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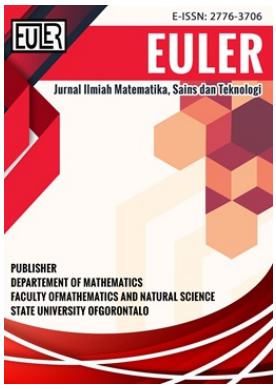
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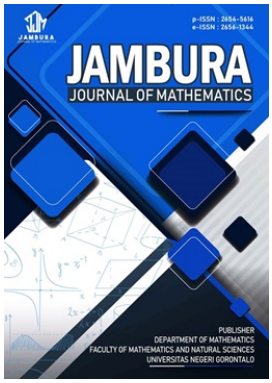


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Research Article

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Math Anxiety in Inclusive Classrooms: Behavioral, Cognitive, and Affective Profiles

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ABSTRACT. *Mathematics anxiety manifests in multiple forms avoidance behaviors, intrusive negative thoughts, and emotional distress yet these manifestations are rarely examined in relation to students' learning profiles. In particular, little is known about how mathematics anxiety is expressed among students with and without special educational needs (SEN) who learn together in inclusive elementary settings. This study aimed to describe the profile of mathematics anxiety across both groups in one inclusive elementary school in Surakarta, Indonesia. A descriptive quantitative design was applied, combining descriptive statistical analysis with thematic interpretation of the response patterns; no independent qualitative data were collected. The sample included 60 third grade students (7 students with SEN and 53 without) who responded to an eight-item self-report scale, adapted from established mathematics anxiety measures and reviewed for content validity, measuring three dimensions of mathematics anxiety: behavioral, cognitive and affective. Within this sample, the two groups showed different descriptive anxiety profiles; because of the small SEN group ($n = 7$), these patterns characterize the participating classroom and should not be generalized to wider populations. Students with SEN presented a behavioral-dominant profile, in which behavioral scores ($M = 5.29$ of 6) fell well above the neutral midpoint of the scale, expressed in avoidance, postponement, and less engagement in mathematics activities. Students without SEN had an affective-dominant profile, with affective scores ($M = 4.62$ of 6) also above the neutral midpoint, mainly manifested in nervousness, fear of mistakes and emotional stress before carrying out mathematical tasks. The cognitive dimension was comparatively similar between both groups. Because no inferential statistical tests were conducted, all reported group differences are descriptive. These results suggest that the concept of mathematics anxiety in inclusive classrooms cannot be sufficiently explained on the basis of total scores. A dimensional approach provides a more accurate understanding of how anxiety functions differently for student profiles and can be useful for teachers in planning emotional and instructional interventions that are targeted accordingly. Given the small and single-school sample, these implications are indicative rather than prescriptive.*

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1. Introduction

Mathematics anxiety has been an ongoing and well-established concern in mathematics education. It is not only correlated with lower achievement but also influences students' attitudes towards learning, their perceptions of their own competence, and their future decisions to pursue mathematics [1]. The construct itself has a fairly long history in educational psychology. Early work recognized an emotional response called number anxiety related to numerical tasks [2]. A more formalized conceptualization of mathematics anxiety was proposed later by Richardson and Suinn [3] with the Mathematics Anxiety Rating Scale, which portrays mathematics anxiety as a state of tension and fear interfering with number manipulation and problem-solving. Meta-analytic findings have consistently supported a negative

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association between mathematics anxiety and mathematics achievement in school-aged individuals [4–6]. The literature has also increasingly demonstrated that mathematics anxiety is not a uniform phenomenon. It manifests across at least three different dimensions, namely cognitive, affective and behavioral, which can each have varying degrees of severity depending on the learner. The cognitive dimension involves worry, intrusive thoughts and a reduction in confidence during mathematical thinking. The affective dimension involves nervousness, fear and emotional discomfort when students face mathematics tasks. The behavioral dimension is expressed in terms of avoidance, procrastination, and withdrawal from participation. These components have been argued by researchers to be examined separately rather than collapsed into a single total score, as they may reflect qualitatively different aspects of a student's experience [7–9].

This distinction has practical and theoretical weight. Cognitive anxiety is related to the occupation of working memory resources and has negative consequences for the efficient solving of mathematical problems [10–12]. Affective anxiety is high in evaluative situations, especially when students are worried about making mistakes and being evaluated by others [13–15]. Behavioral anxiety is somewhat different. Instead of being a direct cause of performance impairment, it reduces the opportunities students have to learn over time, as avoidance limits the exposure to practicing, receiving feedback, and gradually developing effective coping methods [16, 17].

