

**Evolutionary and Neurobiological Underpinnings of Adult Learning.
What Can Veterans Teach Us?**

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Abstract

The role of various neurological structures and their functions play a key role in determining risk versus reward and pleasure versus pain. This neurobiological evolutionary development ultimately drives our motivation or avoidance based exclusively on our desire to survive. Following 16 years of prolonged combat in Iraq and Afghanistan, the military veteran is an exceptional example into how being emotionally distant (Post-traumatic Stress Disorder) can produce unintended barriers to learning. According to Pessoa (2017), the key to adult learning is unlocking the emotional pathways that are interwoven between perception, cognition, motivation, and action.

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The first common ancestors began appearing in Africa 200,000 years ago. According to Passingham and Wise (2014), the primate brain expanded rapidly during this time to include the prefrontal cortex (PFC). The PFC makes up nearly 25% of the brain and is involved with problem solving, reasoning, insight, and imagination. Today's human brain consumes nearly 20% of total blood flow (oxygen supply and energy) from the heart and represents a mere 2% of our total body weight.

The main component of the brain discussed here is the PFC and the limbic system. The limbic system consists of multiple structures, three of which are: the thalamus, the hippocampus, and the amygdala. The thalamus is solely responsible for relaying sensory information to the larger part of the brain. Four (hearing, sight, touch, taste) of the five senses are processed and relayed to the cortex of our brains through this structure. (Sherman, 2006). According to Gluck et al. (2014), the role of the hippocampus is to move short-term memories to long-term memories by encoding them with emotions derived from the amygdala.

The movement from short-term memory to long term is further solidified by the strength of the emotional experience. In 2006, researchers at UC-Irvine demonstrated that the strength of the emotion on a learned event/thing plays a critical role in the strength of that memory. This finding supports the idea that war time experiences that are highly emotional have long lasting effects on future behavior. The role of stress and its impact on the quality of life for the student and military veteran can be deleterious to their success. Ritt (2008) demonstrated that these barriers (stressors) can be personal, professional, or institutional in nature. Personal hurdles can include financial, family or personal illness and commitments, sleep cycle disruption, legal issues, or general fear. Professional barriers can include inconsistent work schedule, inadequate time off, the employer's value structure (e.g., a degree is nice, but not necessary).

Institutional hurdles are far outside of the student's control and can contribute to added stress and diminishing quality of life/experience. This includes limited access to degree options, rigid institutional policies and procedures, and rising costs that result in diminishing affordability. The common neurobiological thread that connects students to the military veteran is living in a state of constant stress. Continued autonomic nervous system (fight versus flight) activation results in prolonged circulation of the hormone cortisol. According to McAuley et al. (2009), circulating cortisol works with adrenaline to produce strong instant memories of things to avoid. Prolonged exposure to these hormones results in damage and atrophy to the hippocampus resulting in poor creation of long-term memories.

Based on this understanding of neurophysiological operation we can extrapolate how the returning veteran can struggle. While not every veteran suffered physical trauma, many suffered emotional trauma, and those injuries are not easily appreciated by society. Moral injuries are some of the strongest emotional injuries sustained by veterans. A study by Litz et al. (2009) articulated that a moral injury is one that violates intimately held beliefs about right/wrong, the value of life, ethics, and so on. These morals can be in place as a result of the broad culture, organizational culture, and group-based culture. As one soldier described it:

Emotions are not a good thing in combat. You have to just react and not think about how you feel about it. See, you are doing bad things to bad people and good people get hurt in the process. If you stopped because of emotions, you will be the next hero to be carried home on your shield. The hard part is once you have a chance to reflect on what you did, once you begin to grasp the gravity and finality of your actions, that you have no way to undo mistakes. You speak of this to no one because then you are marked as weak and unreliable. (Anonymous, personal communication, April 4, 2018)

Once home, the veteran must reform prior relationships, which becomes increasingly difficult in the face of emotional distance as a form of survival. People, places, and things can be a source of triggers for those survival behaviors and causes the veteran to feel more out of place. In the setting of the classroom, this becomes a tremendously difficult situation to overcome to allow quality learning and retention to happen in a meaningful way. These situational hurdles are that much more impactful as the veteran is not within their "band of brothers," which leads to a sense that they don't fit in. This can lead to avoidance as a means of coping and attendance in class suffers, leading to falling grades and additional self and institutional reinforcement that this is not where the veteran belongs. Simply stated, the veteran lacks a foundational need being met of being part of the learning group.

