



Conceptual Roadblocks

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Stress Definition: Impact on Health

- Any challenging, threatening or overwhelming event or stimulus (physical, mental/cognitive or emotional stimulus) that increases a stress response to regain homeostasis.

Unpredictable Stress > Predictable Stress

More Intense > Less Intense Stress

Prolonged Stress > Acute Stress

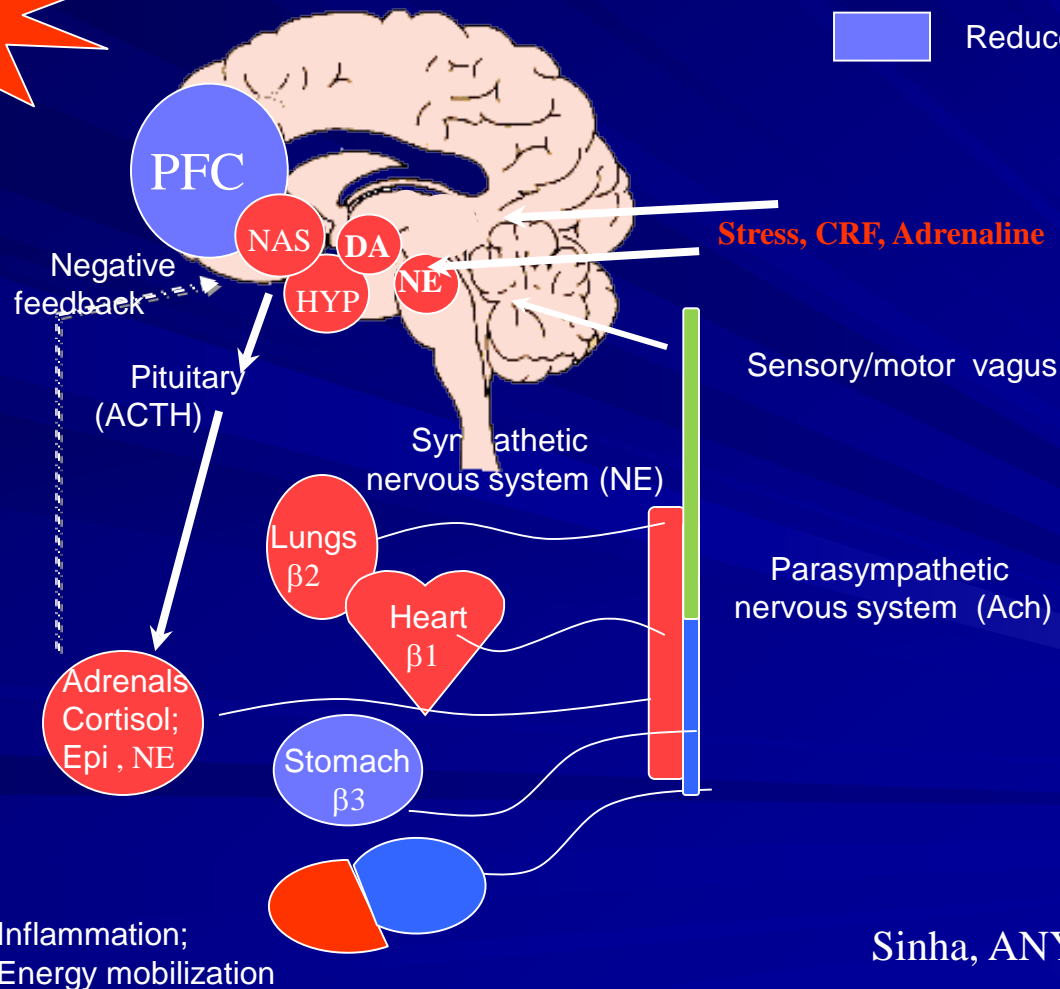
Repeated Stress > Few Adverse Events

Bottom line: Repeated or cumulative stress or chronic prolonged stress can induce lasting changes that increase risk of stress-related disorders even when the stress is removed or has ended.

Changes in the Brain and Body with Stress and Bad Habits



- Activated by stress/bad habits
- Reduced by stress/bad habits



Challenges to comprehensive measurement of stress?

