

## Psychology 105

### Chapter 15: Stress and Health



A stress reducer:  
<http://www.youtube.com/watch?v=5P6UU6m3cqk>

Spring 2008

### Stress, Health and Well-Being

- Stressors, Stress Reactions and Stress
- Biological Responses to Stressors
- Psychological and Behavioral Responses to Stressors
- Psychological and Behavioral Strategies that Promote Health

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### Stressors and Stress

**Stress Response:** A physical and mental response to, or in anticipation of, a challenging or threatening situation

**Stress** a physical condition or psychological feeling that is experienced when a person perceives that demands exceed the personal and social resources that the person is able to mobilize.

**Stressors:** Stimuli or situations that may result in the experience of stress

A stressor is an event  
Stress is a response

The stress response can become more damaging than the stressor itself.

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### What Stress REALLY Is

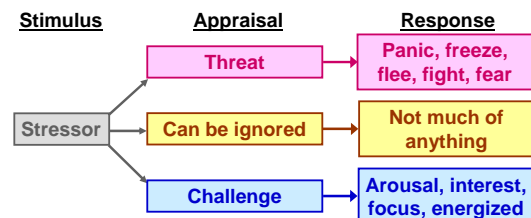
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### Effects of Stressors on the Body

- Variable effects: An event that is a stressor for one person may go unnoticed by someone else: its effect depends on how it is perceived.

The effects of stress (internal response) depend more on the intensity and duration of the stress response than on its source, the stressor



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### Some Thoughts On Responses to Stressors

- LIFE IS TEN PERCENT WHAT YOU MAKE IT - AND NINETY PERCENT HOW YOU TAKE IT.  
• Irving Berlin
- MAY I HAVE
  - THE SERENITY TO ACCEPT THE THINGS I CANNOT CHANGE,
  - THE COURAGE TO CHANGE THE THINGS I CAN,
  - AND THE WISDOM TO KNOW THE DIFFERENCE.• Adapted from Serenity Prayer, authorship disputed (Reinhold Niebuhr?)

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**Acute physical stressors:**  
Animals attacking...



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**Chronic physical stressors:**  
Drought, famine, pests



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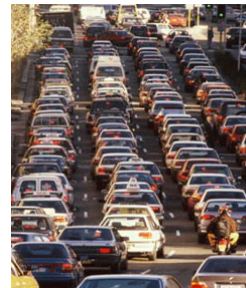
**Chronic physical stressors:**  
parasites, disease



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**Psychological, social stressors:**  
Traffic...



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**Psychological, social stressors:**  
Relationship problems, care for ill or dying relative



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**Psychological, social stressors:**  
Debt and Threat



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### Physical, Psychological, and Social Stressors: Tsunami, Katrina, Earthquake, War

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### Types of Stressors - examples

	<u>Acute:</u> Demand immediate action	<u>Chronic:</u> Ongoing/repetitive
<u>Physical</u>	attack, hurricane, tornado, tsunami, fire, accident, illness, catastrophe...	Chronic illness, aftermath of acute event, pollution, climate change...
<u>Psychological and Social</u>	Loss of job, arrest, rudeness, robbery, "road rage," death of loved one, no promotion, exam...	Poverty, caretaker of ill, "hassles", discrimination, abuse, problems with job, family, school, money; addiction, aftermath of acute events, self-generated stressors (worry, anxiety)...

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### Societal Stress: Hassles

- **Hassles** - primarily psychological/social acute-but-frequent and chronic stressors
- **Hassles** - situation that cause minor irritation or frustration - the "small stuff" of life
  - Effects of repeated, ongoing hassles can accumulate and impact physical and psychological well-being, much as catastrophes can
    - Negative correlation found between frequency and intensity of hassles (high) and health (poor)
  - Individuals differ in their interpretation of hassles and their stress response to them
  - People can and do learn to reinterpret hassles, not letting (some of) the hassles bother them
    - *Don't Sweat the Small Stuff* by Richard Carlson, Ph.D.

