

# 1. THE ROLE OF EMOTIONS, PERSONALITY, AND THE BRAIN



*“Emotional self-control - delaying gratification and stifling impulsiveness - underlies accomplishment of every sort” – Daniel Coleman*

## OVERVIEW

In this module, we will cover the following topics:

- How emotions and personality are linked to behavior and wellbeing
- Cognitive cycle and ABC model
- Personality types and beliefs
- The role of the brain in emotions
- Chemicals, hormones, and emotions
- Brain plasticity and emotional functioning

## **ROLE OF EMOTIONS AND PERSONALITY IN BEHAVIOR AND WELLBEING**

It is a widely accepted fact that there is a profound link between inner experiences—thoughts, feelings, and emotions—and behavior, which again influences personal performance, mental health and well-being, and interpersonal relationships. This is especially the case when emotions are negative or unstable.

Evolutionary psychologists have determined that thoughts, feelings, and emotions are generated—mostly subconsciously—in order to elicit a quick instinctive reaction to a perceived external event. This happens by activating core beliefs, which are sets of rules that we develop over time in order to facilitate such instinctive responses for our protection and survival.

When a situation is encountered that seems similar to any experienced before, our core beliefs and schemas come into play and motivate behavior through thoughts and feelings. Schemas comprise of patterns or themes of core beliefs and constitute the attitude through which we view ourselves, others, and the world. For example, having experienced adverse or negative events repeatedly, we may come to believe that we are unsafe and unloved, that nobody can be trusted, everyone is out to harm us, and the world is a hostile place.

Therefore, in the context of a perceived event, core beliefs and schemas enable us to interpret its meaning and likely consequences. This produces thoughts and feelings, often on an instinctive level. As a direct result we experience physiological sensations (e.g. headaches, stomach upset, dizziness, shortness of breath, and sweating) and when we have difficulty moderating or regulating our emotions, it is expressed as behavior.

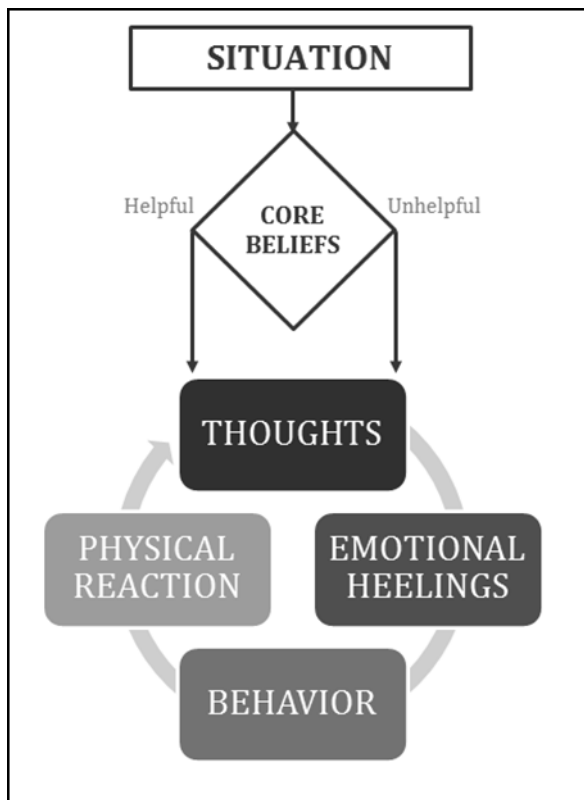
### **COGNITIVE BEHAVIORAL THEORIES**

Therefore, core beliefs, thoughts, and feelings are core components of behavior and emotions. The latter happens due to a response to our interpretation of a specific trigger such as an event or situation. A fraction of a second after identification of the trigger with the help of our core beliefs, chemicals are released in our brain and bodies to help stimulate the response that is deemed necessary.

