Physiology of Anger

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Like other emotions, anger is experienced in our bodies as well as in our minds. In fact, there is a complex series of physiological (body) events that occurs as we become angry.

Emotions more or less begin inside two almond-shaped structures in our brains which are called the amygdala. The amygdala is the part of the brain responsible for identifying threats to our well-being, and for sending out an alarm when threats are identified that results in us taking steps to protect ourselves. The amygdala is so efficient at warning us about threats, that it gets us reacting before the cortex (the part of the brain responsible for thought and judgment) is able to check on the reasonableness of our reaction. In other words, our brains are wired in such a way as to influence us to act before we can properly consider the consequences of our actions. This is not an excuse for behaving badly - people can and do control their aggressive impulses and you can too with some practice. Instead, it means that learning to manage anger properly is a skill that has to be learned, instead of something we are born knowing how to do instinctually.

As you become angry your body's muscles tense up. Inside your brain, neurotransmitter chemicals known as catecholamines are released causing you to experience a burst of energy lasting up to several minutes. This burst of energy is behind the common angry desire to take immediate protective action. At the same time your heart rate accelerates, your blood pressure rises, and your rate of breathing increases. Your face may flush as increased blood flow enters your limbs and extremities in preparation for physical action. Your attention narrows and becomes locked onto the target of your anger. Soon you can pay attention to nothing else. In quick succession, additional brain neurotransmitters and hormones (among them adrenaline and noradrenaline) are released which trigger a lasting state of arousal. You're now ready to fight.

Although it is possible for your emotions to rage out of control, the prefrontal cortex of your brain, which is located just behind your forehead, can keep your emotions in proportion. If the amygdala handles emotion, the prefrontal cortex handles judgment. The left prefrontal cortex can switch off your emotions. It serves in an executive role to keep things under control. Getting control over your anger means learning ways to help your prefrontal cortex get the upper hand over your amygdala so that you have control over how you react to anger feelings. Among the many ways to make this happen are relaxation techniques (which reduce your arousal and decrease your amygdala activity) and the use of cognitive control techniques which help you practice using your judgment to override your emotional reactions.

If anger has a physiological preparation phase during which our resources are mobilised for a fight, it also has a wind-down phase as well. We start to relax back towards our resting state when the target of our anger is no longer accessible or an

immediate threat. It is difficult to relax from an angry state, however. The adrenaline-caused arousal that occurs during anger lasts a very long time (many hours, sometimes days), and lowers our anger threshold, making it easier for us to get angry again later on. Though we do calm down, it takes a very long time for us to return to our resting state. During this slow cool-down period we are more likely to get very angry in response to minor irritations that normally would not bother us.

The same lingering arousal that keeps us primed for more anger also can interfere with our ability to clearly remember details of our angry outburst. Arousal is vital for efficient remembering. As any student knows, it is difficult to learn new material while sleepy. Moderate arousal levels help the brain to learn and enhance memory, concentration, and performance. There is an optimum level of arousal that benefits memory, however, and when arousal exceeds that optimum level, it makes it more difficult for new memories to be formed. High levels of arousal (such as are present when we are angry) significantly decrease your ability to concentrate. This is why it is difficult to remember details of really explosive arguments.

Anger vs. Fear

We said above that anger is a sort of transformation of pain, a category including fear feelings as well as physical pain. Considered physiologically (from the perspective of the body), there are a great number of common characteristics shared by anger and fear. Both emotions are characterized by similar central nervous system arousal. In large part, it is our psychological interpretation of arousal feelings that determines whether we will feel fear, anger, or a combination of both.

Think about your own experiences with fear and anger. What does it mean when you experience that sinking feeling in your stomach, sweat on your brow and nervous palpitation of your heart? These physiological symptoms can be signs that you are afraid, angry, or both. In fact, it can be difficult to tell anger apart from fear if you discount the presence of anger-triggering thoughts. In order to determine what specific emotion you are feeling, you need to examine the contents of your thoughts. What you are thinking is the surest way to figure out whether you are primarily angry or afraid.

Though very similar, the physical manifestations of anger and fear are not entirely identical. While heart rate goes up in both anger and fear, skin temperature and electrical conductance (how easily your skin conducts a mild electric current) react differently, increasing when you are angry, and decreasing when you are frightened. This is why some people say they are “hot headed” when angry and “cold and clammy” when afraid. It is not always the case that angry people get hotter and frightened people get colder, however, so paying attention to how anger and fear affect you personally is a good idea. You'll be able to use this sort of information to better manage your anger.