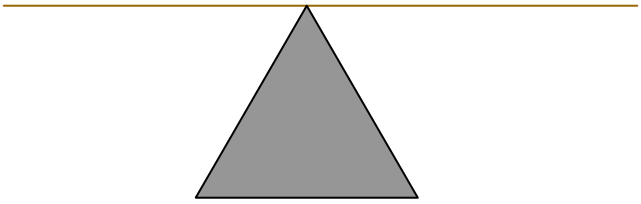
HOW DOES STRESS RELATE TO Illness?

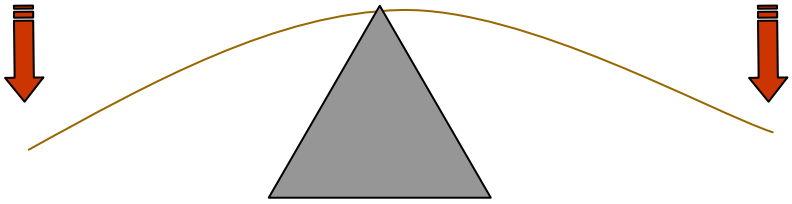
Research suggests that *chronic stress* may be an important factor in the development and maintenance of illness.

The term STRESS comes from the physical sciences and refers to what happens to an object when force is applied to it.

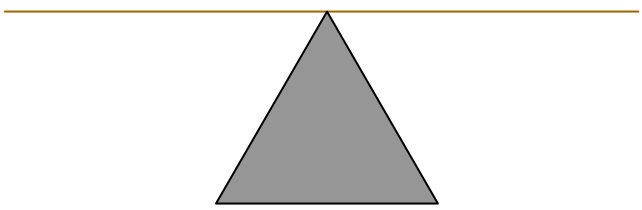
For example, a fresh-cut wooden board is straight.



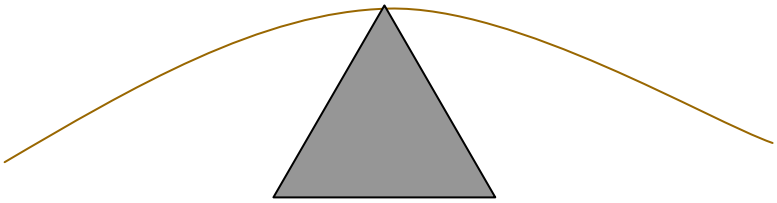
If some (but not too much) weight is applied to the ends of the board it will bend. Under these conditions you would say the board is stressed.



If the stress is removed quickly, the board springs back to its original shape.



If the stress remains for a while and is then later removed, the board might remain warped, even after the weight is removed.



The physical structure of the wooden board has changed from straight to curved in order to **adapt** to the stress of the weight. We use the word "adapt" because the change in the physical structure of the wood allowed the board to survive the weight. If the board had not bent, it would have broken under the stress.

How Does This Relate to Humans?

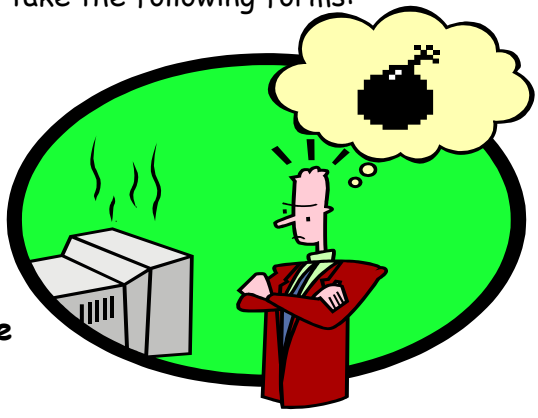
Humans come into contact with many stressors.

In early times many stressors were threats to basic needs:

- Hunger
- Exposure to harsh climates/weather
- Threat by wild animals
- Thirst

Some of **today's stressors** are less obvious but affect us in much the same way as threats to our basic needs. Today's stressors take the following forms:

- Social conflicts
- Illness/disease
- Accidents
- Job-related stress
- Family conflict
- Financial matters



Do the same stressors produce the same reaction in everyone?

NO

Some boards will bend under a 20-pound weight, others will remain straight as though no stressor was present. Other boards will snap under this weight. What's that difference in the boards?

