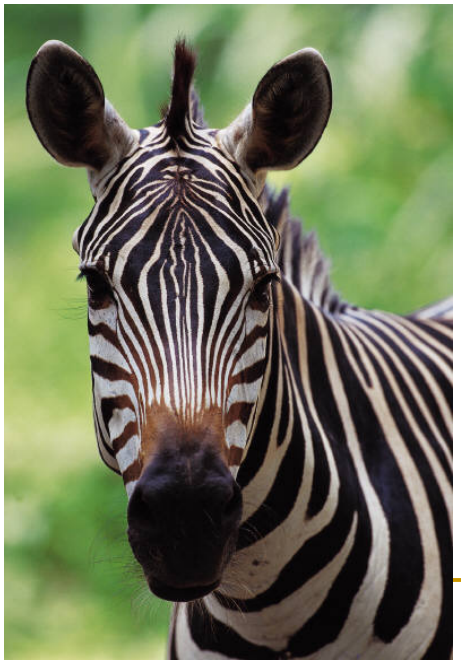
Stress, Cognition and Coping



Why Zebras Don't Get Ulcers!

Linda Chrosniak
George Mason University

Questions to Consider Regarding Stress

- Why do we adapt to some stressful situations but become ill in other situations?
- Why are some of us more vulnerable to stress-related diseases?
- What do personality and psychological variables have to do with this?
- What things are likely to “stress out” humans?
- What can we do to increase our effectiveness in coping with stress?

QUESTION: What things in modern life stress us out?

What is Stress?

- Definitions
  - Stress as a stimulus
    - Physiological or psychological
    - Adaptive or maladaptive
  - Stress as a physical response to “threat”
    - Activation of biological systems
      - Flee or fight response
      - Health behaviors
      - Vigilance
      - Anxiety or worry
  - Interaction between environmental stimuli and a person

Sources of Stress

- Major life events?
- Daily Hassles?
- Catastrophes?
- School or work?
- Family?
- Money?
- Health?
- Environmental stressors: traffic, noise?
- How do these affect your health and well-being?
- What resources do you have to cope?

Why Zebras?

- Title comes from the book by Robert Sapolsky, professor of neuroscience at Stanford University.
  - Stress and its biological effect in humans (and zebras)!
  - Provides strategies for understanding and coping with stress
  - Recommended for the lay and professional reader: *Why Zebras Don't Get Ulcers*

Stress and Health

- Sapolsky (1998) argues that the nature of today's situations or crises are more prolonged.
  - May account for widespread stress-related illnesses and psychiatric problems in industrial societies.
- Long-term, inescapable issues activate a "general adaptation syndrome" which is harmful to our health over time.

General Adaptation Syndrome

General Adaptation Syndrome:

- Alarm stage - increased sympathetic nervous system activity. ("flee or fight")
- Resistance stage - sympathetic response declines, adrenal cortex releases cortisol and other hormones that enable maintenance of prolonged alertness.
  - Reduced ability to cope then
- Exhaustion stage - occurs after prolonged stress and is characterized by inactivity & decreased immune function.

Zebras?????

- Zebras are only concerned about predators, physical injury and starvation.
  - These are actual physical stressors.
  - These specific stressors may “rise to the top” of our stressor list at times but they are usually NOT mentioned first.
- **Humans are more likely than zebras to get ulcers because zebras have physiological adaptations to deal with the stressors above.**

Human Stressors

- Zebras are literally running for their lives but….
  - Humans in modern society tend to be more stressed by non-physiological factors (e.g., mortgages, health).
- These non-physiological stressor "turn on" physiological responses that are usually needed when we "run for our lives" as the zebra does.
  - The biological system is responding to situations (mortgages) that it is not designed to handle
    - Results in overuse of the fight or flight system

Stress and Homeostasis

- Stress: a disruption in the homeostatic balance that keeps physiological system at optimal level.
  - Stressors disrupt this balance (e.g., increase heart rate, blood pressure, use energy, increase release of stress hormones).
  - Stress response can be ”turned on” for physiological or psychological situations (e.g. anticipated situations).
  - Excess disruption of this balance can affect well-being.
    - (e.g., Increased risk for heart disease can be related to an excessive stress response)

Stress

- Stress is part of everyday life.
  - We can experience stress in good situations and in negative situations.
- How we handle stress is extremely important for our lives.
  - We will discuss coping skills later

Activation of the Stress Response

- **Stress activates the hypothalamic-pituitary-adrenal system.**
  - Secretion of cortisol
- **Chronic over-activation can damage the biological system (e.g., memory, disease).**
- **Psychosocial stress is also a risk factor for cardiovascular disease.**
  - Chronic stress can promote plaque formation.
  - Chronic stress can damage the heart muscle.

HPA Axis - (Hypothalamic-Pituitary-Adrenocortical System)

- Delayed response to restore homeostasis
  - Glucocorticoids levels in blood rise-stimulate hypothalamus
    - Hypothalamus releases CRH
    - Pituitary releases ACTH
    - Adrenal Cortex releases corticosteroids (e.g. cortisol)
      - Cortisol: negative feedback to hippocampus.
      - High density of cortisol receptors
    - Hippocampal neurons project back to hypothalamus to suppress release of CRH and ACTH.
    - ACTH levels decrease, adrenal cortex shuts down production of cortisol.