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### Biological and Psychological Responses to Stressors

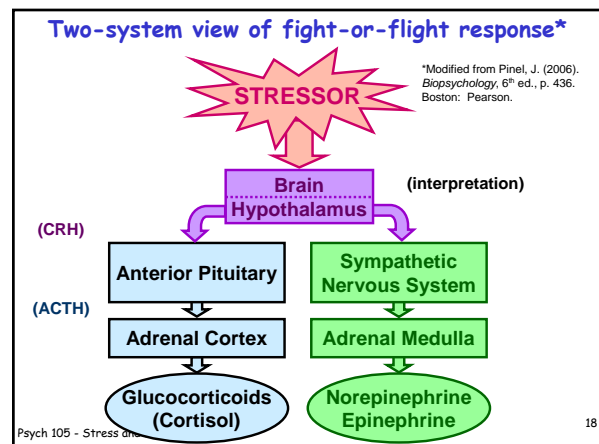
- Mental processes (thoughts, interpretations) continuously influence physical responses
- Stress responses are essential to life
  - Enable defense and meeting challenges
- BUT...**
- Stress responses can result in harmful physical consequences
  - Damage to multiple organ systems
- Our bodies have an old, innate response to stressors that is not appropriate for many modern social and psychological stressors

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### Physical Components of the Stress Response

- Protective behavioral reaction - **fight or flight response** (Walter Cannon)
  - Fight-or-flight response happens in response to a real or perceived or anticipated threat, leading to **readiness for action**:
    - Arousal, alertness, diversion of body resources for muscular action, reduction of maintenance activities
      - Cerebral Cortex → hypothalamus → pituitary triggers release of glucocorticoids, e.g. cortisol
      - Sympathetic nervous system triggers release of epinephrine and norepinephrine (aka adrenaline and noradrenaline)
      - Immune system's effectiveness increases (briefly), then decreases

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### Physical Stress Response - Fight or Flight

**Acute Stress Response - readiness for action:**

- Stress hormones are secreted by adrenal glands (epinephrine, norepinephrine, cortisol)
- Glucose is dumped into bloodstream - fuel for muscles and brain
  - (hypothalamus → pituitary → adrenal cortex → *cortisol*)
- Heart rate, blood pressure, breathing rate, perspiration all increase
  - (sympathetic nervous system → hypothalamus → adrenal medulla → *epinephrine and norepinephrine*)
- Blood is diverted from internal organs to muscles
- Digestion is inhibited
- Reproductive drives are suppressed
- Number of circulating immune cells is increased - initially
- Pain response is initially suppressed
- Pupils dilate
- Sensory and cognitive functions are enhanced

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### Fight-or-Flight Response

➤ Has *Innate and Learned components*:

- *Innate* components discussed in previous two slides
- *Components influenced by past experience or learning*:
  - *Interpretation* of stressor
    - What is considered as a threat (e.g., charging bear, gun in face, insult, hassle, rude clerk)
  - *Classical Conditioning* of internal responses (blood pressure, heart rate, immune response, etc.) to situational cues similar to past threats (e.g., Little Albert)
  - *Appropriate responses* to the threat
    - Norms in peer group, social group, culture
    - Are there alternatives to fight-or-flight?
      - » Withdraw, conserve energy, seek support

We learn to moderate, turn down or turn off the fight-or-flight response

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### Fight-or-Flight Response

**The Problem: the body has essentially one stress response, the fight-or-flight response (which may vary in degree)**

- We make flight-or-flight response to anything that we interpret as a stressor
- For psychological and social stressors:
  - We have little ability to resolve stress responses in biologically adaptive ways (fight or flight)
  - These stressors are often chronic, on-going or frequently repeating
- Frequent or ongoing stress responses have cumulative negative effects on body

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### General Adaptation Syndrome

**General Adaptation Syndrome\* (Hans Selye): a consistent pattern of physical responses in response to any serious, persistent stressor (physical or social)** \*modern view, modified

➤ **Three phases:**

- **Alarm reaction:** Fight-or-flight response
  - Initial mobilization stress responses are similar, regardless of stressor, and similar among mammals
- **Resistance:** Body attempts to maintain **allostasis** (balance) in order to continue coping with persistent or frequent stressors, but maintains an ongoing low-level arousal and stress response.
- **Exhaustion:** Eventually, body systems slow and break down from lack of repair and lowered immune response

Although the human body is well-equipped to cope with brief, temporary stress, a prolonged stress response can lead to physical deterioration of most body systems.