When we become aware of the emotion, we start to think about it and consciously feel it. These thoughts and feelings then provide the

intrinsic motivation to act. When we are not able to moderate or regulate the core beliefs → emotions → thoughts → feelings → behavior process properly, our behavior becomes dysfunctional and maladaptive. To make matters worse, others are likely to respond negatively to our unhelpful behavior, which creates negative feedback and it exacerbates our negative experience and reinforces our already defeatist core beliefs. This basic cognitive cycle is illustrated in Figure 2.1.

Figure 2.1 – *Cognitive Cycle*



This cognitive model is known as the ABC model and is still used today to understand the process between cognitions and behavior and intervene when it is dysfunctional. In the 1950s and 1960s Albert Ellis, an American psychoanalytic psychotherapist, developed the Rational Emotive Behavior theory that explained dysfunctional behavior in terms of irrational thinking and feelings that are the consequences of the instinctive interpretation of real or perceived situations. This laid the foundation of his ABC model of psychotherapy that later became the central principle of cognitive theory.

Initially the ABC model only focused on the way an activating event (A) triggers beliefs that presents as habitual thinking (B). These thoughts cause emotions and feelings that have the sole purpose to motivate and cause a reaction or behavior (Consequence = C).

In turn, the resulting behavior is received by others in our immediate environment and causes feedback. In terms of negative or dysfunctional behavior, the feedback is mostly also negative, which is perceived as punishment or that our negative beliefs are confirmed as valid. Therefore, negative beliefs that give rise to dysfunctional behavior also tend to be reinforcing and self-sustaining. In fact, a deteriorating cycle of distress is often a result from which it is difficult to break free.

Therefore, core beliefs can lead to helpful and un-helpful thinking, which determines the nature of the emotions and feelings that are generated as a result. Such negative core beliefs are most often associated with repeated distressing experiences in our past.

Although defensive or survival-mode thinking may have served a purpose at the time, it can easily become out of sync with our reality and our true identity later on, and continue to exert great harm on ourselves and others in our lives. Therefore, thoughts and feelings are very important signals to how we interpret and react to certain situations. By identifying and understanding those thoughts and thinking patterns that are unhelpful, a person is empowered to challenge them, and eventually redirect them to functional alternatives.

In order to make such positive changes, it is required that a person becomes aware and understands their own and others' emotional experiences. This enables them to manage their own emotions and influence others' emotions positively. These skills are a critical part of emotional intelligence (EI) and as such, most of the focus of the development of EI is on learning to recognize, understand, and regulate emotions instead of allowing it to overwhelm us and suppress it or express it in unhelpful ways.

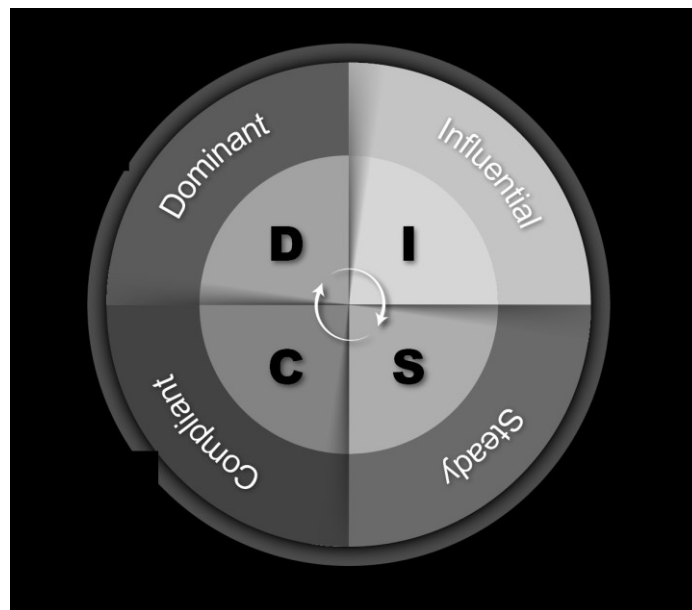
## PERSONALITY THEORIES

According to the American Psychological Association (APA), personality refers to “individual differences in characteristic patterns of thinking, feeling and behaving. The study of personality focuses on two broad areas: One is understanding individual differences in

