
- Potential controllability of the stimulus
- Ambiguity of the event

Psychological Structure is determined by
- Beliefs about the self
- Beliefs about the environment
- Pattern and strength of values and
- Personality dispositions

It is often the case that overloaded people are more stressed than people with fewer tasks and individuals are more vulnerable to stress in central life domains than peripheral life domains.

Secondary Appraisal occurs when the stimulus is appraised as requiring a coping response, individuals evaluate their resources to see if they can cope, if they can it lessens the effect of the stressor (Cohen, Kessler & Underwood-Gordon, 1997).

The Nervous System

The nervous system is composed of the central and peripheral systems.

- Central Nervous System: CNS consists of the
  - Brain
  - Spinal Cord

- Peripheral Nervous System
  - Somatic
  - Autonomic

The Somatic System is made up of
- Nerves to/from spinal cord
  - control muscle movements
  - somatosensory inputs

- Both Voluntary and reflex movements

- Skeletal Reflexes

The Autonomic System consists of
- Two divisions:
  - Sympathetic
  - Parasympathetic

- Control involuntary functions
  - heartbeat
  - blood pressure
  - respiration
  - perspiration
  - Digestion

- Can be influenced by thought and emotion

The Sympathetic Nervous System
"Fight or flight" response
- Release adrenaline and noradrenaline
- Increases heart rate and blood pressure
- Increases blood flow to skeletal muscles
- Inhibits digestive functions

The Parasympathetic Nervous System
- "Rest and digest" system
- Calms body to conserve and maintain energy
- Lowers heartbeat, breathing rate, blood pressure

The Endocrine System

The endocrine system is made up of the hypothalamus, pituitary gland (brain), thyroid gland (in the throat area), adrenal glands (on top of the kidneys), pancreas, testis and ovary. The outer part of the adrenal gland is called the adrenal cortex and it secretes cortisol and the inner core is called the adrenal medulla and it secretes epinephrine and norepinephrine also known as adrenaline and noradrenaline.

2 major stress response pathways
- **Sympathetic – Adrenal Medullary System – SAM**
- **Hypothalamic Pituitary Adrenocortical axis – HPA**

(Cohen, Kessler & Underwood-Gordon, 1997)

**Sympathetic – Adrenal Medullary System – SAM**
- Walter Cannon (1932) proposed the Fight or Flight Response which refers to the response to a stressor – either the organism flees or turns and fights.
- SAM system reacts to various emergency states with increased secretion of the hormone epinephrine by the adrenal medulla and or sympathetic nerve endings.
- Large body of literature (Levi, 1972) evidence for the link between increased epinephrine and norepinephrine secretion in response to a variety of psychosocial stressors

Excessive secretion of epinephrine & norepinephrine leads to
- Suppression of cellular immune function (Rabin, Cohen, Ganguli, Lysle & Cunnick, 1989)
- Hemodynamic Effects – increased BP and heart rate (McCubin, Richardson, Obrist, Kizer & Langer, 1980)
- Variations in normal heart rhythms leading to sudden death (Herd, 1978)
- Neurochemical imbalances that lead to psychiatric disorders (Anisman & Zacharko, 1992)

**Hypothalamic Pituitary Adrenocortical axis – HPA**

Hans Selye (1956, 1974) coined the term General Adaptation Syndrome (GAS) which is a general physiological reaction in response to excessive stimulation (stressor) that characterizes the HPA response (Cohen, Kessler & Underwood-Gordon, 1997).

