Positive Psychology
Biological, Emotional, Cognitive and Student Learning Implications

Inspiration Emotions
Emotions That Inspire Positive Action and Broader Thinking

The Vagus Nerve, Vagal Tone and the
Parasympathetic Nervous System

The Study of Positive Psychology

The Nature Effect

Take A Good Look Around

Kevin Plummer, Ph.D.
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Inspiration Emotions

Emotions that inspire positive action:

- Elevation
- Gratitude
- Admiration
- Compassion
- Empathy
- Generosity

Other positive emotions

- Hope
- Optimism
- Happiness
- Fulfillment

Emotions generate a biological and cognitive effect as well as an emotional effect.

<u>Cognitive Effects (Information Processing, Memory, Integration of Information)</u>

People who experience anger, rage, high stress, and frustration also experience an increase in blood pressure, muscle tension respiration rate, the activation of the sympathetic nervous system, and engagement of the immune system. Their thinking is narrowed (to the matter at hand), more rigid, more automatic, and it is mixed with memories of similar situations, creating a loss of current context and at least a slight dissociation from the present. Action plans include avoidance, rejection, defensive responses (e.g., projection of blame onto others and nearby objects), rigidly adhered to repetitive behavior, and behavior of habit or history. In addition, cortisol limits spindle cell activity, a type of neuron responsible for rapidly integrating vast amounts of information from distant brain regions (this cortisol effect narrows the thinking).

Experiences of positive emotion broaden people's thinking and thought-action repertoire. Thinking is more flexible, expansive, creative, integrative, open, efficient, and more accurately connected with the present. Positive affect generates approach and explore behavior, increased social contact, increased levels of trust and security. Positive affect produces a broad and flexible cognitive organization and greater ability to integrate diverse material (see the articles on Stress, Inflammation and Oxytocin/Serotonin for more information about brain neurochemistry and cognitive functioning).

Positive affect broadens attention and enables people to take in more, to process more, and to process and integrate it more quickly. The focus is more global, encompassing and integrative and the range of thought is longer term rather than shorter and immediate. With negative affect the attention is more localized, individualistic, the focus is on the immediate and it is difficult to process new information. Positive emotions lead us to think about the possibilities and give us greater access to what we already know.

The inspiration emotions also motivate us to take positive action. Emulation, for example, is the action tendency associated with elevation. Admiration, on the other hand, inspires us toward self-improvement, and gratitude inspires us to give back, to return the favor.

> "When any act of charity or of gratitude, for instance, is presented either to our sight or imagination, we are deeply impressed with its beauty and feel a strong desire in ourselves of doing charitable and grateful acts also" —Thomas Jefferson.

Biological Effects

Research has shown that induced positive emotions (especially emotions that inspire positive action) can speed cardiovascular recovery from a recent negative emotional experience. For more information on specific biological effects see the section below on the vagus nerve. Positive emotions can undo (biologically and emotionally) a negative state or lessen the resonance of a negative event by broadening thinking and putting things into proper context and engaging the parasympathetic nervous system to return the body to equilibrium. Resilient individuals (equilibrium is restored more quickly) reported higher levels of pre-existing positive affect on an initial mood measure. Resilient people may be more expert at employing the "undoing" effect of positive emotion.

Broaden and Build Hypothesis

Positive emotions lead to broader thinking and broader thinking leads to seeing the possibilities and finding the positive in situations, and this leads to more positive emotion and broader thinking in an upward spiral effect, leading to appreciable increases in emotional well-being over time (the Broaden and Build Hypothesis— well researched by Fredrickson). People's mood levels shifted significantly when involved in recalling or telling about one of the "inspiration" emotions. "Inspiration" emotions also change (temporarily) the way people view others and view the world. "Inspiration" emotions may not lead to immediate behavior (as anger, anxiety and stress does with fight/flight) but they change people's cognitions and motivations toward building positive relationships, self-improvement, and emulation. They draw people out of themselves to a focus on others, to do good things for other people, to make

other people proud of them, to become a better person. In some studies, the effect of experiencing these emotions has lasted as long as three months. Positive emotions (especially the inspiration emotions) lead to reflective responding. Negative emotions (especially anger, frustration, stress, and anxiety) lead to reflexive responding.

