

ScienceStrength: Essential Expertise for Learning & Performance Specialists
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The Neural Basis of Motivation

As learning and performance professionals, we know that motivation is a key element in the success of any training or intervention. But how does motivation have so much influence over what happens? What is the biological basis? And is it a conscious process, or is it something that happens behind the scenes?

Recent brain science sheds light on these issues. First, let's define our terms. Motivation is about the factors that guide us toward desired goals or away from unwanted outcomes. Motivating yourself is about choosing goals and exerting effort to obtain them. Motivating others is about getting them to move in a desired direction to achieve a result you want.

Over the years, there have been many theories of motivation based on a variety of factors: needs, behavioral learning, cognitive processes, social learning theory, or attribution theory. From research based on these theories, we've learned that people are motivated when results are linked to rewards, need satisfaction, expectations and orientation, self-efficacy (people believing they can do better), reinforcement and role modeling.

Neuroscientists look at motivation in terms of the neural activity that guides us towards and away from particular results. On the cellular level, connections between neural ensembles determine what perspectives, emotions, and behaviors are brought into play.

We learn in the Brain Science workshop that the brain is "plastic." In other words, neural connections are modified by experience. When neurons fire together, it strengthens the connections between them. In the future those neurons will tend to fire together.

Let's take a real-life example. If workers have learned through experience that good performance leads to incentives such as praise, bonus pay, or promotion, they are likely to associate the challenge of a new, difficult project with an experience of joy and satisfaction. If, on the other hand, their efforts have not produced any noticeable

response from management or – even worse – their work has been discounted or associated with negative outcomes, they are likely to associate good performance with a negative outcome and they will be de-motivated. In both cases, the neural representation of the event is that synaptic connections tend to be called into play in alignment with past experience of similar events and expected outcomes upon achieving the desired results.

Emotion plays a key role in motivation on the neural level. Emotional systems are very widespread in our brains, i.e., there are many brain systems activated by emotional states. In addition, scientists now believe our emotional systems evolved as survival mechanisms, so the neural connections associated with some emotions tend to be very strong – they assume preeminence over other things that are happening at the time. For example, when a “fight or flight” reaction is triggered, we are likely to forget we are hungry even if a minute before we were starving! Motivation in any particular situation, then, is stronger when it is connected with remembered or expected emotional states.

Emotional motivation tends to take place on a widespread and nonconscious level. Neuroscientists have determined that many synaptic connections of our emotional systems don’t connect with those functions in the brain that mediate conscious awareness. Consequently, we are not aware of many of the motivating or de-motivating factors involved in our behavioral choices. It is only when we intentionally bring our conscious awareness to this issue that we discover the assumptions and perspectives behind our actions.

Goals are motivating in two ways:

1. They can be intrinsically motivating – such as food and water, or
2. They can be extrinsically motivating - they acquire motivating properties through our experiences with them.

Most of the motivation we work with in organizations is extrinsic. Good performance is linked with physical survival only when a person’s job is at stake in the near future. This is rarely the case. More often, it is necessary to associate desired outcomes with motivating factors. This can be done in several ways:

- A. Through associative learning: good performance brings bonuses and promotion
- B. Through observational learning: workers see someone else’s experience with the goal and want to have same experience
- C. Through word of mouth: workers hear of someone’s experience with the goal and want to have the same experience

- D. Through imagination: This is one way visualization works in the brain: intentionally created neural pathways can produce synaptic connections that tend to be called into play.

Extrinsic motivation works by increasing the synaptic connections of weaker stimuli. The more you align your learning processes with associated positive outcomes, the stronger will be the motivation. If, on the other hand, organizational practices link effort to negative emotional outcomes – the results will be that individuals avoid reaching the goal rather striving toward it.

You can use intrinsic motivation also, by aligning learning processes with a person's values, emotions, or other strongly-felt systems. This type of motivation tends to be stronger, as the neural connections are widespread in many brain systems. This is why it is so important to begin any training or learning process by asking participants to look at what they want to gain from their participation. It is also why integrity is so important in organizations - working in ways people feel good about activates neural pathways representing wellness and success. These pathways connect also with our immune systems, which produces chemicals that strengthen or weaken our health – but that is a topic for another issue!

In summary, it is good policy to align learning processes with both internal and external factors. The more widespread the neural representation, the more learning will be reinforced and accelerated. It also works to assist participants in becoming aware of their motivations and, as we all know, to align organizational culture so the desired results are rewarded. In situations where people seem ambivalent or conflicted, take a look at the possibility that there are neural representations of both positive and negative outcomes. If you can identify the negative outcome that is feared, you can apply a corrective that frees the individual to move forward toward the positive.

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