Inclusive classrooms add another dimension to the picture. The core principle of inclusive education is that all students, regardless of their learning, emotional or developmental profiles, should be supported in common environments [18–20]. Yet shared placement does not mean shared experience. Students with special educational needs may encounter additional barriers related to task access, attentional demands, language processing, speed of information handling, self-regulation, or accumulated difficulties from prior learning experiences. At the same time, students without special educational needs are not necessarily free from anxiety. Performance-oriented tasks, in particular, can evoke strong emotional responses even among otherwise academically proficient students [12, 15]. These dynamics are especially pertinent at the elementary level. Research carried out with primary school students indicates that mathematics anxiety may emerge early on and be already linked to achievement outcomes, self-concept, and problem-solving strategies [12, 21, 22]. Moreover, research with children with mathematical learning difficulties or specific learning disorders emphasizes the need for a careful assessment of cognitive and emotional factors as difficulties in mathematics and anxiety can co-occur without a common root [23, 24]. A simple comparison of groups of students with and without special educational needs, without considering how anxiety is expressed through the dimensions, risks to overlook meaningful variation.

Against this background, the specific contribution of the present study needs to be delimited carefully. The multidimensional structure of mathematics anxiety is already well established in the literature [7–9], and recent studies have described how mathematics anxiety develops and relates to achievement among primary school children in general education [25–27]. Other recent work has examined mathematics anxiety among students with mathematical learning difficulties or special educational needs [23, 24, 28]. What remains scarce, however, is dimensional, item-level evidence from ordinary inclusive classrooms in which students with and without special educational needs learn together under the same instruction, particularly in the Indonesian elementary context. Accordingly, this study does not claim to demonstrate a new structure of mathematics anxiety. Its contribution is empirical and applied: it documents how the behavioral, cognitive and affective dimensions are distributed across learners

with and without SEN within one inclusive classroom; it uses a brief instrument that teachers could realistically administer as part of routine classroom assessment; and it illustrates the added value of a dimensional, profile-based reading of anxiety compared with a single total score.

This study aims to fill this gap, focusing specifically on mathematics anxiety and analyzing it through its behavioral, cognitive and affective dimensions. Without making general causal claims, the study aims to describe the anxiety profiles of third-grade students in an inclusive elementary school context. Consistent with this descriptive purpose, the study does not test hypotheses about causal relationships or population-level group differences; no inferential statistical tests were conducted, and all observed patterns are reported as contextual descriptions. The main research question is: What are the behavioral, cognitive and affective manifestations of the mathematics anxiety profile among students with and without special educational needs in an inclusive elementary school context?

2. Methods

2.1. Research Design

This study used a descriptive quantitative (non-experimental) design, complemented by a structured thematic interpretation of the quantitative response patterns. The quantitative component identified score patterns across the behavioral, cognitive, and affective dimensions of mathematics anxiety, while the interpretive component organized those patterns into classroom-based anxiety profiles. This combination was chosen because numerical trends alone are seldom sufficient to convey how anxiety is expressed within a specific educational context [29].

Two clarifications are important. First, no independent qualitative data (such as interviews, open-ended responses, or classroom observations) were collected; the thematic procedure served as an interpretive lens for organizing the quantitative results rather than as a separate qualitative strand. For this reason, the study is reported as a descriptive quantitative study with thematic interpretation, not as a full mixed-methods study. The study was descriptive and exploratory in nature. No experiment was conducted and no teaching intervention was applied. The findings should therefore be read as contextual profiles, not as evidence of causal relationships. This is especially important to keep in mind given the small number of students with special educational needs in the sample ($n = 7$), which precludes inferential group comparisons.

2.2. Working Group

The study took place in one inclusive elementary school in Surakarta, Indonesia. Participants were 60 third-grade students, aged approximately 8 to 9 years, all of whom learned together in the same inclusive classroom setting. Of these, 7 students had special educational needs and 53 did not. Students' SEN status was based on the school's existing identification records. The SEN label covers a heterogeneous range of learning and developmental needs and is not diagnostically homogeneous; the seven students received individualized support within the regular classroom. Because of the small size and heterogeneity of this group, all SEN versus non-SEN comparisons are reported descriptively (see Sections 2.5 and 3.5). The group was heterogeneous in terms of learning achievement, motivation, and socio-economic background. Participant characteristics are summarized in Table 1.

