ISSN: 3048-9423(Online)
Naveen International Journal of Multidisciplinary Sciences (NIJMS)
© NIJMS | Vol. 1 | Issue 6 | Jun-July 2025
Available online at: https://nijms.com/
DOI: https://doi.org/10.71126/nijms.v1i6.80

Causes of Mathematics Anxiety: Cognitive–Affective Models

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ABSTRACT:

Mathematics anxiety is a pervasive, debilitating affect that undermines motivation, learning, and attainment across schooling and adulthood. This review synthesizes cognitive–affective accounts of its causes—self-efficacy, expectancy–value, and mindset—and maps how beliefs and appraisals precipitate anxiety and avoidance. Low mathematics self-efficacy biases threat appraisal, heightens worry, and constrains working-memory resources, triggering demotivation and withdrawal. Expectancy–value processes link low expectations of success with high perceived costs and instrumental value, producing heightened arousal and defensive disengagement when tasks are important yet daunting. Fixed-mindset beliefs further amplify evaluative threat, converting errors into evidence of limited ability, while growth-mindset orientations frame struggle as information for improvement. Across models, socio-cultural and instructional contexts (e.g., timed testing, rigid pedagogy, anxious role models) shape beliefs, thereby sustaining an anxious-academic loop. The review integrates evidence from school through higher education, noting co-occurrence with broader anxiety and the heterogeneity of risk trajectories. It also summarizes assessment approaches—MARS and abbreviated variants, AMAS, MAS-UK, and problem-solving-specific tools—highlighting psychometric support and use for screening and monitoring. Implications emphasize theory-aligned interventions: scaffolded mastery experiences and credible peer modeling to strengthen efficacy; expectancy–value re-framing that elevates utility and interest while reducing perceived cost; and mindset-consistent practices that de-stigmatize

NIJMS | Received: 08 Jun 2025 | Accepted: 23 Jul 2025 | Published: 31 July 2025 (94)

error, prioritize process feedback, and remove unnecessary time pressure. Multi-modal designs combining cognitive-behavioral strategies, hands-on inquiry, and collaborative structures show promise for interrupting avoidance cycles, improving performance, and broadening access to STEM pathways. Future work should pursue longitudinal, diverse-sample tests of mechanism, implementation fidelity, and context, to refine causal inferences and guide equitable, scalable practice. Worldwide effectively.

Keywords: *mathematics anxiety; self-efficacy; expectancy–value theory; growth mindset; cognitive–affective models; assessment scales; multimodal interventions.*

1. INTRODUCTION:

Despite its importance in education and employment sectors, substantial numbers of students and adults experience mathematics anxiety that adversely affects learning and employment. Although mathematics anxiety can be viewed broadly as a feeling of tension or apprehension that prevents successful engagement with mathematics, cognitive–affective models provide a more focused framework for investigating its antecedents. The ability of Self-Efficacy, Expectancy–Value, and Mindset models to explain a breadth of phenomena surrounding mathematics anxiety has made them particularly popular. The cause of mathematics anxiety remains uncertain, and a range of factors may contribute; these models help elucidate the underlying mechanisms.

Mathematics anxiety involves feelings of apprehension and increased physiological arousal when engaging with mathematical content. The phenomenon is widespread among students, affecting well-being and self-confidence. Mathematics anxiety also tends to co-occur with generalized anxiety disorder and other specific phobias, and it relates strongly to an individual's appraisal of their mathematical ability. Individuals experiencing anxiety look to internal attributions of competence to regulate effort: if sustained effort does not produce improvement, individuals can then attribute the lack of progress to stable, internal characteristics (e.g., low ability), creating an anxious-academic loop. Consequences commonly include demotivation, avoidance behavior, and eventual underperformance. Therefore, understanding the mechanisms underlying mathematics anxiety contributes to the identification of vulnerable individuals and to the development of early or targeted interventions.

