



Memory Strategies for Students with Test Anxieties

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Almost every student has had the experience of studying hard for an exam only to be unable to recall the information at the time of the test. Known as Test Anxiety, this problem plagues many students throughout their academic careers. Clinically, Test Anxiety is currently defined as a complex set of symptoms, including physiological over-arousal and negative ruminations, which result in impaired performance on testing. Test anxiety is different from being worried about lack of preparation for an exam. Students with test anxiety usually report being well prepared or even over prepared for their exam, but they cannot access the material upon command due to anxious feelings. These students usually report physical complaints at the time of testing, including feelings of nausea, excessive sweating, rapid heart rate and shortness of breath. They also experience intense feelings of self-doubt, including negative self-talk, feelings of inadequacy and a fear of failure. These physical symptoms often contribute to memory failures, which greatly impair test performance. A recent study by Dr. Mark Chapel suggests that if students with test anxiety are compared to non-anxious peers with the same intellectual capacity, the anxious student's GPA is usually significantly lower. Methods to improve memory performance often focus on strategies that help reduce the anxiety during the studying period and therefore help with memory retrieval at the time of testing.

Strategies to help reduce anxiety during studying are derived from Hans Eysenck PhD and Martin Calvo PhD's Processing Efficiency Theory (PET). Eysenck and Calvo determined that the state of anxiety during the time of studying affected the ability to recall the information at the time of test. Students with test anxiety experience such intense feelings of dread and worry that it interferes with their ability to encode information into memory. Episodic memory, which is used to remember the association between events, times and places based on personal experience, seems to be particularly inhibited. This may explain why students generally report test anxiety in subjects such as History or Science, which often require students to remember the context of an idea as opposed to just a simple fact. For example, students may be able to recall specific generals during the Civil War, but would be unable to generate hypotheses about why the war started. The most troubling part of the Processing Efficiency Theory is that students with test anxiety exert much more mental energy than their non-anxious peers when studying, but still have difficulties with the recall on information at the time of the test. The following strategies have been empirically determined to improve memory function in students with test anxiety:

Exercise prior to studying

The first strategy to reduce anxiety during studying is to make sure that the student gets some physical activity prior to studying. According to Dr. Andre Miu, who has studied the effects of exercise on memory function, a brisk 10-min walk followed by a 15 to 30-minute recovery period resulted in significant improvement in memory recall. Rhythmic changes in serotonin, epinephrine, norepinephrine and acetylcholine levels all affect cortical arousal and cognitive function. Exercise may result in "altered levels of these neurotransmitters, increased glucose, oxygen or nutrient levels resulting in increased synaptogenesis and neurogenesis." The physiological basis of this temporary improvement in memory remains to be determined, but this simple behavioral intervention may have widespread application in improving memory function.

Positive attitude during the study period

Following a period of exercise, the student needs to be in the right mindset. Dov Zohar in the Journal of Educational Psychology found that students with test anxiety scored up to 50 points lower on the SAT than their non-anxious peers with similar preparation. When the anxious students were questioned about their possible performance before the test, they predicted that their performance would be poor. Self-efficacy, the belief that one is capable, was cited as one of the main differences between the anxious and non-anxious groups. Thus, students with test anxiety should be encouraged during the study period to believe that they have a good memory. Positive expectations can result in significantly improved memory performance.

Active learning strategies

Once students are in the right frame of mind to learn, organizing and ordering information can significantly improve memory. Imagine, for example, how difficult it would be to remember a random list of 62 letters. On the other hand, it would not be difficult to memorize the first sentence in this paragraph, which also consists of 62 letters. Similarly, learning a large amount of unconnected and unorganized information from various classes can be very challenging. Students should therefore be encouraged to learn general concepts before moving on to specific details. When students understand the general concepts first, the details, such as specific history dares, make more sense because the material fits together within the overall framework of a subject. Seeing how the smaller details relate to one another enables students to process the information more deeply (which in turn helps them store, and later retrieve, it from memory). Organizing and adding meaning to the material prior to learning it can facilitate both storage and retrieval. This can mean organizing material on paper, such as making an outline or an idea web, or simply organizing material in the memory, such as learning it in a particular order or making intentional associations between ideas. For example, students may remember the name "Robert Green" by picturing Robert playing golf (on the green), wearing green clothes or covered in green paint. Students should also be encouraged to engage in active learning. Active learning requires being involved, or attending to and thinking about what is being taught. Even if a student attends every lecture and reads every assignment, there is no guarantee that they will learn and remember the information. However, using active learning principles ensures that the student understands the concepts before trying to memorize specifics about the task. For example, when trying to memorize something, it can help to actually recite the information aloud. Repeating information aloud can help program the information using auditory encoding, which may improve recall. Another technique is the use of visual memory cues, such as writing out vocabulary words, theories or algebraic formulas. This allows students to not only practice (and repeat) the information but also to see the way it looks on the page (to develop a visual memory that may be retrieved later). Finally, an effective way to enhance recall and understanding of dense material is to teach it to an imaginary audience. By doing so, the student is forced to organize the material in a way that makes sense to them and to anticipate potential questions. Moreover, articulating the concepts will uncover gaps in comprehension (and recall) of the material. After mastering a particular section from the textbook, a student should try delivering an organized lecture on any topic from that section. The student and parents can then check for accuracy and brainstorm questions about the material as a way of anticipating potential test questions. During the study period, students should also be encouraged to pay attention to facts that are interesting or intriguing. Students remember much more about people, places and topics that fascinate them. Students who are greatly interested in a subject pay closer attention to that subject and in turn their brains release chemicals to form deeper "imprints" on the cells that store memory. Those can literally become "long lasting impressions." So, rather than trying to remember specific names or dates, students should be encouraged to remember salient facts that will help them recall episodic memories on the exam. For example, the muscles in the knee are often referred to as the "cutest" muscles in the body because they resemble a smile. This type of fact can help cue a student with test anxiety to recall the rest of the facts about the physiology of the knee.

In summation, test anxiety can significantly impair performance. However, the application of exercise, a positive attitude and specific study strategies can assist in the recall of information from memory. Students are encouraged to remain calm during the study period and they should be reminded that positive expectations can make a huge difference when entering into the testing session. Given that recall of information is the most common concern of students with test anxiety, they should also be encouraged to utilize both visual and auditory memory methods to encode information. Finally, the recall of information is most salient if the student actively engages the subject through discussion or other forms of contemplation.