Action of Cortisol

- Rate of cortisol secretion: sensitive to psychological factors and linked to stress
- Fights inflammation
- Promotes healing
- Triggers release of stored energy reserves
- Cortisol enhances glucose concentration
  - in opposition to insulin
- Elevates other nutrients to mobilize energies.
  - Cortisol in a drug form is called hydrocortisone

Negative Effects of Cortisol

- Chronic over-activation of HPA system can damage the biological system.
  - Unrelenting stress: more cortisol is released and hippocampus can be damaged.
    - Seen in AD and major depressive disorder
  - Too much cortisol can suppress immune system
    - May lead to infection
  - Too little cortisol reduces inhibition of immunity
    - May lead to autoimmune disease
- HPA axis can become the dominant responder to prolonged stressors.

Stress and Cardiovascular Disease

- **Associated risk factors:**
  - High blood pressure (increased release of neurotransmitters)
  - Arthrosclerosis
  - Elevated C-reactive protein
- **Studied psychosocial stressor include**:
  - Work stress
  - Depression/anxiety
  - Socioeconomic status
  - Dispositional “traits” (e.g. hostility, optimism)
  - Level of social support

Stress & Cognitive Function

- Increased level of glucocorticoids related to more errors on episodic/declarative memory tasks
  - not on non-declarative
- Flight attendant study –increased cortisol and reduced hippocampal volume (Cho, 2001)
  - Some other studies show this as well
- Chronic stress and decreased grey matter (Gianaros et. al., 2007)
- Cognitive impairments found in long-term, high-dose exposure to glucocorticoid exposure

Psychosocial Stressors

- Psychosocial stressors are a risk factor for cardiovascular disease.
  - Examples: lack of social support, SES, job stress, low control, effort/reward imbalance
  - Chronic stress can promote plaque formation.
  - Chronic stress can damage the heart muscle.
  - HPA axis becomes the dominant responder to prolonged stressors.

Now That We are Stressed Out…..

- How do we deal with stress?
- What are the best strategies to cope with stress?
- What cognitive factors contribute to coping?

What is Coping?

- Coping refers to strategies people use to manage problems and stressors.
  - Intended to moderate or buffer effects of stressors
  - Process-oriented rather than trait-like
    - Focus on what an individual actually thinks and does in a situation.
    - Dynamic in a sense, rather than trait-like.
  - Cognitive and behavioral efforts to manage demands
  - Based on cognitive appraisals by the individual

Dimensions of Coping

Lazarus, 1984

- Coping efforts can occur along two dimensions:
  - Problem-focused strategies for coping.
  - Emotion-focused strategies for coping.
  - Coping may include both dimensions
    - Studies show rates as high as 98% using both.

Folkman & Lasarus 1980

Problem–Focused Strategy

- Relies on cognitive strategies
- Try to alter the source of the stressor
  - Reduce the demands
  - Reflects actively seeking an alternative plan
  - May have advantages over emotion-focused coping
    - People using this strategy often report less stress
    - Meta analysis of several studies revealed this finding

      Penley et al., 2002
    - Problem focused more effective with chronic stressors

Emotion-Focused Strategies

- Relies on regulation of stressful emotions: changing how one thinks or feels about the stressor.
  - May use cognitive or behavioral strategies
  - Adaptive strategies (e.g., seeking social support, venting)
  - Maladaptive strategies (e.g., avoidance or denial)
  - Emotion regulation strategies most effective when the stressor is unchangeable.
    - Little or nothing to be done to alter the situation.
    - Controllability plays an important role

Coping Strategies

- All strategies are NOT created equally!
  - Some may bring temporary relief but may be maladaptive
    - Examples?
  - Others may bring more extensive relief and be more adaptive.
    - Examples?
- What approaches then, work for different individuals in different situations?

Cognitive Appraisals and Coping

- *Cognitive Appraisal*: we evaluate whether the situation is relevant to well-being.
  - We classify events as familiar or unfamiliar, threatening or nonthreatening.
  - We generate strategies behavioral strategies to deal with events.
  - Appraisals are negotiations between demands and our goals and personal beliefs.
    - Motivation and existing cognitions come in to play.

Primary Appraisal

- We have beliefs about how the world should work and our commitments to a course of action.
  - Some events are benign or irrelevant
  - Events may be threatening if they violate our beliefs about the world.
- We evaluate whether a problem/threat exists
  - Is there any harm or benefit at stake related to commitments, values, goals, loved ones or self-esteem?
  - Reflects our perception or judgment of a situation (e.g., controllably, challenging, benign)

Secondary Appraisals

- We evaluate the controllability and our coping resources.
  - Reflects a secondary appraisal (e.g., Can we manage, change the situation or cope effectively?)
  - May require some adaptive behavioral intervention to avoid harm or negative outcomes
  - These interventions are referred to as coping strategies!
  - These may be overt or covert
- How we apprise and cope with stressors affects our physiological and psychological well-being!