particular personality characteristics, such as sociability or irritability. The other is understanding how the various parts of a person come together as a whole.” There is a wide variety of personality classifications and models, including the Five Factor Model, the Briggs Myers’ 16 Personality Factors, DISC Personality Profiles, and psychiatric classifications (e.g. DSM-5 and ICD-10). The current version of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) is used for psychiatric diagnoses in North America, while the World Health Organization’s International Classification of Diseases, 10<sup>th</sup> revision (ICD-10) is mostly used in Europe and the Far East.

Generally each classification was developed for a different application and context and has a different level of complexity. For the purpose of the current illustration, the four main personality type profiles of the DISC method will be used: dominant, influential, steady, and compliant (see Figure 2.2).

Figure 2.2 – *DISC Personality Types*



Personality styles are closely linked to core beliefs and schemas as it determines our habitual attitudes and reactions to external events. As such, it is represented by patterns in our behavior, style of interactions and relationships with others, and our default decision-making approaches. Although the People Focus and Reflective dimensions in the DISC profiles can be associated more with elements of emotional intelligence (i.e. recognizing, understanding, and managing emotions), this is not necessarily the case.

A *dominant personality* with low EI skills can be domineering, demanding, and influential through threats and coercion rather than assertiveness. An *influential personality* can be out of tune or simply disinterested in others' emotions and come across as impulsive and irritating when in the pursuit of his own interests. A *steady personality* style is usually supportive, sincere, and sensitive—all features of a high emotional intelligence—can also be insecure and dependent, and depressed, which are hallmarks of a lack of the ability to recognize and manage own emotions. The *conscientious or compliant personality* can be obsessive, secretive, calculating, and condescending—also aspects of deficient emotional intelligence skills.

Therefore, personality style is determined by a common theme of core beliefs, such as:

**Dominant:** “I (and my results) am more important than you (and your feelings).”

**Influential:** “Attention is more important than values and feelings.”

**Steady:** “I cannot handle change and pressure.”

**Compliant:** “If I don't control everything, I will fail.”

For this reason, most people of any personality style have areas in recognizing, understanding, and moderating and managing their own and others' emotions that need further development. In the process to improve emotional intelligence, the heightened awareness and understanding of emotions, will also involve an exploration and identification of unhelpful beliefs that block emotional intelligence. Exercises and training can then be utilized to redirect these beliefs to healthier alternatives, which will also benefit the ability to manage emotions—a core component of emotional intelligence.

### **Exercise 2.1**

Explain briefly how personality relate to emotional intelligence.

*Answers can be found at the end of the module*

**Now watch this video**

**Emotional Intelligence: From Theory to Everyday Practice**

[1:02:28]

Yale University

<https://www.youtube.com/watch?v=e8JMWtwdLQ4>



**THE ROLE OF THE BRAIN IN EMOTIONS**

It is now a widely accepted fact that all the feelings and emotions that people experience are produced through chemical changes in the brain. Emotions such as joy, love, sadness, anger, and fear occur through complex chemical processes. There are a large variety of chemicals and hormones—not only in the brain, but in the body (e.g. the endocrine system) as well—that are involved in an integrated system to help regulate our bodies and emotions. It is a quick process, but with many pathways, and although technically not consecutive, it can be represented by the following simplified chain reaction (of course many such processes overlap at any one time in our body and brain):

Event → interpretation → chemical release → emotions → chemical release → thoughts and feelings → behavior → feedback

It is important to realize that chemicals and hormones are released and distributed throughout the sequence, both as cause and effect of events, our instinctive interpretation thereof, and resulting emotions.

