

Emotion and Learning

Research in the field of Education has shown that emotion is fundamental to learning. Patricia is a student who has had repeated trouble with mathematics homework. When Patricia's teacher asks her to solve a problem on the board, she is scared because of her past experience of failure and her fear of humiliating herself in front of the boy she likes (Hinton, 2008). The emotional feelings that Patricia has prevent her from being able to concentrate, therefore affecting her ability to learn. The fact that Patricia's fearful emotions prevent her from learning are due to the anterior attention system and the fact that emotion and attention are heavily related. Furthermore, emotion is also connected to one's memory through attention and information processing. In addition, emotion is becoming an increasing factor and form of decision-making in both survival and learning. Emotion is important to learning because it effects a student's ability to pay attention and to learn, it effects a student's ability to remember information through the information processing model, and it is becoming an increasing evolutionary factor in survival and decision-making.

The interaction between cognitive and emotional processing demonstrates one of the reasons why emotion is important to learning. Research suggests that, attentional processes associated with the Anterior Attention System regulate both cognitive and emotional processing (Bell, 2004). The Anterior Attention System is housed in the Anterior Cingulate Cortex. It consists of two subdivisions. The two subdivisions are the cognitive subdivision which deals with cognitive processes and the affective subdivision which deals with emotional information (Bell, 2004). The cognitive subdivision is interconnected with the prefrontal cortex, which is responsible for working memory, attention, inhibitory control, decision-making, and planning. The affective subdivision is interconnected with the medial temporal lobe including the amygdala, hippocampus, and the hypothalamus. The processes of cognition and emotion interact through activation and suppression. When one area is active, the other subdivision is suppressed. This means that when the affective subdivision is active and the cognitive subdivision is suppressed, it is difficult for one to pay attention. If someone is not paying attention, they are not learning. The implication of the Anterior Cingulate cortex's subdivisions relate back to Patricia. Because of Patricia's fear that was associated with mathematics the affective subdivision that is responsible for emotional information was highly active while her cognitive subdivision responsible for cognitive information was suppressed. Patricia was unable to focus on the math problems due to her emotions. Also, Patricia is not just learning the math. She is learning the fear for the math and long-term potentiation is occurring. Patricia will now have a fear of math and she will have to unlearn her fear of math to be able to successful at math (Hinton, 2008). Furthermore, in the Posner article, attention training tests were given to four-year-olds. These tests were modeled after a test used to train rhesus monkeys for space travel. The exercises begin by training the child to control the movement of a cat animated on a computer screen by using a joystick. After testing, a change was seen in the anterior cingulate cortex, the area that is involved in emotional regulation as opposed to the pre-frontal cortex which deals with emotional regulation. After the test, the anterior cingulate cortex of the children was developed more similarly to an adult's than a child's. This implies that emotional regulation is a key component to

attention and focus which is directly correlated with learning (Posner, 2005). Through the study of the anterior attention system, we are shown that the relationship between emotion and cognition is fundamental to learning. There must be a healthy balance between emotion and cognition to allow for maximum learning.

The emotional connections to memory demonstrate another reason why emotion is fundamental to learning. One of the reasons that emotion is connected to memory is the fact that consciousness and attention is fundamental to both sensory memory and working memory. Without someone paying attention they will not be able to take in all of the stimuli that is going on around them and it will not be stored in sensory memory. The same is true for the transition between sensory memory and working memory. Attention is required in order to commit items to working memory. With the two subdivisions of the Anterior Attention system interacting through suppression and activation, emotion in learning has further implications for memory. When the cognitive subdivision is suppressed and the affective subdivision is active it may be hard to pay attention to the information therefore making it nearly impossible for this information to be remembered. Furthermore, it is easier to remember and process information if there is an emotional context, meaning, or story behind it. Encoding the material based on its meaning and emotional tone is much more effective than processing the word in terms of its appearance (Baddeley, 2010). This is particularly important when doing maintenance or elaborate rehearsal. If one attaches emotional meaning to what they are learning and studying it will be easier for that individual to remember the information. Additionally, the more that one relates to the information that is in working memory the more likely that information is going to move into long-term memory. The misinformation effect is also something that has implications for education. If someone is undergoing an event and their affective subdivision is active and their cognitive subdivision is suppressed they may have trouble paying attention to all of the details. In the misinformation effect, an event happens, then a distortion happens, the distortion is practiced, said over and over again and “remembered” but it is remembered incorrectly (Loftus and Bernstein, 2005). In education, the misinformation effect could cause a student to learn and then remember information incorrectly and then long-term potentiation will occur and it will be hard for the student to unlearn the information.

The evolutionary contribution of emotion to learning and survival goes back to the beginning of time. “The original purpose for which our brains evolved was to manage our physiology, to optimize our survival and to allow us to flourish. When one considers that this purpose inherently involves monitoring and altering the state of body and mind in increasingly complex ways, one can appreciate that emotions, which play out in body and mind, are profoundly intertwined with thought” (Immordino-Yang, 2007). Every organism has survival instincts that allow them to maintain themselves for a certain life span and seek conditions that will allow them to thrive (Immordino-Yang, 2007). Emotions are nature’s answer to the question of surviving. Our brain has evolved to cope with reading what is happening to the body and responding accordingly. The brain does this through emotion. Furthermore, the basic needs of survival include a way of dealing with thoughts, ideas, using the imagination and creating. The basis of this decision-making process dealing with thought, ideas, imagination, and creating is emotion (Immordino-Yang, 2007). Emotion is therefore fundamentally important to learning. From an evolutionary perspective, emotion is becoming a key-factor in our decision-making, our

imagination, our creativity, and our thoughts and ideas. All of these elements are essential and important in learning.

As can be seen through the discussion of articles by Hinton, Bell, Posner, Baddeley, Loftus, and Immordino-Yang, emotion is important to learning. Emotion is fundamental to learning because it effects a student's ability to pay attention and to learn, to remember information throughout the information processing model, and it is becoming an increasing factor in decision-making and survival.

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