Physiology affects many cognitive processes. One example is how the hormone cortisol influences memory.

In a laboratory experiment, a 1999 study by Newcomer et al. investigated how cortisol influences memory functioning. Cortisol is a stress hormone, and it is believed that prolonged secretion of cortisol is the the cause of the memory impairment, which is one of the symptoms of chronic stress. The research used three experimental groups. Group one was given 40mg of cortisol in a tablet per day; group two was given 160mg of cortisol, and group three was given a placebo tablet. After four days, the participants were asked to listen to and recall a prose paragraph that tested their verbal declarative memory. The results indicated that the participants who were given the high level of cortisol showed a significant impairment of memory.

This study supports the claim that there is a link between physiology and cognition. It is known from scanner studies that chronic stress can result in shrinking of the hippocampus, a brain structure associated with memory. Newcomer’s study showed that even short-term increases in cortisol can have a damaging effect on memory; thus, it is causing the shrinkage of the hippocampus. It can be concluded that there is a cause and effect relationship between levels of cortisol and memory processes.

In examining a function of a physiological process interacting with cognition, the following narrative will consider the interaction and explain the relationship between cortisol and declarative memory as studied by Newcomer, et. al (1999). Cortisol is a stress hormone, secreted during times of stress, which could be defined as either an emotional or physical pressure that the body undertakes. The study’s aim was to determine if any link existed between high levels of cortisol and stress and reduced function of the hippocampus, which is related to the function of memory.

Three experimental conditions were present for the self-selected, double-blind experiment: high levels (160mg/daily) of cortisol, low levels (40mg/daily), and a placebo (no active ingredient) to act as a major, minor, and no stress event, respectively. Participants were asked to listen to and recall a paragraph of prose in order to measure their verbal declarative memory. Following four days of the procedure, the results showed those in the high-level dosage group to have lower performance of memory than both those in the low level and placebo groups, even after day 1. As this was a highly controlled experiment, it can used in order to show a strong cause and effect between high levels of cortisone due to chronic stress and reduced capacities of memory. Additional studies that have utilized brain scans have also shown chronic stress can result in the shrinking of the hippocampus, a brain structure associated with memory. While hearing and reciting prose may not be the most applicable demonstration of memory, Newcomer’s study was able to show the negative physiological interaction of higher levels of cortisol and the cognition of memory. This suggests that the physical long-term exposure to stressful events could impact cognitive processes.