## CHEMICALS AND HORMONES

The presence of varying levels of chemicals and hormones in our bodies are closely associated with our emotions at any time. Most are secreted in the brain, although different glands and organs in the body also produce some. Examples are the thyroid, adrenal glands, pancreas, ovaries, and testes. Hormones are chemicals that act like messengers in the body, giving orders for particular action, such as regulating fighting, mating, and fleeing instincts, generate feelings such as happiness and sadness, and speed up or slow down the metabolism.

The Emotional Brain, known as the Limbic System, is a grouping of related components surrounding the Brain-Stem and lying beneath the Neocortex. These ancillary artefacts include the Hypothalamus, the Amygdala, and the Hippocampus. Although certain activities and properties are centred in each part, it must be emphasised that although each of these artefacts are discrete constructions in themselves, they, as in all things in the natural world, act not in isolation but as part of an integrated system.

Where hormones have a wide variety of functions related to every activity of daily living, including moods, neurotransmitters are only involved with the transmission of nervous impulses. Although less directly, neurotransmitters also have an influence on emotions. Interactions between neurotransmitters, hormones, and the brain chemicals have a significant impact on overall health and well-being. When our concentration and focus is good, we feel more directed, motivated, and vibrant. Unfortunately, if neurotransmitter levels are inadequate these energizing and motivating signals are absent and we feel more stressed, sluggish, and out-of-control. Therefore neurotransmitters play a role to regulate sleep, stimulate hormone production, control the ability to focus, concentrate, and remember, and help modulate our thought and mood processes.

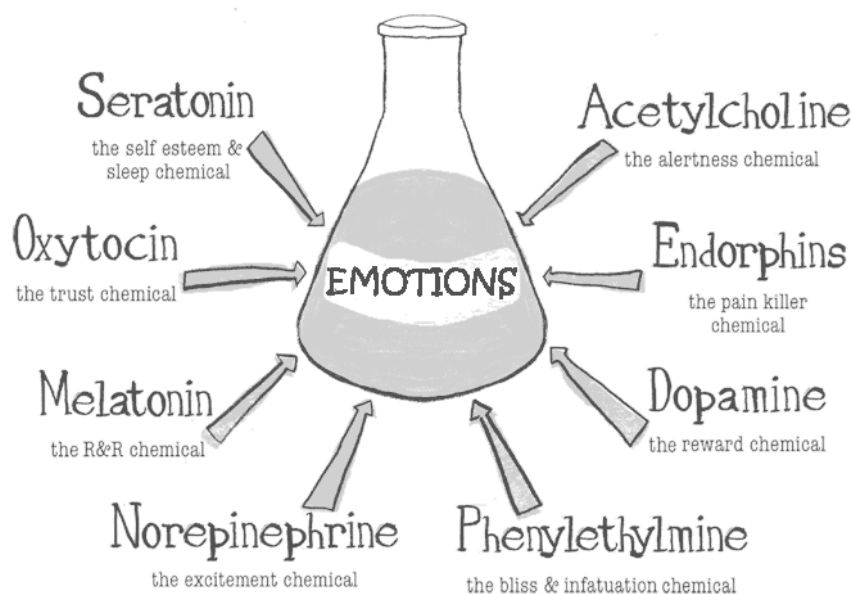
In the brain, the hypothalamus, hippocampus, and amygdala are the most closely linked with emotions. The *Hypothalamus* triggers the



physical manifestations such as the pounding heart and dry mouth that come with fear. The *Hippocampus* is responsible for our memories of incidents that carry a strong emotional flavor.

The *Amygdala* influences the manners in which we behave when emotionally aroused. For example, laughing when happy, and crying when distressed. It is particularly active in emotional reactions associated with fear, anger, flight and defense.

These parts of the brain are the hardware, the chemicals that they use as communicators may be considered as being our software. As such, there are many hormones and chemicals that work together to achieve a desired effect, which, depending on our circumstances and our interpretation of it, may act in our favor or not. Some of the most important of these chemicals are serotonin, acetylcholine, endorphins, dopamine, phenylethylamine, norepinephrine, melatonin, oxytocin, and testosterone.