Math anxiety is the experience of apprehension and increased physiological reactivity when facing mathematics-related situations such as solving problems or being in evaluative settings. It manifests on emotional, cognitive, and physiological levels and is linked to decreased achievement. Among the approaches developed to understand the mechanisms underlying the condition, those usually grouped under the heading of cognitive–affective models are particularly worthy of attention. These theories attribute anxious feelings to maladaptive beliefs and negative attitudes about either one's own capabilities or about mathematics itself. Three key examples—based on the constructs of self-efficacy, expectancy–value, and mindset—are presented here.

2. Cognitive–Affective Models:

Cognitive–affective models describe the underlying mechanism by which an anxiety-inducing situation influences an individual's performance when knowledge and motivation to engage exist. In such models, an anxiety-inducing situation triggers a worry response, which in turn disrupts the cognitive processes necessary for effective performance. Three cognitive–affective models found particularly instructive for understanding mathematics anxiety are examined here: self-efficacy, expectancy–value, and mindset models.

(i) Overview of Cognitive–Affective Models-

Three cognitive–affective models—self-efficacy, expectancy–value, and growth mindset—are reviewed to understand their role in causing mathematics anxiety. Self-efficacy is defined as the beliefs a person has in his or her capabilities to organize and execute courses of action to attain a desired outcome. Low mathematics self-efficacy is viewed as a potential cause of mathematics anxiety. Expectancy–value theory considers individuals' expectations for success and the subjective value of the task or domain. This theory extends into the affective domain by relating increased threat-value to negative emotions, including mathematics anxiety. The growth mindset versus fixed mindset model posits that students' beliefs about the malleability of intelligence can influence their emotional resilience and motivation in learning, influencing the level of anxiety experienced. The Socio-Cultural Psychology model provides a basis for understanding these cognitive–affective models, as it identifies personal factors influencing feelings and behavior in achievement domains. The interrelations among the three factors responsible for achievement emotions—self-efficacy, expectancy–value, and growth mindset—situate the cognitive–affective models within the broader discussions about the factors that cause mathematics anxiety.

(ii) Importance in Understanding Anxiety-

Cognitive–affective models are important because they are based on a relevant theoretical framework and have shown that cognitive beliefs and affective states provide a good explanation of the mechanism of anxiety. The importance of these three models is widespread. For example, it has become an integral part of changes to the personality development of children and adolescents when attempting to promote mental health and chemical education. Mathematics anxiety can exist in all levels of society, from early childhood to college students. Explanations of these models may be used to address the issue of mathematics anxiety in all levels of the academic environment and also interconnect with other personality development models and mental health resources. Moreover, cognitive-affective models can be incorporated as additional topics within the subject area of mathematics.

Mathematics anxiety can be defined as a feeling that an individual experiences when dealing with calculations, and it is an academic issue that many students face. Furthermore, the feeling may be increased by low confidence and self-doubt. These negative feelings lead to a poor performance in mathematics. Approximately 10% of students worldwide experience mathematics anxiety. High levels of mathematics anxiety are an emotional issue that can be destructive to an individual's progress. From a contemporary viewpoint, cognitive-affective models are important because they influence the formulation of present-day treatment techniques. Various coping strategies determined by these models can help students overcome mathematics anxiety and work towards a more positive attitude. By explaining the mechanism of anxiety, these models provide important information to guide and inform the design of effective remedy strategies.

3. Self-Efficacy in Mathematics:

Self-efficacy denotes an individual's belief in their capacity to organize and execute the courses of action required to manage prospective situations. In the domain of self-efficacy beliefs, individuals assess their ability to perform specific tasks by estimating the probability that they can competently execute those tasks to achieve designated goals. Within the context of mathematics anxiety, self-efficacy serves as a robust predictor of the extent to which anxiety symptoms manifest across various emotionally evocative situations. Interventions specifically designed to enhance students' mathematics self-efficacy beliefs have demonstrated substantial reductions in the levels of mathematics anxiety experienced by those students.