Elevation

Elevation is induced in people who witness acts of virtue or "moral beauty". Elevation has been induced (in scientifically controlled studies) by witnessing acts of charity, generosity, unexpected kindness, compassion, understanding, forgiveness, or other exemplary displays of consideration toward others. While experiencing elevation we feel as though we have become (for a moment) less selfish and more generous, and we want to act accordingly. Think of a time when you saw someone demonstrating humanity's higher or better nature for someone else. How did that make you feel toward others and what did it inspire you to do? In our therapeutic classrooms (and even in typical classrooms) we want to create opportunities for our students to experience this emotion, for the cognitive effect as well as the emotional/inspirational effect, and we want to find ways to ensure that the experience is secure in their memories and more easily triggered or recalled when they need it (see Memory Management).

Witnesses to good deeds reported a warm and pleasurable feeling in their chest (vagus nerve stimulation and activation of the parasympathetic nervous system) that triggered a desire to do good deeds themselves. Viewing an uplifting video produced nurturing behavior in nursing mothers (increased oxytocin production—for more information about the cognitive and emotional effects of oxytocin see the article Oxytocin). Elevation motivated emulation and prosocial motivation to be kind, to be a better person. Elevation is one of the calming "inspiration" emotions. It increases openness and warmth toward others (serotonin and oxytocin, threat reduction and increased social proclivity). Elevation leads to greater amounts of cooperation and a willingness to help others. People feel uplifted, altruistic, and more optimistic about humanity.

Elevation, as an emotion, increases oxytocin production and through the oxytocin receptor sites on the vagus nerve it activates the parasympathetic nervous system. The warm feeling in the chest (dilation) and the lump in the throat (associated with the feeling of elevation) are created by vagus nerve activity. Nasal administration of oxytocin has been shown to increase feelings of trust and generosity. This is because it is a neurotransmitter that speeds up social processing (so information involving people and social context is better comprehended and less alarming, less threatening) and activates dopamine production so that reward anticipation is associated with social involvement.

Gratitude

Gratitude is based on the perception that one is the beneficiary of another's intentionally provided benefit. Critical in this experience is that the benefactor is clearly being responsive to the specific needs of the recipient (showing specific thoughtfulness, not just indiscriminant

kindness— indiscriminant kindness is often based on the giver's need more than the recipient's need, the giver's need to be kind). Indeed, research has shown that ratings of thoughtfulness mediated the feelings of gratitude. Gratitude inspires us to give back, to return the favor, but gratitude also broadens our perspective in the moment, beyond just wanting to return the favor.

Research has shown that we all feel more relaxed, secure, cared for, and safe in the presence of an extremely compassionate person. The culture of our therapeutic classrooms should strive to achieve high levels of collective compassion among the students and the staff. It is not only important as a factor in inspiring students and generating the neurochemistry of calm and consideration of others, it leads to increased capacity for cognitive functioning, better information processing, memory access, and integration of new information with previously learned material (see the article on Stress or the one on Oxytocin or The Importance of Community).

Relationships matter in the classroom. While relationships and social engagement are important, it is the depth of relationship and the quality of friendship, the level of authenticity that is more important than the quantity of relationships and the frequency of social encounters.

Admiration

Admiration is the feeling of wonder mixed with reverence (or respect) and awe (or appreciation). It's what people feel when they see displays of extraordinary skill, talent or achievement, or when someone engages in a feat that represents overcoming great adversity. Admiration inspires people toward achieving their own excellence. It can be triggered through recall of an event, watching a video, or listening to an anecdote. Research has documented the biological response to the feeling of admiration. Admiration is experienced with tears in the eyes, chills, increased heart rate, tingles or goose bumps, and a lump in the throat. It often leads to feelings of high energy, and motivation for self-improvement.

Vagus Nerve, Vagal Tone, Parasympathetic Nervous System

The Vagus nerve, the largest nerve in the body, is the key component of the parasympathetic branch of the autonomic nervous system. The parasympathetic nervous system regulates homeostasis of the majority of the body's internal organ systems, largely on a subconscious level (e.g., heart, lungs, stomach and intestines). It supplies motor parasympathetic fibers to all the organs except the adrenal glands, from the neck to the colon.

The vagus nerve conveys sensory information about the state of the body's organs to the central nervous system. Eighty to ninety percent of the nerve fibers of the vagus nerve are afferent—sensory, receiving information—allowing it to gather an abundance of information about the state of the viscera and then communicate this to the brain.

The vagus nerve releases acetylcholine, one of the neurotransmitters that stimulates the release of oxytocin, the neurochemical that reduces activity in the right amygdala (associated with negative affect), speeds up social processing, and stimulates the release of serotonin.