- Type of tree
- Composition
- Size/length
- Thickness
- Amount of water in the board

The same is true for humans. While stressors come in many forms, not all stressors are perceived as stress. Individuals differ as to which stressors produce a stress response.
These individual differences are due to many factors including:

- Genetics
- How many stressors are being handled at any given time
- The nature of the stressor
- The amount of control one has over the stressor
- The predictability of the stressor

How do humans respond to stressors?

Like the board, humans have two stages of stress response: An acute, short-term response and a long-term response.

The short-term response is designed to provide extra energy to the individual in order to help eliminate the stressor.

If the acute burst of energy was unsuccessful at eliminating the stressor, the long-term response is designed to help the individual conserve energy and adapt to the stressor. (This would be like the board bending to accommodate the weight rather than breaking.) Let's talk a bit more about each stress response.

The Acute Stress Response

Whenever we experience something that is perceived as a threat or as a challenge, our brains produce changes in our body chemistry that give us the ability to eliminate the threat. Known as the fight/flight response, this change in body chemistry allows us to…

- Run faster
- Act more quickly
- Act with greater effectiveness
- Increase our strength

- Improve our alertness
- Increase our speed

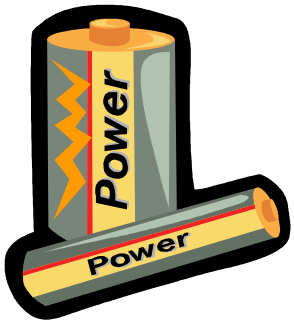
It is easy to see how this ability among humans helped our ancestors to survive when the threat usually came in the form of an attacking animal.

Once the threat is eliminated, the human can calm down and return to a state of rest. It is important that the human calm down since maintaining a state of increased ability costs the body a great deal in terms of energy resources.

In modern times, the fight/flight response does not always eliminate the stressor.
For example:
- It is not appropriate to hit your boss, child, spouse, etc.
- Having greater alertness won't pay the mortgage if the money's not there
- Greater strength doesn't help when you lose your job

Thus we need an alternative stress response when the acute response fails to eliminate the stressor.

The Long-term Stress Response



Whereas the acute response focused on delivering high amounts of energy, the long-term stress response focuses on energy conservation. This makes sense. **Rather than giving us extra energy (which would be wasted on a stressor that can't be eliminated), the long-term response helps us to slow down and conserve energy until**
a) the stress leaves on its own OR
b) our bodies can adapt to the stressor

The long-term stress response is an adaptation by the body to conserve energy. It does this by sending signals from the brain that affect hormones, muscle groups, the digestive system, the immune system, the liver, blood platelets, heart rate, blood pressure, cognitive ability, and breathing. Whereas the acute stress response turns on rapidly and turns off rapidly, the long-term stress response produces adaptations to the individual that can last for prolonged periods time.

Let's look at some examples:

Situation: A cave man experiences cold weather.

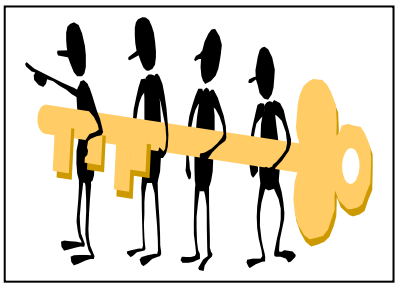
- ⇨ He can flee the cold by running around his cave. This will warm him up temporarily. But this acute stress response will use great amounts of energy and he will not be able to maintain this strategy all winter.

- ⇨ The long-term stress response will conserve energy by increasing fatigue, diminishing desire for activity, and storing excess food as fat for use later, diminishing the need for food. The cave man's body and mind would essentially slow down until the stressor (winter) departed.

In this example, the cave man's body will reduce his expenditure of energy by reducing his activity level until the stressor departs. When warmer weather returns in the spring, the caveman will be physically different from how he was in the fall. The man will be thin, weak, and probably will not be thinking as clearly. Like the warped board, he is different than he was before the stressor occurred because of how his body dealt with the stressor. The cold weather did not change him. He was changed by how his own body dealt with the cold stressor. If his body had not changed in this way, the cold would have killed him.

- ⇨ Modern-day stressors rarely kill us because they are mostly social in nature; but they can persist and can keep our long-term stress response active for prolonged periods of time. Thus, we are often asked to function and engage in daily activities even though our bodies have made adaptations that slow us down.

- ⇨ While social conflict is often the stressor, social support is also often the solution. Input from trusted friends or professionals can provide the needed insight that will



eliminate a stressor or modify the stress response in a way that allows it to shut off. Historically, family, tribes, or communities have banded together to develop creative solutions to environmental problems that single individuals could not effectively combat. In modern times, when families and communities are less integrated, religious leaders, therapists, and friends tend to serve this function.

