

What is maths anxiety?

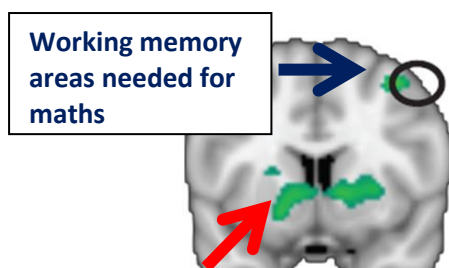
Maths anxiety has been defined by Tobias and Weissbrod (1980) as “the panic, helplessness, paralysis, and mental disorganisation that arises among some people when they are required to solve a mathematical problem” and it is thought to affect a large proportion of the population. Jones (2001) found that 26% of 9000 American students had a moderate to high levels of maths anxiety; and Perry (2004) found that 85% of students in introductory maths classes claimed to experience at least mild maths anxiety.

Symptoms of maths anxiety include:

1. **Emotional symptoms:** feeling of helplessness; lack of confidence; fear of getting things wrong.
2. **Physical symptoms:** heart racing; irregular breathing; sweatiness; shakiness; biting nails; feeling of hollowness in stomach; nausea.
3. Frustration from trying to do maths and not being successful.
4. Not knowing where to start with questions or never getting the right answer.
5. Confused and just wanting to quit and go home.
6. Very stressed before and during exams.
7. Begin to shut down and stop listening in class.

Effects on the brain

Recent research using brain scanners (fMRI) have shown that maths anxiety has measurable effects on parts of the brain used to understand maths.



Working memory is important for solving mathematical problems. Maths anxiety eats away at working memory because the brain is too busy worrying about maths instead of doing it (Young, 2012). This means that whilst someone is in a state of anxiety, they will struggle to understand the maths being taught or attempt questions.

Anxiety reduces brain power in them

Bad experiences with maths in the past mean that the brain sometimes associates maths with pain, so the regions of the brain associated with pain processing are activated when thinking about maths (Lyons and Beilock, 2012). This only occurs when *thinking* about the maths, but doesn't occur when the brain is actually *doing* maths. The brain can also see maths as a threat, so the natural response is to 'run' away from maths in a similar way as one would run from a tiger.

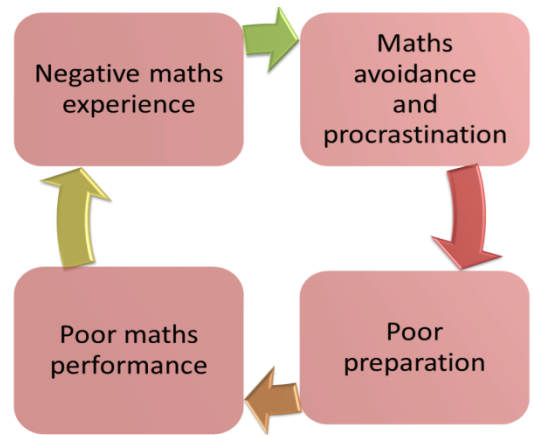


Pain region activated before maths question asked

Causes and impact

Finlayson (2014) reported that maths anxiety is usually linked with the kind of teaching styles experienced in the classroom, which often focus on memorisation and rote recitation. Their early maths teaching may have been from teachers who were anxious themselves, and thus over-compensated by emphasising a black-and-white, right-or- wrong approach.

Most people have had negative maths experiences such as embarrassment or humiliation from failure, teachers who are insensitive or uncaring, negative attitudes about maths from peers or family, and traditional rote learning rather than understanding the processes. Maths therefore triggers negative thoughts and memories so many maths anxious students will avoid maths. This could mean avoiding subjects or modules they think contain maths (including statistics) or in situations where they have to study maths, avoid studying until the last minute. Poor preparation leads to poor performance which is another negative maths experience, making the student more anxious as it reinforces their view that they are bad at maths.



Avoiding maths or statistics is becoming increasingly hard given that most degrees now require students to study at least one of them. However, maths anxiety can be overcome within a nurturing environment, recognising and controlling the anxiety and by accepting that maths requires practice rather than inbuilt ability.

References

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