This produces an overall effect of calm and well-being, trust, and social interest (for more information on oxytocin see the article Oxytocin). The vagus nerve is active in all the "inspiration" emotions. It is commonly referred to as "the nerve of compassion".

Research has shown that children with higher vagal tone present healthier psychological, social and behavioral profiles. A higher vagal tone is indicative of more adaptive functioning. It is positively correlated to positive expressiveness, increased interest, behavioral inhibition, increased sympathy, better coping, higher levels of sustained attention and even temperament. Higher vagal tone is negatively correlated with internalizing stress. Children with higher vagal tone made a more rapid adjustment to preschool and children with low vagal tone adapted poorly to marital discord.

Vagal tone is a measure of how effectively the vagus nerve and parasympathetic nervous system can restore equilibrium (high vagal tone is associated with quicker restoration). Vagal tone cannot be directly measured, as can heat beat or respiration rate. Instead, other biological processes are measured that represent the functionality of vagal tone.

RSA is in reference to Respiratory Sinus Arrhythmia. During inhalation vagal activity is temporarily suppressed and heart rate increases. During exhalation vagal activity resumes, decreasing heart rate (the calming effect of taking a deep breath is in the exhale, not the inhale).

HRV refers to Heart Rate Variability, the periodic changes in heart rate (the amount of variability of time between heart beats) during a resting state due to RSA. HRV is more pronounced in athletes and decreases with age. Athletes and young people have a quicker return to a lower heart rate during RSA and their low rate is lower than non-athletes and older people. HRV is used to indicate vagal tone. High vagal tone indicates a more responsive and well-conditioned parasympathetic system. Children with more secure attachments exhibited greater empathic responsiveness, less social inhibition, and higher vagal tone.

The Study of Positive Psychology

Positive psychology is the study of human flourishing, the scientific study of strengths and virtues that enable individuals and communities to thrive. Individual strengths and virtues include courage, compassion, resilience, creativity, curiosity, integrity, self-knowledge, self-control, and wisdom. Community strengths include justice, responsibility, civility, nurturance, guidance, teamwork, leadership, work ethic, purpose, and tolerance.

It is important to remember that psychological states influence brain physiology (i.e., brain plasticity). Psychological states influence the activity of specific genes in the brain and the development of the brain's neurological connections. For example, genes that control the density of receptors on neurons and alter the reactivity of the nervous system can be turned on and turned off.

Positive psychology believes we are the source of our own happiness. We don't have to wait for life to trigger the neurochemistry and the sensations for us, we can trigger this ourselves. We are hard wired to make all the happiness we need. The source of positive emotion is

yourself and under your control. Happiness, according to research, is less of a trait and more of skill that can be trained and practiced and applied.

The Nature Effect

Scene processing is a subconscious function. Our subconscious brain continually processes sensory stimulation in the context of our surroundings to engage in threat assessment while regulating our level of arousal. Traumatized children, children with anxiety conditions, children under chronic stress, and children on the autism spectrum are often over aroused by this scene processing mechanism and this over arousal leads to increased stress and irritability and these mood shifts lead to misperceptions and activation of harmful memories. Reality is altered and behavioral responses are not well matched to the actual situation. These children need help getting settled to then enable them to make more reasonable decisions. Research has shown that for all people scene processing activity in the brain is much higher in non-natural settings and threat assessment is turned down considerably in natural environments. People show increased alpha wave activity in the brain when exposed to nature or nature scenes. Anxiety is associated with lower alpha wave activity and with increased beta wave activity. Higher alpha wave activity is associated with greater serotonin production and increased feelings of calm, and decreased arousal.

People exposed to city scenes compared to nature scenes registered higher levels of circulating cortisol (one of the stress hormones responsible for sustaining the stress and arousal response). People with a stress response showed a quicker stress recovery when exposed to nature when compared to exposure of a neutral scene. This was measured by heart rate, muscle tension and skin conductance. Furthermore, rural scenery activated brain regions associated with positive emotion while urban scenery produced enhanced activity in brain regions involved with anxiety and high arousal. Cluttered environments generated higher arousal and stress than neat and organized environments.

Natural environments and engagement with nature can reduce perceptions of threat and lower arousal while promoting positive emotion and a sense of calm and well-being. We can use natural environments to restore and reset by taking advantage of the way nature quiets the limbic system and this will enable us to be more present (activation of the frontal cortex), making it easier to keep things in proper perspective.

