THE ANATOMY OF ANXIETY

What Triggers It...

When the senses pick up a threat—a loud noise, a scary sight, a creepy feeling—the information takes two different routes through the brain.

A. The Shortcut

When startled, the brain automatically engages an emergency hotline to its fear center, the amygdala. Once activated, the amygdala sends the equivalent of an all-points bulletin that alerts other brain structures. The result is the classic fear response: sweaty palms, rapid heartbeat, increased blood pressure and a burst of adrenaline. All this happens before the mind is conscious of having smelled or touched anything. Before you know why you’re afraid, you are.

B. The High Road

Only after the fear response is activated does the conscious mind kick into gear. Some sensory information, rather than traveling directly to the amygdala, takes a more circuitous route, stopping first at the thalamus—the processing hub for sensory cues—and then the cortex—the outer layer of brain cells. The cortex analyzes the raw data streaming in through the senses and decides whether they require a fear response. If they do, the cortex signals the amygdala, and the body stays on alert.

- Auditory and visual stimuli: Sights and sounds are processed first by the thalamus, which filters the incoming cues and shunts them either directly to the amygdala or to the appropriate parts of the cortex.
- Olfactory and tactile stimuli: Smells and touch sensations bypass the thalamus altogether, taking a shortcut directly to the amygdala. Smells, therefore, often evoke stronger memories or feelings than do sights or sounds.
- Thalamus: The hub for sights and sounds, the thalamus breaks down incoming visual cues by size, shape and color, and auditory cues by volume and dissonance, and then signals the appropriate parts of the cortex.
- Cortex: It gives raw sights and sounds meaning, enabling the brain to become conscious of what it is seeing or hearing. One region, the prefrontal cortex, may be vital to turning off the anxiety response once a threat has passed.
- Amygdala: The emotional core of the brain, the amygdala has the primary role of triggering the fear response. Information that passes through the amygdala is tagged with emotional significance.
- Bed nucleus of the stria terminalis: Unlike the amygdala, which sets off an immediate burst of fear, the BNST perpetuates the fear response, causing the longer-term unease typical of anxiety.
- Locus ceruleus: It receives signals from the amygdala and is responsible for initiating many of the classic anxiety responses: rapid heartbeat, increased blood pressure, sweating and pupil dilation.
- Hippocampus: This is the memory center, vital to storing the raw information coming in from the senses, along with the emotional baggage attached to the data during their trip through the amygdala.

For the full article click here: The Science of Anxiety

Source: Dennis S. Charney, M.D., National Institute of Mental Health

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