- Cumulative stressful events (life span assessment of events)
- Subjective perception of stress (e.g. PSS)
- Early life stress (Adverse Childhood Experiences Survey - ACES, Childhood Trauma Questionnaire - CTQ)
- What about stress manifestation in symptoms and behaviors?
 - Are there stress symptoms?

Common Stress Symptoms

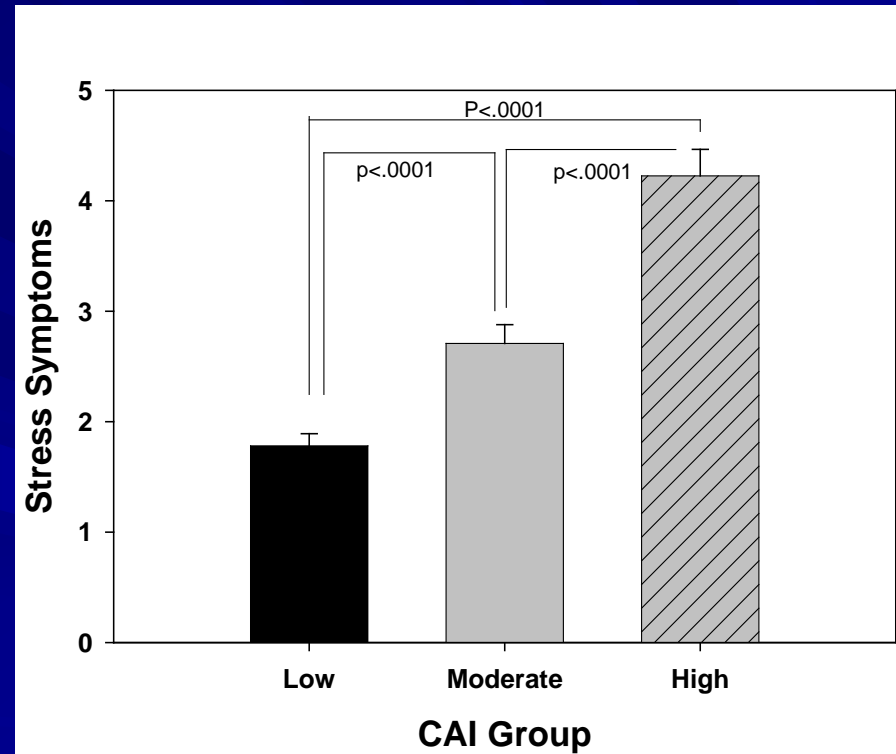
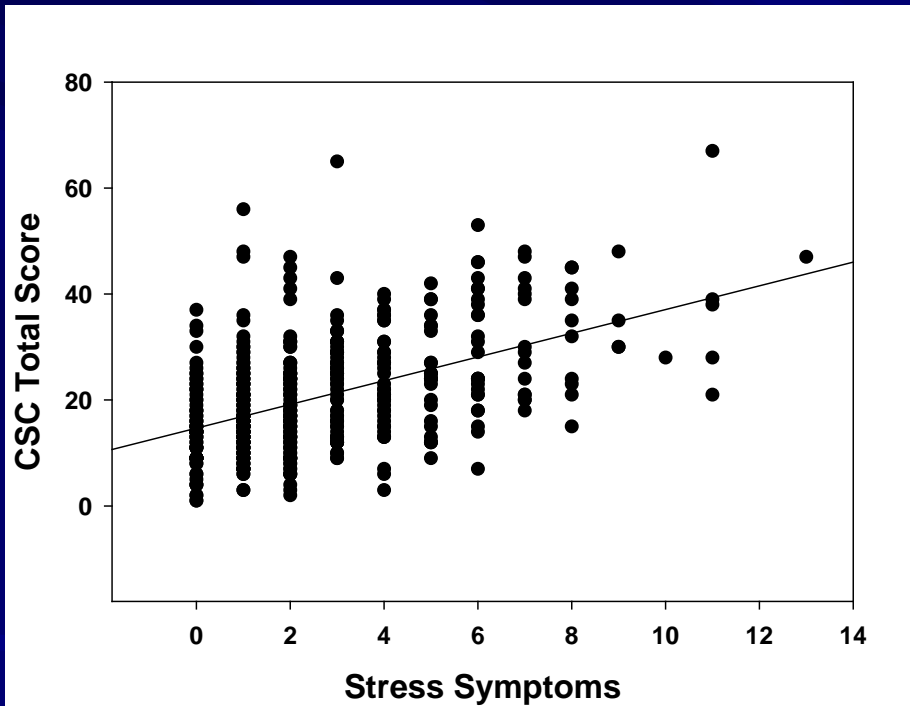
- Feeling overwhelmed and mood swings
- Increased frustration, edginess, irritability
- Difficulty concentrating, forgetfulness, unwanted thoughts
- Low energy for activities and taking initiative
- Difficulty sleeping
- More aches, pains, and sickness (colds, flu, infections, migraines, back pain, arthritic pain, flaring up of skin problems, etc)
- Increased intake of alcohol, comfort foods, nicotine or other drugs including OTC and prescription pain pills.
- Easily fatigued
- Episodes of racing heart/high blood pressure
- Stomach problems