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### Stress and the Immune System

**Psychoneuroimmunology:** study of the relationship between mind, nervous system and immune system (psycho - neuro - immunology)

➤ Depression and ongoing stress response may result in **immunosuppression** (reduced immune system response)

➤ Studies have found lowered immune function and increased risk of disease and death after stressors:

- Following breakup of strong interpersonal relationship, the incidence of disease and/or death increases
- Care-takers of people with Alzheimer's have weaker immune response (fewer antibodies) to flu shots than matched controls (same age)
- Recent widows and widowers are more likely to become ill and die in the next year than people of same age with living spouses
- People who are feeling stressed are more likely to get sick with a cold (rather than fight it off)

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### Type A and Type B Personalities\*: Different Responses to Stressors

*Personality: an individual's characteristic pattern of thinking, feeling, and behavior, which is expressed fairly consistently across different situations and tends to persist over time.*

**Personality and typical style of response to stressors impacts health:**

**Contrast two personality styles:**

➤ **Type A:** Driven, achievement oriented, impatient, easily angered, competitive, hostile, demanding, workaholic, lives to work

➤ **Type B:** Easy-going, relaxed, patient, slow to anger, cooperative, friendly, works to live

**Which one is more likely to have a heart attack?**

Ps: \*AKA Type A and Type B Behavior Patterns 24

### Type A Personality

- Friedman and Rosenbaum - cardiologists who studied Type A personality: people with Type A are more likely to have an early heart attack (before age 50) than Type B
- Further studies: hostility and anger are the most important factors in predicting heart attacks:
  - People otherwise Type A (driven, motivated, impatient, competitive, achievement oriented) but low on anger and hostility are not at higher risk of heart attacks
  - People who were also often angry and hostile were at higher risk
- Type A people are at lower risk of dying from second heart attack (why?)



Type A Chair

### "Repressed" Personality

- "Martha Stewart" - highly controlled, highly organized, attempt to minimize stressors in their lives, emotional expression is slow or absent - repressed
- Although appearing calm, they have overactive stress responses - cardiovascular, cortisol, relatively poor immune function
- Those who suppress anger and negative emotions are also more likely to have heart attacks than those who can respond to stressors without anger and hostility

### Psychological Effects of Stressors: Learned Helplessness

- Learned helplessness\*: Passive resignation after repeated failures, punishments, inescapable stressors
  - Learned: "nothing I do has any effect on what happens to me"
- Animal studies: dogs receiving inescapable shocks stopped trying, even when later given chance to escape (Seligman, et al., 1978)
- Humans demonstrate this in lab
- Life examples: abused and battered children and spouses, prisoners of war, depressed patients, nursing home patients

\*See Nevid, pp 525-526

### Post Traumatic Stress Disorder (PTSD)

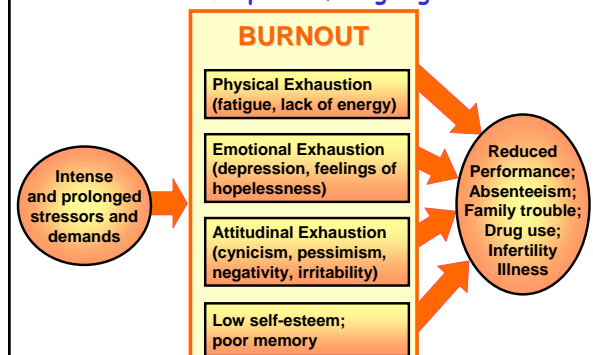
PTSD: "an anxiety disorder that can develop after exposure to a terrifying event or ordeal in which grave physical harm occurred or was threatened\*."

- Response to event included intense fear, horror or helplessness
- Symptoms lasting more than 4 weeks (often for years)
  - Re-experiencing event in flashbacks, dreams, intrusive thoughts, illusions, sense of reliving the experience, flashbacks, distress upon experiencing reminders of event
  - Persistent avoidance of stimuli associated w/ trauma: thoughts, feelings, conversations, activities, places, people; inability to recall part or all of trauma
  - numbing of general responsiveness - disinterest in activities, feelings of detachment from others, restricted range of emotion, sense of short future