Everyone experiences stress from time to time. But… not everyone experiences prolonged stressors that trigger the long-term stress response.

Symptoms such as pain, fatigue, memory problems, headache, digestive problems, etc., can sometimes be **triggered** by events such as:

- Infections (e.g., parvovirus, Epstein-Barr Virus, Lyme Disease, Q fever)
- Physical trauma (automobile accidents)
- Psychological stress/distress
- Hormonal alterations (e.g., hypothyroidism)
- Drugs
- Vaccines
- Certain catastrophic events (e.g., war)

While it may be possible that some symptoms are caused directly by the stressor, current research suggests it is very likely that the maintenance of the symptoms is a secondary result of the body's own natural attempt to conserve energy **until the stressor can be eliminated**. Although this long-term stress response is natural and intended to increase chances of survival, it does alter the body.

If this stress response stays on for a prolonged time, the body can break down. This breakdown then opens the door for other diseases to attack.

Discomfort from illness tends to come from 3 sources:

(1) The triggering event itself (e.g., pain from an auto accident)
(2) The body's **adaptation** to stress (e.g., fatigue)
(3) The open door to other diseases

Whether the symptoms from these 3 sources can be fully reversed or rehabilitated is still not fully known. We currently have good therapies for acute stressors and chronic diseases, but we know less about how to reverse the effects of the long-term stress response. It is thought that **behaviorally oriented treatments,** like self-management, are a good option.

Once bitten…. **It is likely that self-management can help to reverse the body alterations caused by the long-term stress response. BUT the body may remain sensitized to stressors. That is, it may be more vulnerable to future stressors because of having previously dealt with a long-term stressor.** This vulnerability makes it easier to trigger a subsequent long-term stress response. Thus, it is likely that the techniques discussed in each unit will need to be used over an extended time period in order to manage the long-term stress response.

So what can be done about the stressor and the stress response?
Some people would like to eliminate stress from their lives. Besides being practically impossible, this is not recommended because some stress is actually helpful. For example, you need some acute stress (challenges) in order to be motivated. Life would be dull if there were no challenges. A dull life is a stressor.

Now, let's focus on two stress management skills:

1) **Tracking stressors**
2) **Deep Breathing**

Refine your Tracking Skills: Tracking Your Stressors

Purpose: to track your body's response to stressors.
Goal: to learn what stressors in your life lead to increased symptoms.

STEP 1: Make a note of the stressors you are aware of each day.

STEP 2: Note how the stressor affects your body and functioning level (using your personal discomfort ratings, 0 to 10). Do you think the stressor triggers the acute or the long-term (chronic) stress response? Here's an example.

Personal Tracker (sample)

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
Acute Stressor: **Rushing to get to an appt.** **Rating: 6** My memory got worse & headache increased after trying to rush in heavy traffic.		**Acute Stressor:** **Holiday Shopping** **Rating: 9** I almost can't function for 24 hours after each shopping day.		**Chronic Stressor** **Fear of Job Loss** due to health **Rating: 7** Feeling increasingly exhausted.		**Acute Stressor:** **Family tension about holiday plans** **Rating: 8** Increased headache, more pain, & fatigue

THE RELAXATION RESPONSE

The relaxation response is perhaps one of the most important skills you will use to gain control over your body. Research on the relaxation response has shown that this simple technique can:

Increase energy
Decrease muscle tension
Improve decision-making ability
Improve sleep
Increase arousal from a drowsy state
Increase motivation
Enhance productivity
Reduce fatigue
Lower blood pressure

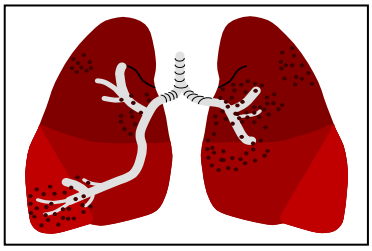
The Relaxation Response is:

- A mentally active process that leaves the body relaxed
- Best done in an awake state
- Trainable and becomes more and more profound with practice

There are many ways of achieving the relaxation response.
If you like the idea of learning ways to manage your response to stress through the relaxation response, additional methods are covered in the "Relaxation" self-study module.