## Dopamine

Dopamine is a hormone and neurotransmitter that plays a large role in reward-motivated behavior. Experience or anticipation of a pleasurable or rewarding experience (e.g. sex) increases the level of dopamine in the brain. The presence of selected dopamine receptors has been associated with an increased risk of behaviors such as addictions and compulsions.

## **Serotonin**

Serotonin is another neurotransmitter that has been found to be related to emotions and moods. Elevated levels of serotonin are associated with feelings of calm and contentment; low levels are associated with irritability and gloom. Depletion of serotonin is also common in depression, anxiety, and obsessive behavior.

## **Testosterone**

Elevated testosterone levels are commonly associated with aggressive and dominant behavior, increases in anger-hostility, and an overall reduction in fatigue-inertia. Low testosterone levels are again linked to depression and a difficulty to express emotions. It can also affect mood, weight, and concentration negatively.

## **Acetylcholine**

Acetylcholine is known as the alertness chemical. It acts as a neurotransmitter in the autonomic nervous system, is produced by the central nervous system and pituitary gland, activate muscles, and is involved in the release of epinephrine and norepinephrine to affect attention and vigilance.

## **Endorphins**

The effect of endorphins is to act as a natural pain killer by central modulation of pain perception and inhibition of pain signals. As part of the opioid family, a feeling of euphoria may also be produced. These pain killers are released by the pituitary gland when under great stress, which are received by receptors in the brain. But, it is also linked to addiction and withdrawal. If an artificial painkiller such as morphine is given, it occupies more of the pain receptors in the brain; however, less natural painkiller is released. Then, when the artificial source is taken away, there are more empty pain receptors, causing the craving for narcotics and a withdrawal response.

## **Phenylethylamine**

Phenylethylamines are neurotransmitters and part of a class of chemicals that is known for its psychoactive and stimulant effects. It is believed that phenylethylamine offers many other benefits such as weight management, nervous system stimulation and digestion aid. It

was found to relieve depression, probably due to it stimulating dopamine release.

### **Norepinephrine**

Norepinephrine and epinephrine are the chemicals that regulate excitement and the fight or flight response by directly increasing heart rate, triggering the release of glucose from energy stores, and increasing blood flow to skeletal muscle. As a stress hormone, norepinephrine affects parts of the brain where attention and responding actions are controlled. Medically it is linked to hypotension (low levels) and hypertension (high levels). Both hormones also have important metabolic actions: stimulating the breakdown of glycogen to glucose to raise the blood sugar level and increasing the level of circulating free fatty acids that are used as fuel.

### **Melatonin**

The primary function of melatonin is to help regulate sleep and wake cycles. It is a hormone produced by the pineal gland. Normally, melatonin levels begin to rise in the mid- to late evening, remain high for most of the night, and then drop in the early morning hours to stimulate waking. The amount of light also effects how much melatonin is produced. Psychologically, changes in levels or deficiency can lead to feelings of depression, sleep difficulties, anxiety, and stress.

### **Oxytocin**

Oxytocin is a hormone known as the trust or love molecule. Research is suggesting that oxytocin plays a crucial part in enabling us to not just forge and strengthen our romantic and social relationships, but is an indispensable part of childbirth and mother-child bonding. As it also has the ability to break down social barriers, induce feelings of optimism, increase self-esteem, and build trust, oxytocin is increasingly being seen as something that can help people overcome their social inhibitions and fears. Oxytocin also seems to be helpful for relief of stress and depression, while it is linked to increased compassion and empathy.

## **BRAIN PLASTICITY**

Another question that has been pondered for centuries is whether our brain, its structure, abilities, and functioning are genetically hard-

wired, that is: Does the brain that we are born with predetermine our destiny? This concept is known as neuroplasticity, or brain plasticity, which refers to the brain's ability to change throughout life. Some ancient practitioners have believed in this ability for a long time, but it is only now that neuroscientists are beginning to discover scientific evidence of the brain's amazing power to reorganize itself by forming new connections between brain cells called neurons. Essentially, it describes how experiences throughout life can cause long-lasting functional changes in the brain by changing its neural pathways.