### PTSD, continued

- Symptoms, continued
  - Heightened arousal: insomnia, hypervigilance, poor concentration, exaggerated startle response, irritability
  - Disturbance creates significant impairment in work, family, social functioning
- Incidence: About 60% of adults living in US have experienced a traumatic event in their lives (McNally, 2003)
  - About 20% of women and <10% of men will develop PTSD following trauma
    - Incidence of trauma (rapes, beatings) greater for women
  - Researchers estimate that about 20% of returning vets from Iraq and Afghanistan suffer from PTSD
    - Some of these have been diagnosed by military doctors as having a 'pre-existing personality disorder' and hence have been denied treatment by military

### Burnout - Endpoint of Ongoing Stress



## Healthy Strategies for Coping with Stress

- *Behaviors and attitudes that promote health and well-being also tend to combat distress, and they are under our control, to a great extent: they are things that we can initiate and do for ourselves*
  - Psychological Strategies
  - Physical and Behavioral Strategies

Recommended: *The Relaxation and Stress Reduction Workbook, 5e*, by Martha Davis, et al. Many different types of techniques for managing and reducing your stress; enables you to find one or more that work for you.

## Social Support

- **Social support:** having and using a network of friends and family
  - **Social and emotional support:** providing knowledge that you are loved, cared for, connected
  - **Tangible support:** providing money, shelter, transportation
  - **Informational support:** providing feedback, guidance, data
  - People lacking social support are more prone to disease, psychological problems (depression), earlier death, particularly following a disaster or tragedy
  - **Caveat:** families & relationships can be major stressors
- **Religion and spirituality:** many people who are seriously religious or spiritual are reported to be less affected by stressors (but there is much controversy here)
  - A component of support in a religious community is social support
  - **Caveat:** Rejection by one's religious community can be a major stressor

## Relaxation

*Learning to and performing relaxation-focused activities:* helps to counteract the physical and emotional effects of stress (See Handout)

- **Get away from stressor** - have fun, relax, listen to music, laugh, hobbies, take a day off, vacation
- **Induce relaxation:** can decrease anxiety, slow heart rate, lower blood pressure and muscle tension
  - **Deep breathing\*** - slow, controlled abdominal breathing
  - **Progressive Relaxation** - consciously tensing and then relaxing different groups of muscles
  - **Relaxation Response\*** - response to meditation-like process (also increases alpha wave production)
- **Get a pet**
- **Laugh!**

\* See Viewgraphs and Supplementary Materials for Chapter 1 (Deep Breathing) and Chapter 4 (Meditation, Relaxation Response) or <http://www.relaxationresponse.org/steps/>

## Meditation and Trance

- Techniques for directing attention and consciousness away from worldly concerns and external stimulation.
  - Contact with the spiritual side, or
  - Focus on the internal, spiritual self, or
  - Focus on nothing
- Meditative states hold several physiological features in common, now called "**The Relaxation Response**" (Benson)
  - Lowered heart and respiration rate
  - Increased alpha wave production, but not sleep
  - Decreased muscle tension and blood pressure (opposite of "fight-or-flight" response)
- Meditation is often recommended for people experiencing a lot of stress

## The Relaxation Response - How To Meditate

- Sit quietly with your hands in your lap in a comfortable position
- **Close your eyes**, and **breathe slowly and deeply** from your diaphragm ("belly breathing")
- As you feel your self starting to **relax**, breathe normally
- **Focus** all of your attention at the end of your nose
- Observe your breath come in, and observe your breath go out
- If your thoughts start to wander, gently bring your attention back to your breath and to the end of your nose
- At the end of 10-20 minutes (set a timer), bring yourself gently back to normal consciousness, breathe, stretch, and go about your day

## Biofeedback

- **Biofeedback:** learning to control autonomic responses using external feedback (access to internal feedback is poor for these responses)
  - Can learn to reduce heart rate, blood pressure, respiration rate, muscle tension, increase hand temperature, increase alpha production
  - Simple biofeedback device: gently grasp bulb of a mercury thermometer (if you can find one) or use a liquid crystal skin patch, and try to increase the skin temperature in your hands (you'll have to peek periodically)\*

\*(hint: try using relaxation response techniques as you do this)

## Optimism

- **Optimism** - looking for and expecting positive aspects in life situations
- People with an optimistic style of thinking tend to be healthier, recover from illness more rapidly, and live longer
- **Optimism can be learned**
  - **Self-talk**, constructive style of thinking
  - **Cognitive restructuring**: reduce uncertainty thru research, learn healthy coping techniques, change of attitude
- **Take a proactive approach** - anticipate problems, don't be blindsided (realistic optimism)

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## Optimism

### Characteristics of Optimistic Thinkers

- Attribute unpleasant experience to specific causes
- Blame problems on external rather than internal conditions
- Assume that causes of pain are unstable or temporary
- Assume good outcomes are possible and most likely

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## A "Hardy" Personality (Kobasa, 1982)

People with **hardy personalities** are more able to face stressors without becoming ill or having psychological problems.

