

Evaluating a Media Representation describing the Psychology of Mathematical Anxiety

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Media Source Evaluated:

<https://www.youtube.com/watch?v=7snnRaC4t5c&list=PLBCQtXpjuNnERSSKn7pRQdIWpIRJ52EHa&index=2>

Evaluating a Media Representation describing the Psychology of Mathematical Anxiety

The media example that will be evaluated in this paper is a TED-Ed animated video on YouTube. The video explores the question, ‘Why do people get so anxious about Math?’ by describing the concepts of working memory, metacognition and providing solutions. It has been found that people suffering from math anxiety do not experience decrements in performance simply due to mathematical incompetence (Ashcraft and Kirk 225). The video tries to convince students that it’s not poor math skills resulting in anxiety but actually vice-versa.

Math anxiety is defined as “the feelings of tension and anxiety that interfere with the manipulation of numbers and the solving mathematical problems in a wide variety of ordinary life and academic situations” (Richardson and Suinn 551). The video dives into the symptoms of math anxiety such as faster heart rate, sweaty palms and an inability to

concentrate. These are common symptoms of performance anxiety which includes math anxiety before a test (Gotter).

The video describes how mathematical anxiety depletes a cognitive resource called working memory. Working memory is the system responsible for the limited memory span; It has limited storage and processing capabilities (Baddeley and Hitch 86). A relationship between anxiety and cognition called the processing efficiency theory exists (Eysenck and Calvo 409). The theory describes how performance deficits caused due to general anxiety are more prominent in tasks that require the use of working memory (Eysenck and Calvo 409). Studies by Ashcraft and Kirk have extended this theory to mathematical anxiety (225). The working memory, in particular the central executive component, is heavily involved in applying procedures of arithmetic during problem solving (Ashcraft qtd. in Ashcraft 225). It is also

where intrusive thoughts and worry are stored and attended to (Ashcraft 236). Their results have shown a 'reduction in the available working-memory capacity of high-math-anxiety individuals when their anxiety is aroused.'(235). This reduction negatively impacts performance in math or math-related tasks that rely on working memory, 'including not only addition with carrying but presumably any counting-based task.'(235) This is only a temporary reduction in processing ability of the central executive which occurs due to anxiety build up (236). This verifies the video's claim that worrying about the math problem at hand, 'eats up working memory' making it harder to tackle the math itself. This leads to people sometimes forgetting even basic arithmetic skills as they do not have enough space in their working memory to bring that information from long-term memory and use it in the math problem.

The video also describes how parents and teachers make students more anxious about math by making it seem like a 'challenging' subject. Teachers play an important role in how students approach mathematical learning. Studies indicate sensitive teachers can help alleviate mathematical anxiety (Aldrup et al. 745). Students whose teachers have better knowledge of the right pedagogical methods to use in the classroom and are enthusiastic about teaching show higher achievement gains in math classes (Kunter et al. 815). Additionally, students with teachers who were enthusiastic about teaching showed a significant increase in mathematics enjoyment (Kunter et al. 815). This increase in enjoyment can boost the confidence of highly anxious math students.

The video explains how students can use 'their knowledge of the brain to change their mindset'. Using one's knowledge of the brain is called metacognition, the ability to reflect and understand one's own mental processes. Here, the 'psychological principle' of the 'growth mindset' is brought up. An individual with a growth mindset has the belief that their intelligence can be improved through effort and practise. (Dweck and Yeager 4) Students with a growth mindset are able to perform better in transfer tasks (Xu et al. 10). These transfer tasks are tasks where individuals must have 'the ability to construct a coherent mental representation from the presented material' and 'use the presented material in novel situations'(Mayer 20). This is particularly useful in mathematics where students must first understand complex formulas and then apply them to new problems in a novel exam setting. Hence the video rightly describes how a growth mindset might benefit a math student struggling with anxiety.

The video explores other techniques to reduce anxiety such as practising breathing exercises or even engaging in physical exercise. These are popular methods to reduce anxiety in general (McDermott). The video highlights how 'writing down your worries can also help'.

This is a useful strategy. Expressive writing before a math test has been shown to improve the performance of math-anxious students, especially when words related to anxiety are written down. (Park et al. 103). As discussed earlier, math anxiety reduces the cognitive resource called working memory and hence by alleviating the anxiety, students will be more efficient at problem-solving. Some other tips the video could have included are getting a good night's sleep before a math test, (something which students often skip), a little meditation or skipping coffee the morning of the test (McDermott).

The video is a successful exploration of the link between working memory and mathematical anxiety. It provides research-backed information to its viewers about the reasons behind this form of anxiety and also how they can use metacognition to their advantage to overcome it. The video is socially useful; People suffering from math anxiety will appreciate the clear psychological explanations and solutions provided.

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