Take a Good Look Around and Practice Finding Fascination

Watch the butterfly balance on a solitary stem of the astilbe growing just inches from where you sit. Notice the way the light illuminates the shiny blue dragonfly perched restfully on the wire of string lights suspended above your deck. Look at the way the arching branches of the butterfly bush cast a gently swaying shadow on your living room wall. Watch your daughter's face while she talks and notice the tiny indicators that speak about how she feels and what she is really thinking about. Live in the present and see what is right in front of you instead of living out of the limbic system and subconscious memory while letting what is right in front of you slip past unnoticed.

Your eyes scan everything, but most of what your eyes scan you never actually see, because it never reaches conscious awareness. This is adaptive. We would be hopelessly impaired, paralyzed with information overload if we had to pay attention to everything that the eyes took in, and the most vital information would be lost amidst the clutter. The brain screens the input and determines what is important enough to bring to conscious awareness.

You can train your brain to bring to consciousness more of what your eyes see from the casual scan of your surroundings. This is important, because how much you really see, your ability to truly notice what is happening all around you (mindfulness), influences how well you feel (the information is more fully processed, enabling us to more easily create proper context or perspective and stay in the present). In turn, how well you feel influences how much you are then able to see. Mood heavily influences perception and perception heavily influences mood. It's a circular relationship and you have to start someplace, so you might as well start with increasing what you notice.

The more mindful and present you are the better you feel. The better you feel the more you see, and the more you see, the better you will feel. This is because our subconscious alarm reaction (fear and anxiety generated in the right side limbic system) is influenced by how rapidly and suddenly the world is coming at us. When you notice more of your surroundings, examine things more closely, take the time to really look at what is around you, this brings you into the present and slows your subjective perception of time. Your subjective perception of time slows because your brain is processing more sensory information in a shorter time frame. As time slows and you are more attuned, the life coming at you appears to be proceeding at a more comfortable pace. The threat level lowers, the limbic system quiets (no longer reacting to every minor provocation) and you feel more settled.

This state of mindfulness also helps quiet your limbic system by engaging the frontal cortex. Focused attention and processing detail generates activity in the frontal cortex and the frontal cortex keeps things in proper perspective by continually factoring in current context. When you live your life in the present by increasing your attunement to what is going on around you, you are actively engaging the frontal cortex and this prevents you from slipping too far into the limbic circuit (a slight dissociative state as memories create alarm or a mood that changes your perception of what is really happening, and this leads to additional memory triggers that take you even further from reality as these memories are superimposed on the present, which can lead to the creation of a false memory that may threaten you later).

The brain becomes more creative and makes an increased multitude of connections during a positive mood and this enables you to actually see more of what is right in front of you. Time slows because you are processing more in a shorter period of time. The picture develops greater detail and this promotes calm and well-being and feelings of trust and connectedness and this is why you feel better when you see more.

Our mood is greatly influenced by our ability to find fascination with what is right in front of us. If you train yourself to see more of what is right in front of you, your mood will elevate and you will experience calm.

It isn't as easy as it sounds to find fascination, to truly see what or who is right in front of you. Life can sometimes be like an action-packed movie (and sometimes, realistically, we have no choice about where we focus), full of fast-moving events, partial scenes requiring quick interpretation, but remember, a movie is nothing more than a series of still frames in rapid sequence. Freeze time, look around you and see the still frames, however insignificant they may seem. The more you make yourself see, the more and the deeper you will feel and the better you will feel.

Watch your daughter's face while she talks and notice how she feels and what she is truly thinking about. Make it into "one of those moments". There is more to see and it's right in front of you. Take a good look around yourself and practice finding the fascination and appreciating the detail.

<u>This is it, right now, one of those moments</u>

Recognize when
It is one of those moments
right now
and make a deliberate effort to create the space
for just that moment.
You will not have this chance again.

<u>The Data You Choose</u>

Instead of measuring your day by the events that frustrate
focus on the number of times you smile,
the number of times you see others smile.
The pieces of information you choose to focus on can help determine
the story you tell at the end of the day.

Time Is On Your Side

It takes discipline and patience and confidence and trust to recruit and then harness time, to resist the urge to jump in, direct, take action, issue judgment. It takes courage, insight and vision (and sometimes nerves of steel), to assiduously apply time like an emollient to the circumstances you face, to enable time to work for you. This leads to better listening and it leads to better problem solving because time enables you to be reflective rather than reflexive. It allows the problem to become clearer while our brains activate the memories and gather the information that will help. It allows problems to be solved by the right person at the right time in the right way.