Cognitive Styles Influence Coping Strategies

- The way we think about the world influences how we perceive and interpret events.
  - Stressors, then are approached based on our interpretations of the situation.
  - Cognitive Styles can influence coping and ultimately well-being.

Cognitive Styles

- Underlying cognitions are evoked by a person as an ‘explanatory” style.
  - Characterized as a vulnerability to a type of thinking.
  - Usually “automatically” and easily accessed
  - Referred to as a ‘schema”
    - We use what we have represented in memory (i.e., schemas) to interpret the world around us.
    - Underlying cognitions (negative for some) are evoked when we encounter situations and we process that information based on our stored representations (schemas).

Cognitive Styles and Stress

- One's disposition and "cognitive style" can affect the ability to cope with stress.
  - Optimistic style as a buffer (adaptive)
  - Looming cognitive style (maladaptive)
  - How we think about and approach (appraisals) a stressor affects our coping ability.
- Understanding how we approach stressors will enable us to find a strategy to cope with stress.

Emotions and Cognitive Styles

- Emotions are made up of cognitive, neurobiological and behavioral components.
  - Positive emotions have been linked to positive effects on heart health.
  - Negative emotions have been linked to cardiovascular disease in varying degrees.
    - Negative emotions and cognitive styles
      - hopelessness, pessimism, anxiety, rumination and anger

Pessimistic Cognitive Style

- A pessimistic style reflects a tendency to expect negative outcomes as a general rule.
  - A pessimistic person would attribute bad events to himself.
  - A pessimistic person would discount a good event; would be discounted and linked to an external cause.
- The Veterans Affairs Normative Aging Study found a significant relationship between coronary heart disease and a pessimistic style. (Kubzansky et al., 2001)

Positive Emotions and CVD

- People with an optimistic style appear to have some protection against the development of coronary heart disease. (Kubzansky et. al., 2001)
  - Study with veterans
- Optimistic style associated with faster recovery, and overall well being after coronary bypass surgery.
- Other positive emotions are currently being studied (e.g., gratitude).

Loneliness and Isolation

- At least one strong relationship is a predictor of good health (Michael et al., 1999).
  - Severe isolation in elderly women was related to an increase in mortality over a 5-year period.
  - Lonely young adults reported less “efficient” restorative sleep and feelings of daytime dysfunction.
  - Loneliness may decrease positive health behaviors (e.g., medical compliance or increase negative health behaviors).
  - Social isolation in men was related to earlier death.

Coping Strategies

- **Establish a self-care plan.**
  - Adjusting coping skills may improve our well-being.
- **Some stressors are more readily dealt with.**
  - Some are short-term and acute.
  - Others are long-term and chronic.
- **Coping strategies will vary with different types of stressors.**

Specific Coping Strategies

1. Positive thinking
   - Optimistic styles are related to better health.
   - Stressors may provide a chance to adjust one's outlook.
   - May provide an chance to develop new "habits' or learn new cognitive styles (e.g., changing self-talk).

     - An excellent resource is a book called:

       Learned Optimism by Martin Seligman.

Coping Strategies continued

2. Focus on gaining some control in a stressful situation.
   - Seeking to control past circumstances or future circumstances is maladaptive.
   - Seeking to control the things you can is adaptive.
     - We can control our responses to others, what we eat or when we sleep.
3. Seek accurate and predictable information.
   - An excess of information can be overwhelming.

Coping continued

4. Be Task focused
   - focus on positive aspects of accomplishments or on tasks you attempted.
5. Self-acceptance: Avoid self-criticism; alter negative reactions
   - Reframe things in cognitive processing
6. Find positive outlets for stressors:
   - Relaxation techniques (e.g., yoga)
   - Meditation
   - Listening to music
   - Engage in enjoyable physical activity

Coping cont.

7. **Develop or use your support system**
   - Gives opportunity to vent, problem-solve or gain others' perspective
   - May help develop a new "cognitive style"
   - One study found that a supportive therapy setting was related to increased survival time for breast cancer patients.
8. **Communicate needs to others.**
   - May help with problem management (e.g., tell family you need help caring for elderly parent)

Coping Strategies concluded

9. Find some humor in situations where possible
   - It can reduce stress
10. Get enough rest: it will help coping.
    1. Sleep deprivation is detrimental to health and well-being
11. Get regular exercise which also helps reduce stress.
12. Eat healthy foods.

Concluding Comments

- Stress can be adaptive but it can also be maladaptive.
- Stressors in modern life tend to be more non-physiological.
- How we assess and perceive stressors can affect our well-being.
- Developing healthy and appropriate strategies for coping with stressors is related to healthier outcomes.

Useful References

- *Learned Optimism* by Martin Seligman
- Kubzansky, L.D. Is the glass half-full or half empty: A prospective study of optimism and coronary heart disease in the normative aging study. *Psychosomatic Medicine, 63*, 910-950
  - She is a researcher at Harvard and has written many papers on these topics.