Cumulative Stress/Adversity Checklist (CSC/CAI- from Turner et al., 1998; 2003; 2008)

The CAC is a 20 minute structured interview that asks about events experienced in lifetime, how often and first and last age of experiencing that event:

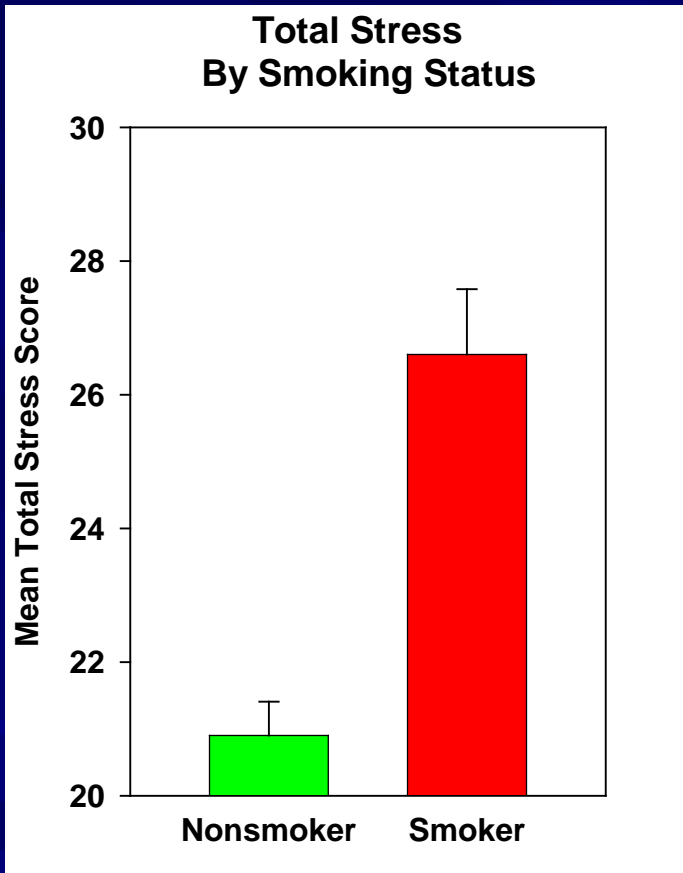
- **Major Life Events**: e.g. abandonment, divorce/separation, loss of child, parents substance abuse, relationship difficulties.
- **Life Traumas**: loss of home, witnessing or being in an accident, and in violent situations, sexual, physical and emotional abuse, being shot, assaulted, tortured, being in combat, losing someone to violence.
- **Recent Life Events (past year)**: Accidents, illnesses, loss of child, trouble with law, pregnancies/abortion/miscarriages, school drop-out, financial crisis, school or work failures, work and relationship problems, living problems.
- **Chronic Stressors**: sense of being overwhelmed with life, unable to manage life problems, difficulties with job, living, finances relationships, conflicts, loneliness, unfulfilled desires, problems with children, living, etc.

