How the Brain Responds to Threats

Sometimes, "thinking before acting" is a near impossible task. When we feel triggered and begin to feel flooded by emotions, it may seem too late to prevent ourselves from acting on impulses. In such moments, we may not become aware of what we were thinking or feeling in that moment until after we have already acted. Later, when we calm down or regulate, we may have thoughts such as, "I don't know what I was thinking (or feeling, or doing)," or even "I can't remember what happened." Understanding how the brain responds to stress and threats helps us understand why it may be difficult to think through a situation before responding or acting.

The brain is an amazing organ, capable of memorizing details from our recent or distant past and making decisions based on what we have learned from those memories. For example, some people or events "remind us" of others from our past. This "reminiscence" can activate our emotional memory systems in the brain and can trigger feelings, such as fear, excitement, joy, sadness, anxiety, and anger. Underlying these feelings, our memories can also trigger physiological (body-based) responses, such as racing heartbeat, shallow breathing, sweaty palms, dizziness, upset stomach, muscle tension, and tearfulness, to name a few. We can become emotionally distressed when a person, place, or situation in our environment preconsciously reminds us of a perceived threat/danger in the past, activating our emotional memory system and causing us to react as if the threat were present in real time, even if it is not.

The Cycle of Regret

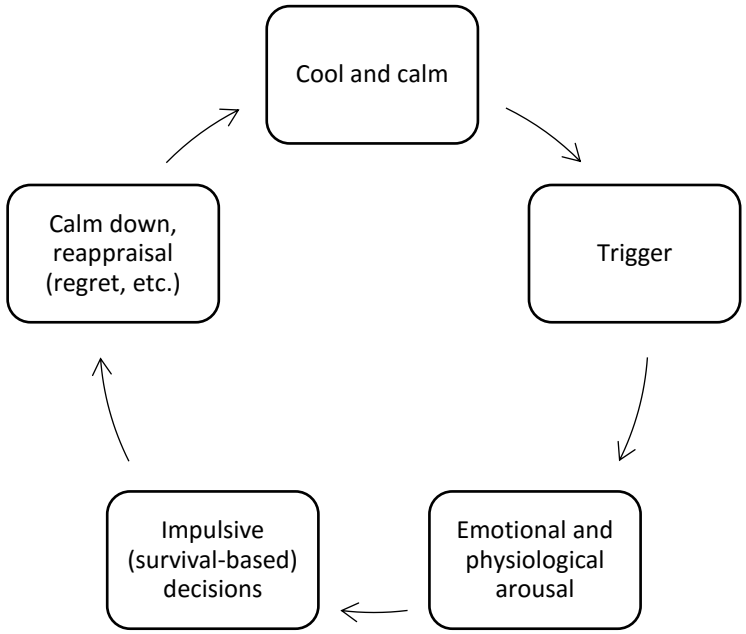


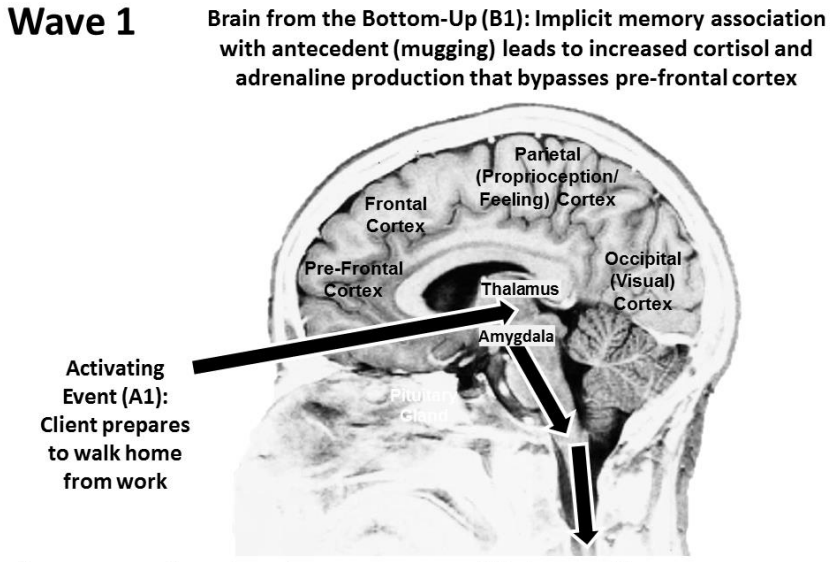
Figure 1. The cycle of regret.