**Hardiness** - an effective coping style in the face of change, characterized by:

- **Challenge**: change welcomed as a challenge, not a threat; tend to be optimistic
- **Commitment**: make a commitment to purposeful activity, problem solving, meeting challenges; can-do attitude
- **Control**: have a sense of control over their actions and experiences ("internal locus of control")

Don't Sweat the Small Stuff!



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## Stress and Perceived Control

- People who perceive that they have at least some control over their lives are less likely to be adversely affected by stressors
  - "Executive rats" who could terminate shocks were less likely to develop ulcers than rats who got the same shocks, without being able to control them (Weiss, 1977).
  - British Civil Servants who are executives outlive those in who are clerks or laborers; the more control workers have, the longer they live (Bosma, 1997, Marmot, 1997) (*is there a possible confounding variable here?*)
- **Perceived control is opposite to learned helplessness**

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## Control: Be Proactive re Foreseeable Stressors

- **Proactive**:
  - Anticipating problems, needs or changes and acting or setting up means for dealing with them;
  - Taking control of a situation, rather than reacting to it
  - Tie your actions to your goals
- **Reactive**:
  - tending to react to events or situations when they happen, rather than controlling or initiating them

Being **PROactive** can often control events before they become stressors

- Manage your time
- Anticipate risks
- Plan and set priorities
- Don't procrastinate
- Do the most important things first

Ps:

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## Regular Exercise

- Lessens effects of stress response
- Reduces mortality rate
- Improves several disease markers (diabetes, cardiovascular)
- Decreases depression
- Reduces anxiety
- Improves self-image
- Helps maintain and improve cognitive function
- Promotes better sleep

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## Drugs

- **Self-Medication:**
  - Legal: alcohol, nicotine
  - Illegal: heroin, marijuana, cocaine, amphetamines, ecstasy, uppers, etc.
- **Prescription:**
  - Antianxiety drugs (tranquilizers), antidepressants
  - Not useful if used solely for escape; useful if they give stressed person some "space" to relax and to solve their problems
- **Neither type of drug is recommended as a long-term solution to stress**
  - Behavioral & cognitive measures more effective and more healthy
  - Arrest for illegal drug possession usually leads to a rather large and prolonged stress response...

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## Nutrition

- Adequate nutrition is available to almost everyone in the US, but many people rely on fast food instead
- Both overdose and lack of some nutrients can have direct physical and psychological consequences
- A healthy, balanced diet\* contributes to decreasing and managing effects of stress
- \* Sadly, the definition of what constitutes a healthy, balanced diet is often the subject of controversy, but most would agree that it **excludes** junk food and large amounts of sugar, trans-fats, saturated fats, refined grains, and salt.

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## "Life-Style" causes of mortality

- Modifiable behaviors were the leading causes of death in the US in 2000

Actual Causes of Death in the US, 1990 and 2000*				
Actual Cause	No. (%) 1990		No. (%) 2000	
Tobacco	400,000	(19)	435,000	(18.1)
Poor diet/ physical inactivity	300,000	(14)	400,000	(16.6)
Alcohol consumption	100,000	(5)	85,000	(3.5)
Microbial agents	90,000	(4)	75,000	(3.1)
Toxic Agents	60,000	(3)	55,000	(2.3)
Motor vehicle	25,000	(1)	43,000	(1.8)
Firearms	35,000	(2)	29,000	(1.2)
Sexual behavior	30,000	(1)	20,000	(0.8)
Illicit drug use	20,000	(<1)	17,000	(0.7)
<b>TOTAL</b>	<b>1,060,000</b>	<b>(50)</b>	<b>1,159,000</b>	<b>(48.2)</b>

\*Data from McGinnis and Foege. Percentages are for all deaths.

Psych 105 Mokdad, A. H., et al. (2004). Actual causes of death in the United States, 2000. *JAMA*, 291, pp. 1238 – 1245.

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