It has 3 stages.
- **Alarm** – initial reaction
- **Resistance** – full adaptation to the stressor
- **Exhaustion** – stressor is sufficiently severe and prolonged – depletes somatic defenses
  - Alarm – anterior pituitary gland secretes ACTH (adrenocorticotropic hormone) - activates the
adrenal cortex to secrete corticosteroids (cortisol)
- Resistance – output of corticosteroids remains high but stable (symptoms disappear)
- Exhaustion – symptoms reappear and vulnerable organs (determined by genetic and environmental factors) may break down

**Criticisms**
- It is too general a theory of Reactions to a wide variety of stressors
- Different stressors may lead to different responses
- Though SAM & HPA are the most discussed pathways there are other hormones and neurotransmitters that play a role in the stress response

In this model Cohen, Kessler & Underwood- Gordon (1997) attempt to integrate the three perspectives on stress. According to this model, an environmental stressor/event leads to an appraisal which in turn leads to a perception of stress and may lead to a negative emotional response which leads to a physiological or behavioral response which could lead to increased risk of physical as well as psychiatric disease.

**Stress and Physical Illness**
In general stressors are thought to cause negative affective states which in turn affect biological processes or behavioral patterns that influence disease risk (Cohen et al, 1986). The pathway linking emotions to disease is hormonal. Hormones have been implicated in cardiovascular disease (Herd, 1986) as well as diseases of the immune system – cancer, infectious diseases and autoimmune disease.

However stressors may impact the development of disease independently of the emotional response (Cohen et al, 1986).

A third path is via Behavioral Changes –
People may overeat or eat junk food, not be able to sleep, stop exercising, start smoking and drinking to cope with the situation. All these behaviors may predispose the person toward illness (Cohen & Williamson, 1988).

**Psychiatric Illness**
There are 2 views regarding how stress leads to psychiatric illness (Cohen, Kessler & Underwood-Gordon, 1997).
- Stressful experiences are so extreme that they lead to states of anxiety or depression
- Stressful events lead to psychiatric disorder only in the presence of some preexisting personal vulnerability
  - Vulnerabilities could be
    - Environmental (Lack of social support)
    - Genetic
    - Biological (HPA) wear and tear of the body

**Stress and Illness Behavior**
When people are stressed they are more likely to recognize and report symptoms. They are more likely to somatize (experience stress as a physical symptom such as a headache or stomach ache) (Cohen, Kessler & Underwood-Gordon, 1997).

**Other Theories of Stress**
Other than Selye and Cannon’s theories and Meyer and Lazarus’s perspectives there have been theories which have explained stress from a more cognitive perspective.

*Theory of Cognitive Costs – Glass & Singer, 1972*
(as cited in Taylor, 1995)
- Stressful events require an individual to expend cognitive resources to cope.
- Monitor the environment for potential threat (Cohen, 1978).
- Attention narrows and fatigue results – reducing the reserve of attention for other tasks
- Less time and energy to focus on other tasks leads to arousal and performance decrements result which may lead to further problems.

Stressors that are predictable and therefore controllable require less cognitive effort or attention and are easier to deal with than stressors that are unpredictable which require you to be always vigilant which is exhausting, for example discrimination.
Learned Helplessness

Seligman & Maier's (1967) classic experiment with dogs indicated that sometimes situations over which they have no control result in helpless or resigned behavior and even when control is restored they do not realize and continue to behave in a helpless way. Poverty or living in an oppressive regime may create learned helplessness.

Learned Helplessness creates 3 deficits

Motivational – people don’t want to try, become resigned/ fatalistic
Cognitive – don’t attempt new things not creative in trying to solve the problem
Emotional – can lead to mild or severe depression

It sometimes generalizes to other life areas.

Chronic Strain

Can people adapt to chronically stressful events?

Long term stressors lead to chronic strain. Some sources of chronic strain are for example long term but unsatisfying relationships, work situations that are very demanding or long term financial concerns.

- Chronic Strain (marriage, parenting, household functioning, job) predicted psychological distress
  (Pearlin & Schooler, 1978)
- Strain that lasted more than 2 years implicated in depression (Brown & Harris, 1978).
- Chronic strain maybe more strongly related to depression than acute stress (McGonagle & Kessler, 1990).
- Chronic Strain may predispose people to react more severely to other stressful events.
- It is difficult to measure chronic strain therefore it is hard to study.

References

• Sympathetic Parasympathetic nervous system accessed September 16 2012 (http://www.becomehealthynow.com/popups/sympth_parasympth.htm)