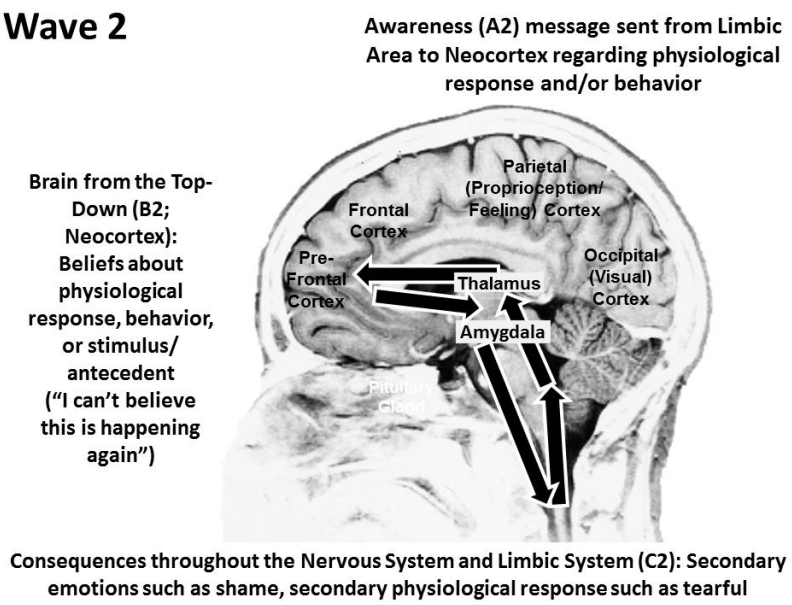
The diagram above in Figure 1 depicts the "cycle of regret" that many of us experience. At the beginning of the cycle, we feel cool and calm until a trigger or perceived threat appears in our environment. In response, we become upset and emotional as the body releaes "stress hormones" such as adrenaline and cortisol into our system.

Sensing a threat, the brain and body prepares for action – either to attack ("fight"), or leave the situation and avoid ("flight"). In cases when the body is overwhelmed by stress, and fighting or fleeing no longer do not seem possible, the body may feel unable to choose between those impulses ("freeze"). When the brain begins to process information more quickly, we tend to react automatically to attack or avoid before the rational part of the brain has a chance to evaluate the options available to us. After all, this is a natural, survival based response. Thinking through our options when we are truly in a life or death situation, would likely spell certain death. Yet when the threat is not valid, but we react automatically, those reactions are not helpful to the situation and even harmful. Sometimes it is not until after these behavioral choices are made, that we can calm down and evaluate our decisions. Having acted in ways that were unhelpful or harmful can often lead us to feeling embarrassed, regretful, or even ashamed, even if those reactions were intended to keep us safe. Unless we learn to interrupt this cycle, we risk having it repeat and experiencing the same negative consequences the next time a similar trigger enters our environment.

Wave1 and Wave2

The following is an example of how the brain adapts to stress and threat in its environment. One evening, a person walks home from work and is mugged unexpectedly. After that incident, their brain learns to become acutely sensitive to threats in their environment. Every day following the mugging incident, the act of preparing for their walk home causes the person to become physiologically "triggered," with epinephrine (adrenaline) and cortisol production causing an increase in heart rate, sweaty palms, shallow breath, anxiety, and feeling "frozen" as if they cannot walk (*Wave1*). The person becomes aware of their physiological, emotional, and behavioral response, developing beliefs about this ("I can't believe this is happening again," "I should be able to do this"). As a result of these beliefs, the person can feel shameful and become tearful (*Wave2*). The diagrams below depict this process in the brain.





Why Does the Brain Work this Way?