(i) Definition and Theoretical Framework-

Math anxiety is a detrimental condition triggered by anticipated or actual mathematical tasks, with negative repercussions on achievement. Its worldwide prevalence warrants extensive scholarly inquiry to develop effective mitigating strategies. Cognitive–affective frameworks, culminating in the consideration of self-efficacy, expectancy–value, and mindset models, consolidate findings from multi-faceted perspectives into a coherent explanatory account. Psychological factors, incorporating cognitive, affective, social, and cultural elements, are decisive in etiological explanations. Cognitive–affective models emerged to adapt general anxiety frameworks to the specific context of mathematics and to resolve inconsistencies among existing empirical outcomes. Persistent disparities concerning mathematics-related determinants and consequences legitimated the need for an integrated theoretical platform.

Self-efficacy theory explicates mathematical functioning and informs tailored intervention schemes to diminish ethical limitations of breadth so far. Expectancy–value theory interprets motivation patterns, weaker compared to correlates of self-efficacy, highlighting significance under a motivational perspective. Mindset paradigms offer an approach to re-frame negative contextual-developed attributions in constructive terms; dependent on epistemological congruence, models enforce divergent predictions and recommendations.

(ii) Role in Mathematics Anxiety-

Given the detrimental impact of mathematics anxiety on performance and motivation, explaining its formation is an important goal. Cognitive–affective models provide plausible accounts of potential mechanisms by describing theoretical systems of interrelated variables that specify how anxiety emerges from particular belief, motivation, or memory structures. These systems generate explicit predictions concerning the processes and outcomes that should be observed in specific situations. Self-efficacy is the belief that one can successfully perform a specific course of action in a particular domain. Although originally proposed as a general expectancy, contemporary theorists consider it to be a judgmental mechanism that reflects the degree of confidence one has in their ability to produce an anticipated outcome under a specified set of circumstances. The construct focuses on the anticipated performance of a course of action, rather than on causal attributions. Interventions that successfully improve self-efficacy also reduce levels of school- and mathematics-related anxiety, and perceived self-efficacy accounts for the relationship between anxiety and academic achievement.

(iii) Interventions to Enhance Self-Efficacy-

A substantial body of research has developed interventions designed to enhance self-efficacy, with an emphasis on approaches that address mathematics anxiety. Behavioral strategies entail manipulating the immediate physical environment to create optimal conditions for task performance. Cognitive strategies focus on modifying thought processes regarding task-related beliefs, which can be accomplished through psycho-education, cognitive restructuring, or reframing—and on regulating accompanying affective states. In addition, more recent research has explored cognitive-behavioral interventions that integrate components of both behavioral and cognitive approaches. Improvements in the ability to regulate physiology and affect may contribute to the enhancement of self-efficacy. Physiological states, such as anxiety, serve as potent sources of information about the level of personal capability, yet they tend to influence self-efficacy in a negative manner. Reductions in anxiety level or in the intensity of other distressing emotional states, either by means of behavioral or cognitive strategies, thus have the potential to strengthen efficacy beliefs.

4. Expectancy–Value Theory:

Expectancy–Value Theory emphasizes two key components that closely interact to determine motivation: expectancy of success and subjective task value. Expectancy of success, a key motivational belief, corresponds to self-efficacy beliefs through the interaction of ability beliefs and perceptions of task difficulty. Subjective task value comprises the perceived importance of the task (attainment value), the perceived enjoyment (intrinsic value), and the perceived utility of the task. Difficulty-based values, such as the costs of engaging in the task—in terms of effort, training requirements, or lost opportunities—also influence motivation, typically exerting a negative effect. The expectancy component plays a principal role in the emergence of anxiety; low expectancy increases the likelihood of anxiety, especially if an individual when faced with a challenging task perceives the associated value as high. Here, the value becomes an incentive that triggers generalized apprehension, heightened threat sensitivity, and lack of confidence, all of which lead to distress and, subsequently, to mathematics anxiety.