There are times when brain plasticity normally occurs—during childhood when the immature brain grows and organizes itself, in case of brain injury when it compensates for lost functions or maximize remaining functions, and throughout adulthood when something new is learned. But, it was also found that the brain continues to make connections between neurons throughout life and that exercises can improve or multiply these connections to improve brain functioning.

Brain function is affected daily by many factors, including the environment, drugs, stress, growth factors, learning and aging. Regular conditioning promotes whole brain thinking, not only by stimulating changes, but also by reducing stress and negative moods such as depression and anxiety. It is known that stress and depression lead to changes that affect the neuroplasticity of the brain and the ability of the brain to regenerate neurons, which is called neurogenesis. Therefore, overall brain health depends on a balance of physical, mental (e.g. meditation), and brain (e.g. memory and attention training) exercises.

According to a 2003 study by Davidson and his colleagues at the Laboratory for Affective Neuroscience, University of Wisconsin, even a relative short mindfulness meditation program was found to significantly increase brain and immune functions by structural changes that had long-term effects. Therefore, intellectual, functional, and emotional features of the brain can and do change and is extremely codependent.

**Exercise 2.2**

Briefly discuss why the brain is important in emotions?

*Answers can be found at the end of the module*

This concludes the explanation of how emotions, personality features, and the brain co-function to represent our self and our functioning and ability at any time. But, even more important than realizing how dependent each is on the other, is the understanding that it can be intentionally changed by training, physical and mental exercises, meditation, and therapy. Emotion is not a purely psychological phenomenon, but have important links with our body and mind. It is also not conscious feeling states that are formed in discrete locations in the brain, but are interconnected to other functions. In the next modules we discuss how to understand, transform, and manage our own emotions and those of others.

## **EMPHASIS BOX**

### ***Examples of neuroplasticity in action.***

1. The adult human brain has approximately 100 billion neurons. Education increases the number of branches among neurons, increasing the volume and thickness of the brain.
2. Physical exercise promotes creation of new neurons in the brain, the process known as neurogenesis. It also stimulates sensory and motor cortices and helps the brain's balance system.
3. By shifting cognitive activities from one lobe in the brain to another the brain can optimize itself to compensate for any weaknesses.
4. Specifically designed brain exercises have been shown to strengthen weak brain functions in children and adults with learning disabilities.
5. Stroke patients recover some lost abilities when the brain reorganizes itself to move functions from the damaged location to a new one.
6. Because the brain physically changes its state as we think, it is possible to measure the changes electronically. As a result, there's technology that allows completely paralyzed people move objects with their thoughts and interact with computers.
7. Imagination and illusion exercises have been used to restructure brain maps and help people manage their phantom pain and some forms of chronic pain.
8. People can improve performance through visualizations because action and imagination often activate the same parts of the brain.
9. If you were to wear blindfolds for two days, your visual cortex would reorganize itself to process sound and touch.
10. The Sea Gypsies, Nomadic people who live in a cluster of tropical islands in the Burmese archipelago and spend most of their lives in boats on the open sea, can see clearly under water at great depths because they learn to control the shape of their lenses and the size of their pupils, constricting them 22%.

11. A research study found that London taxi drivers have a larger hippocampus compared to bus drivers. It's because this region of the hippocampus is specialized in acquiring and using complex spatial information in order to navigate efficiently.

12. Research showed much greater activation of powerful gamma waves in advanced meditator than in students during meditation. Even when the participants were not meditating, the trained meditators' brains showed a large increase in the gamma signal. This is linked to improved mental activities such as focus, memory, learning and consciousness.

13. It was found that gray matter (cortex) volume is highest in professional musicians, intermediate in amateur musicians, and lowest in non-musicians in several brain areas involved in playing music: motor regions, anterior superior parietal areas and inferior temporal areas.