High Cumulative Stress Checklist (CSC) and High Stress Symptoms



$r=0.49$, $R^2=.24$; $t(588)=8.56$, $p<.0001$;

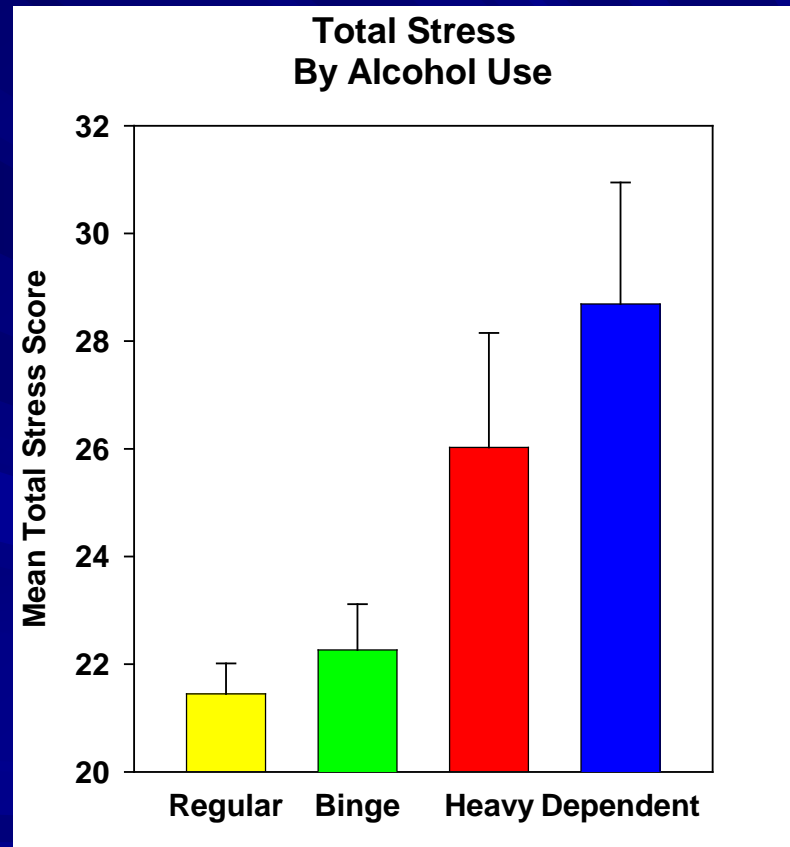
Cumulative Stress and Adversity is Associated with Smoking and Alcohol Abuse (community adults)



N=588

$X^2 = 31.66$, $df=1$, $P < 0.0001$

OR =1.196 (1.124-1.273)

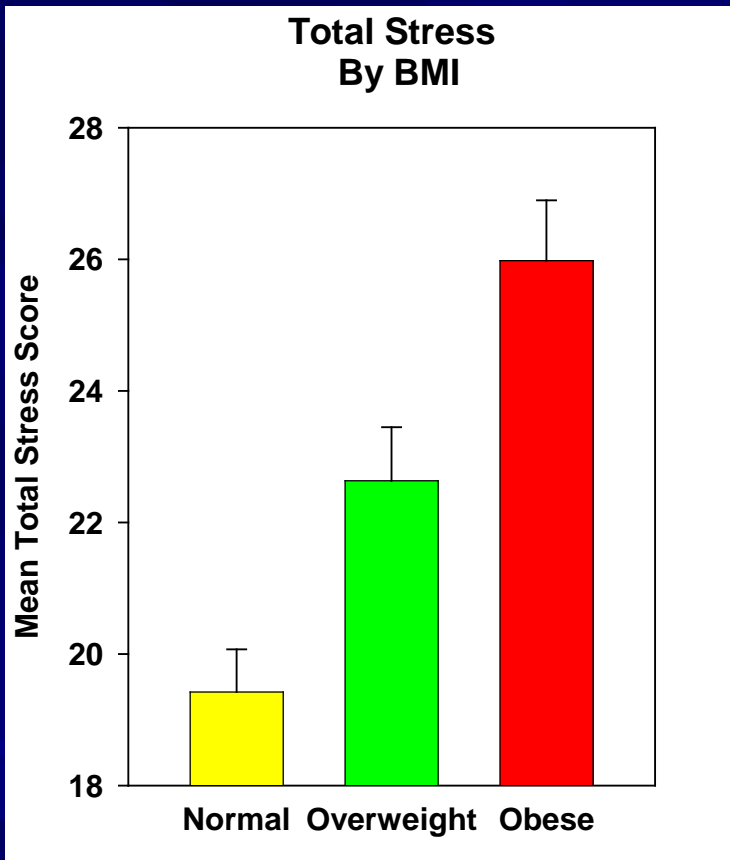


N=588

$X^2 = 15.37$, $df=1$, $P < 0.0001$

OR =1.113 (1.055-1.173)