(i) Conceptual Framework-

Mathematics anxiety is defined as a feeling of tension and anxiety that interferes with manipulation of numbers and the solving of mathematical problems in a wide variety of ordinary life and academic situations. Math anxiety is a negative emotional reaction to mathematics, caused by adverse emotional reactions to mathematical content and situations at home or in the classroom which can interfere with one's ability to perform mathematical tasks and to learn new mathematical content. Approximately 20% of students worldwide experience mathematics anxiety at some point, which weakly correlates with academic performance but poses a real threat to students' well-being, computational literacy and even their future careers in many fields of science. A developmental bio-psycho-social model of mathematics anxiety highlights the complexity of the pathways that may lead toward its development and identifies major vulnerability factors along the path. Cognitive–affective models of mathematics anxiety have been proposed to provide new insights into the mechanisms through which adaptive and maladaptive anxiety operate. A plausible cognitive-affective explanation of the psychoneurophysiological responses underlying mathematics anxiety is necessary. Psychoneurophysiological responses relate to the psychological mechanisms through which stressors influence the physiological expression of stress and anxiety. The cognitive-affective framework underlines principal mechanisms responsible for the psychoneurophysiological phenomenon and elucidates its specific path from investment to manifestation. The proposed formal psychological explanation posits anticipation and generalization as key cognitive-affective mechanisms—along with classical conditioning, operant conditioning and avoidance behaviour—that sustain physiological activation when threatened by mathematics tasks or situations. In the psychological framework, the experience of anxiety is accompanied by typical physiological responses.

(ii) Influence on Student Motivation-

Self-Efficacy Self-efficacy, a key construct in Albert Bandura's social-cognitive theory, refers to one's confidence in their own ability to perform a specific task—in this case, mathematics. Research confirms that students with high self-efficacy experience less mathematics anxiety. Studies have shown that by nurturing self-efficacy, it is possible to significantly reduce students' mathematics anxiety. Role model intervention programs and repeated successful experiences with mathematics tasks have proven particularly effective for children in early primary education. Self-efficacy also shapes the interpretation of stressful situations and anxiety; students with high self-efficacy respond to such situations with excitement, while those with low self-efficacy tend to experience tension, nervousness, and increased anxiety. Given self-efficacy's pivotal influence on motivation and anxiety, counseling psychologists should focus on ways to boost students' mathematics self-efficacy, as this can alleviate anxiety symptoms.

(iii) Expectancy–Value and Anxiety Correlation-

Expectancy–Value constructs are posited as formative components influencing mathematics anxiety. Core to Expectancy–Value Theory are the constructs of expectancy—an individual's belief about likely future success—and value—the perceived importance of a specific task. Both expectancy and value jointly determine behavioral choices, effort expenditure, and persistence when confronting particular activities. Expectancy and value exert a significant impact on diverse academic domains such as reading, mathematics, and mathematical problem solving. Students who anticipate success are more disposed to exhibit heightened motivation. Methods to enhance a student's expectancy of success and perceived value—thereby potentially mitigating mathematics anxiety—include maintaining a positive emotional environment, providing challenging work assignments, and offering sincere praise following accomplishments. These strategies are incorporated into various educational models aimed at reducing anxiety in mathematical contexts.

5. Growth Mindset vs. Fixed Mindset:

The concept of mindset forms another cognitive–affective framework used to explain mathematics anxiety. Mindset theory distinguishes between fixed and growth mindsets. Adolescents with a fixed mindset regard intelligence as an innate, static trait: “You have a certain amount of intelligence, and that’s it.” Individuals shift to adopting a fixed mindset the moment they experience challenges, setbacks, or obstacles. On the other hand, adolescents with the growth mindset regard intelligence as malleable and capable of developing through effort and learning: “You can develop your intelligence over time.” A growth mindset fosters positive responses to adverse educational experiences, leading students to devote more effort and persist longer instead of giving up. Conversely, a fixed mindset may result in avoiding mathematics altogether when confronted with challenges. The choice of mindset also influences responses to criticism and failure; fixed-mindset individuals tend to perceive these experiences as indicators of personal inadequacy. Several interventions have been proposed for cultivating a growth mindset, including exposure to models exemplifying growth-minded behavior, pedagogical training, direct emphasis on mathematical development dialogue, and workshop activities.

