
Sustained Traumatic Brain Injuries During Military Conflicts

Ada Pekin - İTÜ GVO Ekrem Elginkan High School

ABSTRACT

The study of those who have sustained traumatic brain injuries during military conflicts has facilitated research in the fields of neuropsychology, it also helped us understand the correlation between brain and behavior. The Vietnam Head Injury Study suggests that damage to the prefrontal cortex (PFC) can cause aggression and violence in humans. Prefrontal cortex is basically the part of the brain that helps us make healthy decisions and regulates our impulsive behavior. Many human studies proved that a damage to PFC can cause uncommon behaviors in humans. In Vietnam Head injury Study fifty seven normal controls and 279 veterans, matched for age, education and time in Vietnam, who had suffered penetrating head injuries during their service in Vietnam were studied. The aim was to see if damage to PFC affected violence/aggressive behaviors. To see the results family observations and self-reports were collected. The results show that the patients who had damage in their PFC consistently demonstrated Aggression/Violence scale scores higher than controls and patients with damages in other brain areas. These results support the hypothesis that prefrontal cortex damage may increase the risk of aggressive and violent behavior.

Keywords: *Brain Injuries, Military Conflicts, Traumatic,*

Effects Of The Brain Injuries On Behavior

The damage to the prefrontal cortex may have an influence on violent behavior. There are many types of human behaviors that most of the time have negative impacts on humans; anger, stress but most importantly violence. Violence is such a complicated behavior that most of the time it's hard to tell what causes violence. It can be a great number of reasons behind it. Though there is a fact that it has a connection between brain. Unfortunately brain is one of the most complex structure in human body. Brain is such a complicated structure that most of the time it's hard to examine it as a whole. That's why when studying brain we study it piece by piece. Amygdala, hippocampus, thalamus and many more. One really important area is prefrontal cortex (PFC). It is located in the frontal lobe. The PFC has multiple functions. Some of them are; modulating cognitive control, take control of impulsive behavior, prospective memory and cognitive flexibility. There is also a part that is called ventromedial prefrontal cortex (vmPFC). This part of the PFC is implicated in the processing of risk and fear. It also plays a role in the inhibition of emotional responses, and in the process of decision-making and self-control. Since these are such important decision mechanisms for our brains a damage to them can create bad results as expected. It can cause behavioral disorders, emotion compliance and even death of somebody. Since there is numerous possibilities to light up this situation many studies and experiments were held. While some had complicated results some studies had results that would really help psychologists and neurologists when understanding

human brain. The Vietnam Head Injury Study was one of the studies that still have such an important role in neuro-psychology world.



Figure 1. Vietnam war veterans (image from wikicommons)

The Vietnam Head Injury Study (VHIS) was set up by William F. Caveness a famous neurologists. The importance of this men is that he was a retired Naval Reserve captain who had served in the Korean War, who was chief of the Laboratory of Experimental Neurology. In his experiment he gathered data from 1,221 Vietnam veterans who sustained a brain damage during the war (1967-1970). In previous conflicts neurological damage was in the background and not enough doctor and health treatment was provided to the soldiers. The Vietnam conflict was the first conflict that early treatments was provided to soldiers. Therefor this situation result is higher rates of survival. Caveness contacted with neuroscientists who worked with soldiers at the Vietnam War. He requested to examine the voluntery patients who had damages to their head. Although he received around 2,000 registry forms, addresses could only be found for 1,221. The brain of the veterans were examined and ones who had damages in their prefrontal cortex were detected. Phase two of the study was to study the veterans behaviors. Unfortunately Caveness passed before the phase 2 start. Grafman who is another neuroscientist who is interested in sustained traumatic brain injuries took over the study. Of course with the help of Caveness's team members. Grafman contacted with the veterans to meet them in person but only 520 of them answered Grafman's call. The reason behind that is some veterans being death after few years from the war and some of them was unreachable. Though the other 520 people volunteered for this study. Grafman's aim was to see if there is any correlation between damage to prefrontal cortex and violence behavior. To examine this correlation he prepared multiple tasks for veterans and their families. First he contacted with soldiers families. Grafman asked about their observations asked if they noticed any differences before and after the war. The data he gathered showed him the soldiers were less aggressive and violent before the war. They showed more violence behaviors after the head injury compared to their healthy brain situations. Other than family observations self-reports for Vietnam veterans also showed the same result. Self-reports refers to questionnaires that veterans filled about themselves. All these results showed that compared to other controls the ones who received damage specifically

to their prefrontal cortex had much higher rates on violence and aggressive behavior. Verbal violence and aggression, as opposed to physical, was more commonly reported.

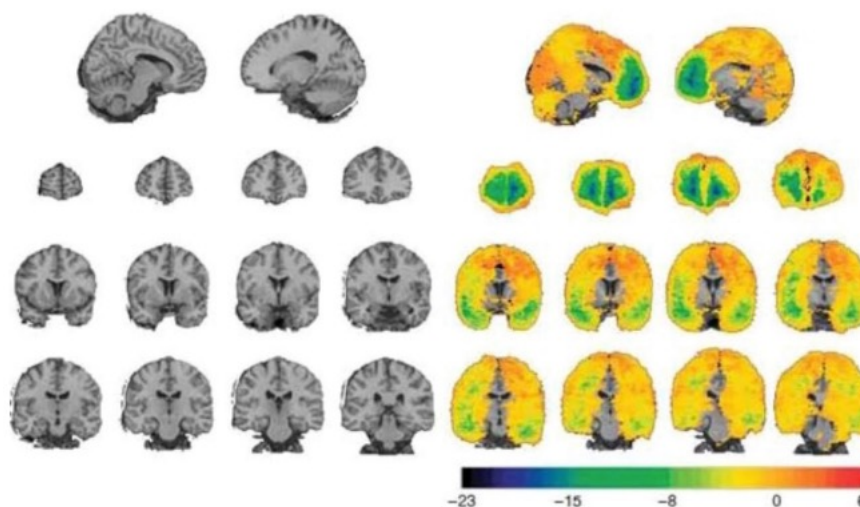


Figure 2. Lesion difference analysis

The study found partially correlation between the extent of the brain damage and behavior, but instead found that ‘‘disruption to family activities’’ was more likely to cause aggressive and violent behavior. Since there are types of violence behavior Grafman also investigate the type of the violence. The investigation results showed that the violence of the soldiers were not mostly physical, instead it was more verbal and emotional. The aggression levels of the PFC damaged veterans were also compared with the ones who received damage in different brain areas. The ones who had PFC damage were also more violent compared to the others. This number of result helped neuroscientists a lot about understanding the functions and importance of PFC. As a conclusion in this study we can see that while there are biological factors that affects behavior, there is still an environmental factor that is influential. The Vietnam Head Injury Study proves that a damage to the prefrontal cortex may have an influence on violent behavior.

References

<https://www.themantic-education.com/ibpsych/2016/10/04/key-study-brain-damage-and-violence-graftman-et-al-1996/>

https://www.frontiersin.org/10.3389/conf.fneur.2010.56.00016/event_abstract

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3093742/>

<https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.879.672&rep=rep1&type=pdf>