14. Learning to juggle can increase gray matter in the occipital-temporal cortex as early as after seven days of training.

15. Extensive learning of abstract information can also trigger some plasticity changes in the brain, e.g. in the parietal cortex and the posterior hippocampus - brain regions involved in memory retrieval and learning.

*Excerpted from Doidge (2007).*

## REMINDER

Have you completed the following exercises?

- Exercise 2.1
- Exercise 2.2

Tick each box when you have completed the exercises. Then you can move on to the next module.

## SUMMARY

1. There is a close and important link between thoughts and feelings and behavior.
2. Emotions are instinctive or intuitive feelings that are generated to motivate behavior for a purpose such as self-protection.
3. Core beliefs are sets of rules developed on the basis of our experiences and determine how we view ourselves, others, and the world.
4. When encountering a familiar situation, core beliefs are activated, which cause chemical changes in the brain and generate thoughts and feelings.
5. The ABC cognitive behavioral model explains how an activating event (A) triggers beliefs (B), which have emotional and behavioral consequences (C).
6. Beliefs are linked to our personality style, which is the context in which our emotions are formed and expressed.
7. Chemicals, hormones, and the brain structure play an important role in the presence and functioning of emotions.
8. Dopamine, serotonin, and norepinephrine are three hormones that are linked to emotional wellbeing and unhappiness including stress, anxiety, and depression.
9. Brain functioning can be improved or new abilities developed through neuroplasticity, which allows for changes/additions to neural networks and neuron regeneration.

## NEXT STEPS

Well done! You have completed Module 2.



## REFERENCES

- Davidson, R. J., Kabat-Zinn, J., Schumacher, J., Rosenkranz, M., Muller, D., Santorelli, S. F.,...Sheridan, J. F. (2003). Alterations in brain and immune functions produced by mindfulness meditation. *Psychosomatic Medicine*, 65, 564-570. DOI: 10.1097/01.PSY.0000077505.67574.E3
- Doidge, N. (2007). *The brain that changes itself: Stories of personal triumph from the frontiers of brain science*. New York, NY: Viking.

## EXERCISE ANSWERS

### EXERCISE 2.1. ANSWERS

*Explain briefly how personality relate to emotional intelligence.*

- Our personality is represented by sets of beliefs—how we see ourselves, others, and the world—that have developed since childhood based on our experiences.
- Emotional intelligence is the ability to monitor and understand one’s own and others’ emotions and to use this information to guide thinking and behavior.
- Personality beliefs guide how we react instinctively to situations.
- When these beliefs are activated, thoughts and emotions are generated to motivate behavior.
- It is usually a reflexive and subconscious process that is not thoughtful.
- Therefore certain personality beliefs can interfere with or block emotional intelligence, which is a mindful process.
- But, emotional intelligence is also a part of human personality. Personality is the context in which EI operates; understanding personality is a component of EI.

### EXERCISE 2.2. ANSWERS

*Briefly discuss why the brain is important in emotions?*

Emotions are both the cause and effect of chemicals and hormones that are released in the brain and elsewhere. These chemicals help create and manipulate emotions as part of complex processes designed to stimulate behavior. Therefore the brain is affecting how you feel, how you think about it, and how you respond to those feelings, often without your awareness. Emotions are expressed as a combination of thoughts, feelings, and behavior, for which our bodies are primed by release of chemicals to help get the message across. Dopamine, serotonin, and norepinephrine are three of these important neurotransmitters that are related to anger, anxiety, depression, panic, and stress when in imbalance. Some disorders such as posttraumatic stress disorder (PTSD) are associated with abnormal levels of these chemicals. Certain parts of the brain are also involved in emotional

functions: the amygdala assesses the emotional value of stimuli, the hypothalamus helps to regulate how you respond to emotions, and the hippocampus is involved in memory storage and retrieval, which also shape your emotional responses.