Mathematics anxiety is characterized as a feeling of tension and anxiety that interferes with the manipulation of numbers and mathematical problem solving in ordinary life and academic situations. It severely impairs cognitive processing of math-related information and may have a devastating effect on well-being and general self-confidence, thereby compromising information processing more widely. It can be induced and transmitted by teachers, peers and parents and is exacerbated by distorted perceptions of the surrounding environment. It negatively affects a large proportion of students and adults worldwide, yet its causes leading to onset and its underlying mechanisms remain poorly understood.

Mathematics anxiety is a debilitating emotional reaction to situations involving mathematical problem solving. It has been linked to shame, anger, and guilt, and to poorer motivation for learning and lower achievement in mathematics. Cognitive–affective models have been suggested as a framework for understanding the development and maintenance of mathematics anxiety. The extensive literature on self-efficacy, expectancy-value theory, and mindset is central to the development of these models.

Mathematics anxiety is a psychological phenomenon describing feelings of tension and anxiety that interfere with the manipulation of numbers and the solving of mathematical problems in ordinary life and academic situations. It is more often reported by female than male students, and by adults than children, but the difference by gender tends to diminish with age. Some 11–15 per cent of US high school students report extreme mathematics anxiety. Its early stages often emerge in early schooling, particularly among primary school children who have not yet developed the capacity for abstract thought. An inverted U relationship between anxiety and mathematics achievement suggests that moderate anxiety may prove optimal, but more often higher anxiety is associated with poorer achievement.

Mindsets refer to beliefs about the malleability of personal attributes. Dweck (2006) distinguished between growth mindset (intelligence and ability can be improved through effort) and fixed mindset (intelligence and ability are fixed and unchangeable). Several researchers have demonstrated that a growth mindset is an important factor in overcoming mathematics anxiety. Learners who hold a growth mindset tend to have positive motivational beliefs, and favorable learning strategies. Conversely, a fixed mindset can lead to avoidance of learning and poor performance. Therefore, a growth mindset may buffer the effects of mathematics anxiety, while a fixed mindset may exacerbate it.

6. Factors Contributing to Mathematics Anxiety:

Mathematics anxiety refers to feelings of tension, apprehension, or fear that interfere with mathematics performance. It is widely reported that individuals with strong mathematics anxiety tend to avoid mathematics, which limits their opportunities to excel in science, technology, engineering, and mathematics (STEM) domains. Factors that contribute to the development of mathematics anxiety are identifiable within the socio-cultural environment, educational environment, and personal characteristics.

Mathematics anxiety prevails on a vast scale, is an important lifelong determent of success, is fuelled by several factors, and can be combatted by particular strategies. Explanations of its role, causes, and correlations have explored what makes some individuals more vulnerable than others to the phenomenon, the main cognitive models, diverse contributing factors and possible remedies. Cultural requisites and expectations have a strong message for a person who is not competent in mathematics within a society in which mathematics is important, a recurrent emphasis being mathematics and freedom. Western cultural assumptions suggest that the methods of mathematics and science are foolproof and lead to the liberation of individuals. One aspect of mathematics teaching is therefore to liberate the mind by teaching these methods. “Western cultural assumptions hold that to link mathematics and power is to entail a faulty value judgment: the only way to be powerless is not to be rational”. The speculations about the origins of mathematics anxiety did not take the existence of passionate cultures into account. Nevertheless, there is an urgent need for scientifically based formulations of the causes of the development of mathematics anxiety within educational experience. These formulations would assist in limiting the extent of the anxiety-provoking experience.

Negative classroom experiences correspond to the strongest setting in which mathematics anxiety develops. Insensitive instructor attitudes, formal evaluation procedures, gender bias, and age discrimination each exert an influence, and both covert and overt instructor behaviors negatively impact students’ attitudes towards mathematics. Although some roots of mathematics anxiety are cognitive in nature, relating for example to the individual’s preferred learning style, a significant portion enzymes from prior negative experiences. Such considerations help to explain why alternative explanations — including personality type or gender predisposition — are insufficient to account for the phenomenon. Nevertheless, once established, a student’s mathematics anxiety generally persists and manifests in other settings, with negative implications for long-term engagement with the discipline.