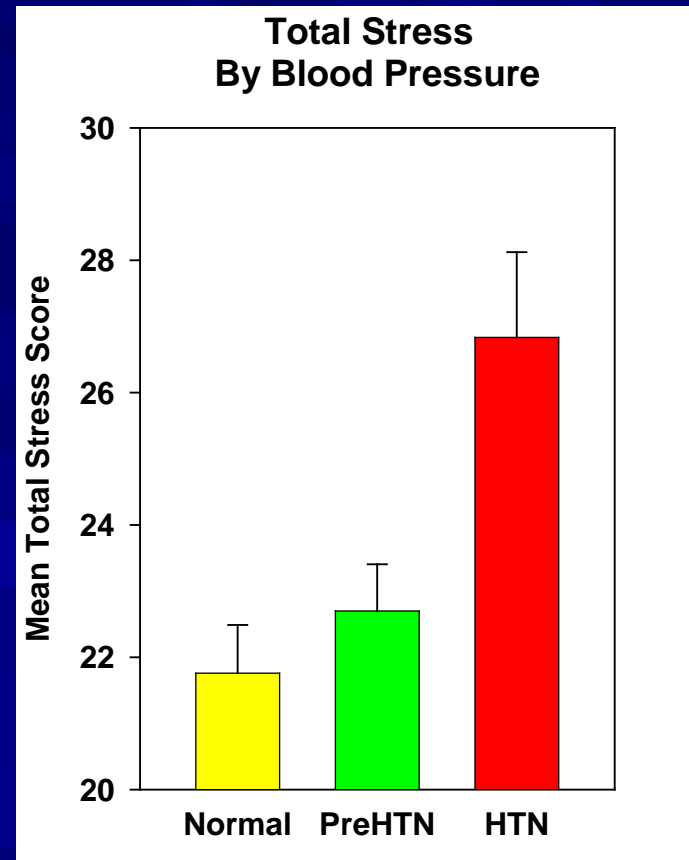
Cumulative Stress and Adversity is Associated with Obesity and Hypertension



N=588

$\chi^2 = 25.47$, $df=1$, $P < 0.0001$

OR = 1.146 (1.087-1.208)