As mentioned above, the brain is a complex organ capable of recalling events and details without our consciously awareness. The brain protects us by responding instinctively to perceived threats in our environment. It is theorized that the brain's sensitivity to perceived threats was initially a survival strategy to protect humans from danger in their environment. For example, early humans needed to attack or avoid a wild animal approaching them to protect themselves from danger. Today, this survival mechanism continues to protect us from being hurt or injured by our environment or others. Again, the brain's quick response to threats is therefore *adaptive*. However, in the modern world, this sensitivity to perceived threat can be *maladaptive*, meaning that a person can perceive threat (e.g., environmental trigger, etc.) when none is present, resulting in unnecessary and perhaps undesired emotional distress and unwanted behaviors.

The brain adapts when learning new behaviors, too. When we learn something new for the first time, we tend to concentrate better and are more aware of ourselves and our reactions. Over time, some behavioral responses can become "automatic." For example, a person who has been driving for ten years might have little awareness of the specific behaviors involved with driving a car such as moving foot pedals, checking side mirrors, and indicating to turn, because they "do it all the time." Automatic responses can lead to behaving without complete awareness, or "acting without thinking." Examples include becoming verbally or physically aggressive when feeling threatened or afraid, biting nails when stressed, and becoming stuck or "frozen" when feeling anxious about making a decision.

What Can I Do About It?

Getting in touch with our physical responding helps us to develop an awareness of when we are feeling threatened in our environment ("triggers"), slow down responses, calm our physiological responding, and acknowledge our thoughts and feelings in the moment without immediately acting on them. The skills below help us to reduce the potential for acting on emotionally-driven survival impulses:

Wave1 Strategies

1. **Supporting optimal brain health and preventing neurophysiological susceptibility.** Certain life style habits reinforce the brain and body's optimal ability to cope with threats and stressors in an adaptive manner. Areas of focus include sleep time, physical time, focus time, down time, time-in, play time, connection time, adequate and healthy nutrition. Use the handout on supporting optimal brain health and preventing neurophysiological susceptibility to learn more about each area, track current practices, and plan for the integration of these activities into daily life.
2. **Sensory-based coping.** Identify a pleasant sensation that you can easily experience in daily life. Hold a warm drink, stroke your hand lightly with your forefinger, feel the sun or wind on your skin, chew gum. These help you to become more aware of your sensory input and how your body feels in this moment.
3. **Mindfulness practice.** Breathe in deeply. Pay attention to your breath. Noticing how you feel inside of your body. Observe three new things around you. Try to hear three new things in your environment.
4. **Anchoring.** Pair a pleasurable experience with a physical anchor, and practice until you experience the same sensation/feelings even outside of the original experience.
5. **Systematic desensitization.** The experience of gradually exposing yourself to situations when you would normally become triggered and overwhelmed can be helpful in training yourself to not automatically respond. If you have experienced trauma, it may be especially important to proceed very slowly with this practice and work in conjunction with a mental health provider.
6. **Neurofeedback and biofeedback.** This is a more technical intervention that involves training your brain and body to operate in a more relaxed and aware state through feedback about your brain and body's current responding.

Wave2 Strategies

1. **Connecting behaviors and feelings to physiological states.** Ask yourself, "if my body could talk, what would it say and why?" Listen to the relationship between body and emotion/behavior, to understand our reactions.
2. **Counting your pulse.** Using a timer, count your pulse for 60 seconds by placing your index and middle finger onto the wrist of your other arm or your neck. Usually, an adult heart rate (HR) above 80 beats per minute (BPM) indicates that epinephrine (adrenaline) has been released, causing you to feel ready for action. You are at-risk of reacting automatically! Leave the situation and wait until your HR is less than +20 BPM over your resting HR.
3. **Self-acceptance and compassion**. Accept your current physical and emotional experiences without judgment. Your body knows what it is doing! Be kind to yourself in light of past events. Ride the wave.
4. **Reappraising past events.** Ask yourself what you have learned from that experience. Consider your current experiences as a way to challenge your past thinking about the situation.