Teaching practice reviewed cognitive–affective models that relate the association between individuals’ thinking patterns about mathematics and the anxiety they experience. Self-efficacy theory accounts for the belief that mathematics skill is personal and malleable, rather than fixed and imponderable.

Expectancy–value theory suggests that individuals who expect to fail and value mathematics negatively are likely to develop anxiety. The mindset construct addresses the question of whether people perceive cognitive ability as malleable or fixed; those holding a fixed mindset regarding mathematics ability are more inclined to exhibit anxiety. Each framework offers a comprehensive account of the cognitive origins of mathematics anxiety and points toward pedagogic pathways that may accelerate the decline of the phenomenon. In pedagogic settings, mathematics anxiety emerges from interactions between the individual and the environment. Classes involving co-players promote self-efficacy and provide opportunities to restore control; accordingly, collaboration—rather than competition—constitutes the preferred approach for students confronting anxiety. Students who are already anxious may nevertheless experience anxiety during testing; cognitive techniques that encourage self-talk and refocusing attention are useful in this context. Teaching students that ability is malleable, rather than fixed, enhances engagement and reduces anxiety. Education systems might develop programs to promote the adoption of such mindsets.

Individual accounts of the onset of mathematics anxiety attest to both the variety and complexity of its causes. Found that prospective elementary teachers frequently experience anxiety in mathematical content involving spatial concepts and algebra, tracing the origin to earlier schooling. More generally, the process begins in elementary school, often instigated by anxious teachers who employ instructional practices that are rigid and structured. Pressures to perform within strict time limits and the imposition of a single correct approach to problem-solving, together with embarrassing classroom incidents, contribute to diminished confidence and the formation of negative attitudes toward the subject. Early-career teachers often report negative classroom experiences, with additional factors such as communication barriers, instructor attitude, quality of instruction, evaluation methods, gender bias, and age discrimination playing contributory roles. Finally, although mathematics anxiety is widely attributed to adverse prior experiences, it also arises from the cognitive domain, including discrepancies between teaching styles and individual learning preferences. The various explanatory frameworks and empirical findings reviewed in this article accord well with the ôdynamic developmental frameworkö recently proposed by Rubinsten, Marciano, Eidlin Levy, and Daches Cohen. This framework acknowledges the persistence of heterogeneity in risk factors and models their reciprocal interactions over time. More specifically, these risks operate in conjunction with environmental influences to yield the individual profile of symptoms evident at any given developmental stage. The nature and relative contributions of the antecedents are not fixed, but change according to the unfolding developmental process. These changes—together with variation in predispositions and capabilities, situational determinants, and the complex interrelations between symptomsâ€"ultimately produce the shifting symptomatology observed across different developmental periods. Ongoing longitudinal investigations are beginning to clarify these effects, with initial findings indicating moderate symptom stability during childhood, in accord with the emphasis on precursors in early stages. Particularly among low academic achievers, the statistical separation of direct and indirect effects provides insight into the interplay between distinct risk factors. Nevertheless, there exist cases of individuals who transcend their childhood mathematics anxiety to attain advanced proficiency, an outcome that remains to be incorporated into the evolving theoretical framework.

7. Assessment of Mathematics Anxiety:

The mechanisms through which mathematics anxiety manifests and influences mathematical performance are inherently cognitive and affective. A range of cognitive–affective models accounts for various components of mathematics anxiety. Several such models are considered afterwards and particular attention is devoted to the models of Self-Efficacy, Expectancy–Value and Mindset.

The importance of assessing MAT is one driver behind the development of adequate instruments and scales. These tools and scales serve to assess the intensity of anxiety and fear in general or in specific domains such as mathematics. They also help to understand how this affects pupils' achievement and performance in school. When used in interventions, they make it possible to use a reflective approach to better understand their emotions and feelings during the session. To select the appropriate scale or instrument, a number of aspects need to be considered, including the population being assessed, the context in which the assessment takes place, and the psychometric quality of the scale. Several reviews have already focused on existing measurement instruments. For example, Melo-Pfeifer and Noskova use psychometric details and other features to evaluate scales for young pupils (primary and lower secondary education). A complementary overview focuses on scales for adult populations, including students in higher education (university or other).