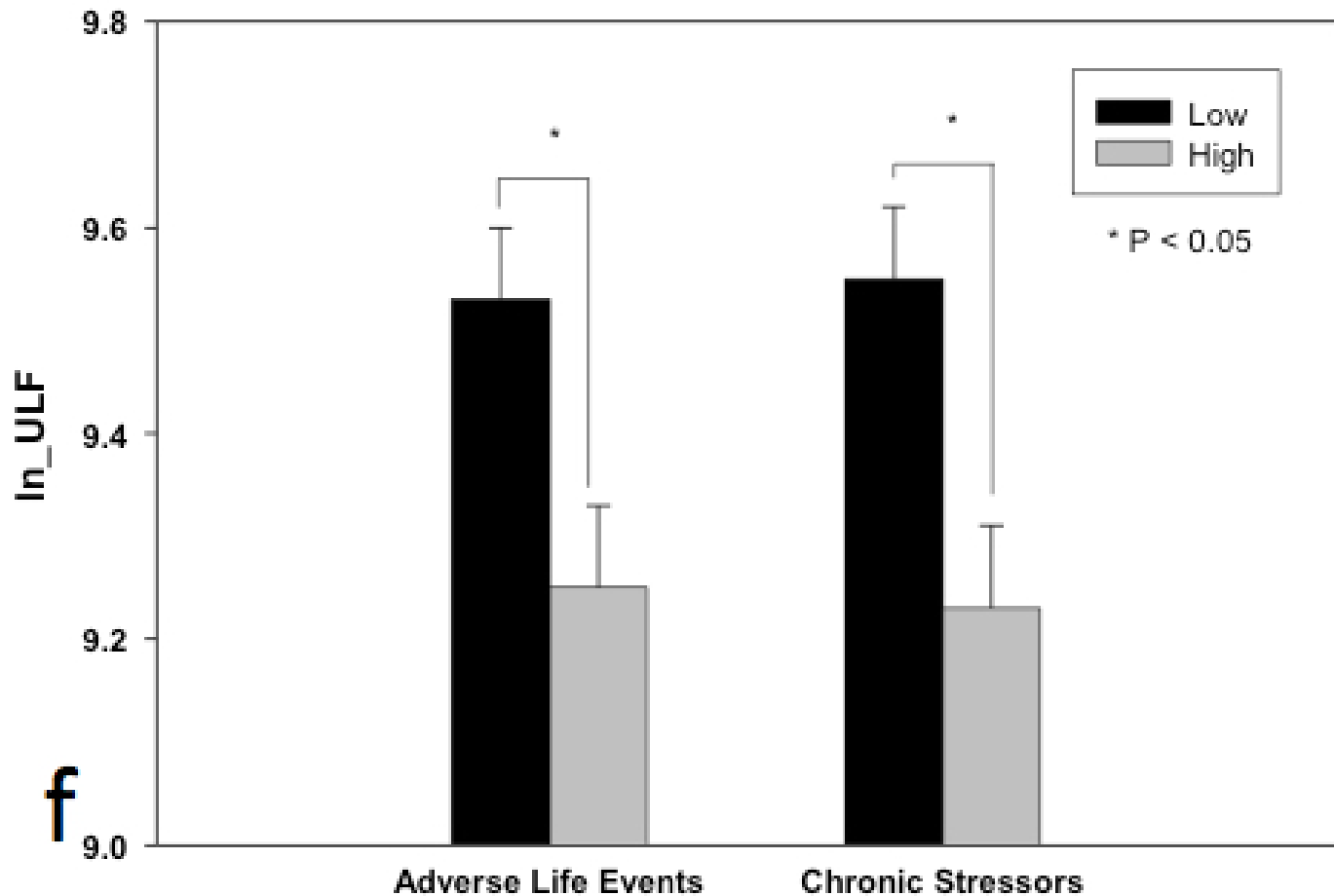
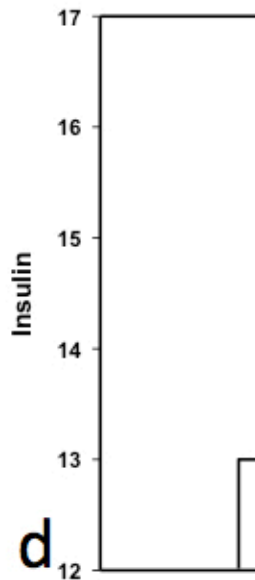


N=560

$\chi^2 = 6.46$, $df=1$, $P = 0.0110$

OR = 1.19 (1.04-1.33)

High Cumulative adversity effects on metabolic measures and heart rate variability



P = 0.002

Symptoms of Stress:

SKIN

Acne and other skin problems

HEART

Faster heartbeat, rise in blood pressure, increased risk of high cholesterol and heart attack

MUSCLES AND JOINTS

Muscle aches and tension (especially in the neck, shoulders and back), increased risk of reduced bone density

REPRODUCTIVE SYSTEM

For women: irregular or more painful periods, reduced sexual desire.
For men: impotence, lower sperm production, reduced sexual desire

BRAIN AND NERVES

Headaches, feeling of despair, lack of energy, sadness, nervousness, anger, irritability, increased or decreased eating, trouble concentrating, memory problems, trouble sleeping, mental health problems (such as panic attacks, anxiety disorders and depression)

STOMACH

Nausea, stomach pain, heartburn, weight gain

PANCREAS

Increased risk of diabetes

INTESTINES

Diarrhea, constipation and other digestive problems

IMMUNE SYSTEM

Lowered ability to fight or recover from illness

- Feeling angry, irritable or easily frustrated
 - Feeling overwhelmed
- Stomach/GI problems, changes in eating
 - Problems concentrating
 - Feeling nervous or anxious
 - Trouble sleeping
 - Problems with memory
 - burnout with workload and low mood
- increased intake of alcohol, nicotine, comfort foods and sedentary behaviors
 - More tension, aches and pains
 - Low energy and fatigue

Beyond stressors, reactivity and to stress impact: Focus on adaptation

- Getting past stress responses to look at health effects and behavior
- Measure stressors or stress effects?
- Can we develop brain responses as biomarkers?