Some other relaxation techniques are:

- Progressive Muscle Relaxation (PMR)
- Visual Imagery
- Meditation
- Hypnosis
- Yoga



In this module, we introduce one quick and effective version of the relaxation response: breathing relaxation, or deep breathing. Also called "diaphragmatic breathing," this type of breathing is a more relaxed form of breathing. It leads to:

- Fewer breaths each minute
- Greater amount of oxygen in the blood
- Improved blood circulation

Breathing Relaxation

It may seem strange, but many people breathe incorrectly. When stressed, people tend to breathe shallowly. That is, they chest breathe. Chest breathing actually causes muscles to tighten and conflicts with good relaxation.

How do I do deep breathing?

LEARN A NEW SELF-MANGEMENT SKILL:
Deep Breathing

Purpose: to learn a brief, effective skill for managing symptoms of stress.

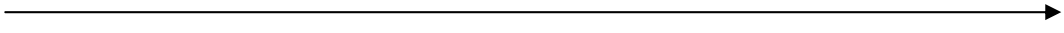
Goal: to notice symptoms of stress and to use deep breathing regularly to minimize those symptoms.

STEP 1: focus on breathing through your abdomen (your belly, below your navel). As you breathe in through your nose, push the air down into your belly, as if it were a balloon you are blowing up. Hold the breath very briefly.

STEP 2: exhale through your slightly open mouth. Try to make the breath out slow, steady, and smooth. Exhale all the air out and pause briefly before breathing in again. This may feel awkward at first, but with practice it will feel comfortable and relaxing.

SKILL: Track your Stressors AND your Deep Breathing

1) Note your daily stressors and the amount of tension they produce.
2) Place a check for each day that you practice deep breathing. Your goal is to deep breathe once per day **for at least 15-20 breaths**.
3) Rate the amount of tension you feel after the exercise. Regular deep breathing is recommended to help you minimize your stress reactions throughout your day.

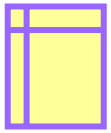


0 1 2 3 4 5 6 7 8 9 10

No Tension **Highest Tension**

GOAL: **Deep Breathing 1X per day**	Day1 0-10	Day2 0-10	Day3 0-10	Day4 0-10	Day5 0-10	Day6 0-10	Day7 0-10
Note your daily **stressors** and **rate the discomfort** they produce	Rushing to get to an appt. **Rating: 6** My memory got worse & head-ache increase-ed after trying to rush in heavy traffic.	Making dinner when tired. **Rating: 5**	Holiday Shop-ping **Rating: 9** I almost can't func-tion for 24 hours after each shop-ping day.	Meet-ing a dead-line at work **Rating 9**	Fear of Job Loss due to health **Rating 7** Feeling ex-haust-ed.	Rush hour traf-fic **Rating 6**	Family ten-sion about holi-day plans **Rating 8** In-creas-ed head-ache, more pain, & fatigue
Place a **check** for each day you practice **deep breathing**	✓	✓	✓	✓	✓	✓	✓
Rate Tension **after breathing**	5	4	6	5	6	4	4

- Stressors come in many forms. Everyone is different in terms of what triggers their stress response.
- The acute stress response is designed to deliver energy for eliminating stressors.
- If stressors can't be eliminated, the long-term stress response becomes active.
- The long-term stress response focuses on energy conservation.
- The stress response is designed to change the body in ways that help the individual adapt to a chronic stressor.
- While the long-term stress response system is protective, it comes at a cost. Over time these changes can lead to the body breaking down and making way for other diseases.
- Relaxation techniques like deep breathing can reduce the effects of stress on our minds and bodies. TRACKING your deep breathing and tension levels, allows you to see that efforts to reduce stress reactions can pay off.
- Dealing with stressors on an ongoing basis prevents the build-up of chronic problems and stress reactions that can trigger the long-term stress response.



SKILL: Track your Stressors AND your Deep Breathing

Step 1) Note your daily stressors and the amount of tension they produce.

Step 2) Place a check for each day that you practice deep breathing. Your goal is to deep breathe once per day **for at least 15-20 breaths**.

Step 3) Rate the amount of tension you feel after the exercise. Regular deep breathing is recommended to help you minimize your stress reactions throughout your day.

GOAL: Deep Breathing 1X per day	Day1 0-10	Day2 0-10	Day3 0-10	Day4 0-10	Day5 0-10	Day6 0-10	Day7 0-10
Note your daily **stressors** and **rate the discomfort** they produce							
Place a **check** for each day you practice **deep breathing**							
Rate Tension **after breathing**							