The Assessment of Anxiety in Problem Solving Mathematics (AAP–M) scale was developed by Tsybina and Flynn to assess anxiety during mathematics problem-solving and to be used for diagnostic purposes and as an evaluation tool. Psychometric evaluation supports the use of the scale as both a continuous and a categorical measure of aspects of anxiety in students' problem-solving experiences. It shows promise for use in the diagnosis of problem-solving anxiety and the evaluation of anxiety in different forms of mathematics learning. Integrating anxiety measurement within lessons can help students to become more aware of their feelings and emotions during mathematical learning activities. It can provide information to teachers about the difficulties that pupils encounter during the activities, in particular when explaining underlying concepts.

Various instruments have been developed for assessing mathematics anxiety (Moore, 1988). The Mathematics Anxiety Rating Scale (MARS) by Richardson and Suinn is the most widely used measure, comprising 98 items that describe mathematics-related situations. Extensive psychometric analyses indicate the MARS possesses adequate internal consistency, test-retest reliability, content validity, and concurrent validity. Rigorous statistical and experimental methodologies further validate the MARS-Abbreviated (MARS-A), an 18-item concise version derived from the original scale. Despite variations in format, content, response scales, and target populations, most popular measures feature items that systematically vary by anxiety level, enabling an aggregated anxiety score. Several scales are adapted from general or social anxiety instruments; for instance, the Academic Anxiety Inventory includes a subset specifically targeting mathematics anxiety.

8. Conclusion:

The theoretical target of this essay is a better understanding of the causes of mathematics anxiety, and the theoretical approach is one of cognitive–affective models. Three candidate models are considered: self-efficacy, expectancy–value, and growth vs. fixed mindset. The essay pays attention to the status and evidence behind each model, keeping the theoretical and empirical flavour to the fore throughout. The outline incorporates the three models in the order listed, spell out the underlying assumptions and relations to mathematics anxiety, discuss relevant studies, and exemplify with interventions and practical strategies. The question of what it is reasonable to claim about causes remains the key concern, alongside a completely coherent and self-contained presentation of the treatment. The problem of mathematics anxiety is first reviewed, with theory then compared; the theoretical basis for cognitive–affective models is next summarised, before considering self-efficacy, expectancy–value and mindset in turn; take-up factors and the measurement of anxiety are discussed; finally, worry and interventions are outlined and evaluated. The conclusion recaps the main points and highlights the overall contribution of cognitive–affective theory to the understanding of mathematics anxiety. Bridging cognition and affect, cognitive–affective models are essential for understanding anxiety phenomena. The focus is on mathematics anxiety, regarded as a special case within the broad family of anxieties to which the models apply. Three variants—self-efficacy, expectancy–value and growth vs fixed mindset—claim to explain why anxiety arises and why it has the distinctive effects noted earlier. The essay investigates whether they succeed as candidates and how well their claims align with empirical findings. Confining the analysis to cognitive–affective models and to a select sample of contemporary examples facilitates thorough treatment and fits the general requirement of a concise general review. The three models are evaluated in detail, considering their theoretical basis, mechanisms and practical consequences. The next section contrasts an account of mathematics anxiety with the characteristics of the cognitive–affective framework. Theory is briefly summarised and the three models are assessed. The final section—the conclusion—recaps the main points, emphasising the explanatory role of cognitive–affective theory and outlining its broader significance for understanding and addressing mathematics anxiety at many levels.

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Cite this Article:

Shishank Johnson and Dr. Prashobh Paul D'Souza, "Causes of Mathematics Anxiety: Cognitive–Affective Models", *Naveen International Journal of Multidisciplinary Sciences (NIJMS), ISSN: 3048-9423 (Online), Volume 1, Issue 6, pp. 94-105, Jun-July 2025.*

Journal URL: https://nijms.com/

DOI: https://doi.org/10.71126/nijms.v1i6.80