The wider application of the veteran's experiences and path home can be appreciated in all students. Consider individuals with a history of physical/emotional/sexual abuse not in the context of war (e.g., the student with a history of substance abuse and how the classroom and society views that such that a social valuation is created within the student or students with a past college failure due to an overly stressful life style related to current vocation and childcare needs). Two distinct prongs of solution are (1) re-establishing self-authorship and (2) learning in an environment that is within a "wrap-around" support structure.

Evans et al. (2010) described self-authorship as having four main components: following formulas [bestowed by parents and mentors], crossroads, becoming the author, internal

foundation. Self-authorship, according to Evans et al., is a way humans organize new experiences rather than replacing old experiences as life is lived. These new experiences are woven together with prior experiences to create a more complex understanding for the individual.

Students and veterans come to the classroom in various stages of self-authorship. Students and veterans who have relapsed to the crossroads stage may be dissatisfied with self and need support to re-craft a path towards becoming the author of their life. As Evans et al. (2010) state: “Students who worked with advisors who encouraged reflection in goal setting and intentional planning and discussed with students their nonacademic life experiences were more likely to develop abilities and perspectives associated with self-authorship” (p. 190).

Wrap-around support structure is a series of services designed by institutions to meet the complex and varied needs of the students and veterans (see Figure 1). Examples of these could be: financial support, career services, spiritual services, academic support, legal services, physical health access, curriculum advising, mental health, and social services. A key difference in this as pointed out by the Positive Behavioral Interventions & Support (2018) is that the student or veteran is at the leadership position rather than being forced/dragged through a process. It becomes a system of “I need” rather than “you must.” The key to success with this is to foster a system that is both student- and veteran-centric but also one that promotes and allows interdependent relationships when appropriate. Students and veterans may be more successful if they connect with the easily accessible services and each other in a way that will promote personal worth, character, growth, and self-authorship.

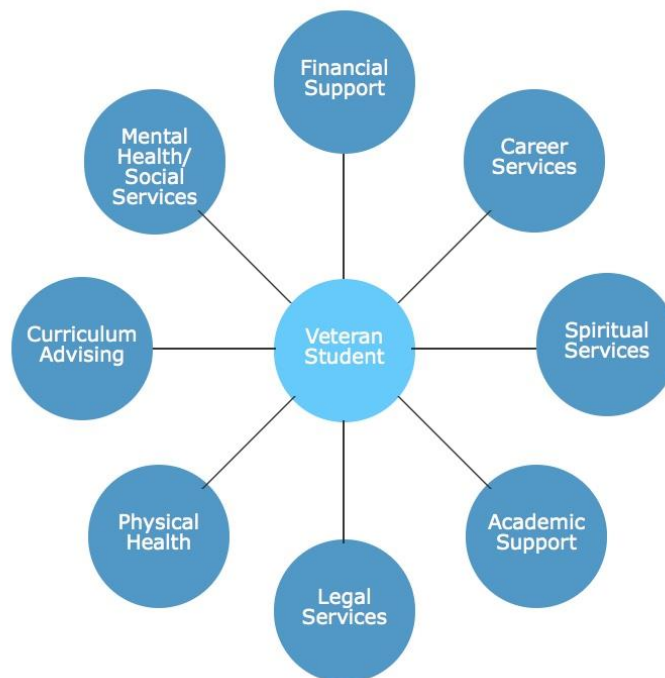


Figure 3. Diagram of National Louis University’s wrap-around support. Reprinted from *National Louis University Veterans and Military Program*, retrieved from <https://www.nl.edu/veteransandmilitaryprogram/> © 2018, National Louis University.

One of the greatest tragedies thrust upon our students and veterans by society is of apathy, misunderstanding, and mistrust towards emotional trauma. It is more salient to appreciate that the student and veteran possess deep emotional connectedness to survival behavior crafted through experience forged in the fires of war. That the student and veteran are not unwilling to advance gradually into new and potentially uncomfortable areas of growth, but that they are incapable of deriving new behaviors from a cemented prior emotional/behavioral response. Stone (2017) demonstrated that the key to self-authorship in the military population is contingent on drive, initiative, and supportive and interdependent relationships. This path of personal growth all students follow can be positively supported using a “Wrap-Around” support at the university level. This provides a unique opportunity for the professors and university to become a place of personal growth, professional success, and safety that will pay dividends for the individual for a life time.

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