Table 1. Participant Characteristics

Group	n	Percentage	Classroom setting
Students with SEN	7	11.7%	Inclusive third-grade classroom
Students without SEN	53	88.3%	Inclusive third-grade classroom
Total	60	100%	Inclusive elementary school

2.3. Data Collection Tools

Mathematics anxiety was measured with an eight-item self-report scale addressing three dimensions: behavioral, cognitive, and affective. The behavioral dimension included two items on avoidance and task postponement. The cognitive dimension included four items on forgetting concepts, confusion despite instruction, nervousness while the lesson is being presented, and dislike of mathematics learning because it provokes anxiety. The affective dimension included two items on nervousness and fear of making mistakes. The complete item composition of the instrument is presented in Table 2. Item assignment followed the dimensional framework of the source models: items describing worry- and thought-related responses tied to following and recalling lesson content were classified as cognitive, whereas items describing acute emotional arousal in evaluative situations were classified as affective.

Table 2. Item Composition of the Mathematics Anxiety Scale

Dimension	Code	Item
Behavioral	B1	I prefer to rest rather than attend mathematics lessons.
Behavioral	B2	I tend to postpone doing mathematics tasks.
Cognitive	C1	I often forget mathematics concepts even though I have already studied them.
Cognitive	C2	I feel confused even after I have been taught.
Cognitive	C3	I feel nervous when the teacher discusses the mathematics lesson.
Cognitive	C4	I do not like studying mathematics because it makes me anxious.
Affective	A1	I feel nervous before doing mathematics worksheets or end-of-semester tests.
Affective	A2	I am afraid of making mistakes when calculating on the board.

The items were developed by adapting established mathematics anxiety measures principally the Mathematics Anxiety Rating Scale [3], the Abbreviated Math Anxiety Scale [30], and dimensional models of worry, emotional discomfort and task-related responses [7, 8] to the vocabulary, the mathematics curriculum, and the daily learning experiences of third-grade students in Indonesia. All items were written in Indonesian and checked for age-appropriate wording.

A short instrument was deemed appropriate for this age group, as younger students tend to find lengthy questionnaires tiring and harder to follow; brief mathematics anxiety measures have accordingly been developed and validated for elementary-aged children [31]. At the same time, the shorter scales need to be interpreted with caution and should be interpreted in light of this limitation. The scale was therefore explicitly treated as a brief screening profile rather than as a diagnostic test [32, 33]

Content validity was examined through expert judgment. The draft instrument was reviewed by mathematics education experts and experienced inclusive classroom teachers, who rated each item for relevance to its intended dimension, clarity, and comprehensibility for eight- to nine-year-old students. Items judged ambiguous or difficult were reworded before administration.

Internal consistency was estimated using Cronbach's alpha, computed from the raw response data. For the eight-item scale, alpha was .63; for the behavioral, cognitive, and affective subscales, alpha was .59, .35, and .48, respectively. These values are reported for

transparency and interpreted with caution, given the small number of items per subscale, and particularly the two-item behavioral and affective subscales [32, 33].

Students rated the items on a 3-point Likert scale: 1 = disagree, 2 = neutral, and 3 = agree. Total scores ranged from 8 to 24. The behavioral subscale ranged from 2 to 6, the cognitive subscale from 4 to 12, and the affective subscale from 2 to 6. Higher scores reflected greater anxiety. Because the scale is anchored at 1 rather than 0, the lowest possible subscale score equals the number of items in the subscale, and a student responding 'neutral' to every item would obtain exactly 66.7% of each subscale maximum. To allow meaningful comparison across dimensions with different maximum scores, each subscale score was converted into a percentage of its maximum possible score, interpreted relative to this 66.7% neutral baseline, and additionally expressed as a percentage of the possible range above the scale floor, computed as $(M - minimum)/(maximum - minimum) \times 100$.

2.4. Data Collection Procedure and Research Setting

Students completed the questionnaire in their classroom, accompanied by trained researchers and teachers. Assistance was limited to clarifying the meaning of items and response options. Teachers or researchers did not direct students toward particular responses.

The questionnaire was administered during regular school hours so that anxiety could be experienced in a real classroom setting as opposed to an artificial or controlled environment.

The study took place in the students' regular inclusive third-grade classroom and did not involve any experimental conditions, treatment groups, or instructional interventions. Students attended their ordinary mathematics lessons, and the questionnaire was administered without altering the existing teaching arrangement in any way.

2.5. Data Analysis

The analysis proceeded in four steps. First, descriptive statistics were calculated for each dimension, including mean, standard deviation, range, percentage of the maximum score, and percentage of the possible range above the scale floor (Section 2.3). Second, the dominant anxiety dimension in each group was identified by comparing these percentages across behavioral, cognitive, and affective subscales. Third, item-level patterns were examined to identify which specific items contributed most strongly to the dominant profile in each group. Fourth, the quantitative patterns were interpreted thematically into descriptive anxiety profiles.

The thematic interpretation followed the analytic logic of Braun and Clarke's thematic analysis [34], adapted to quantitative response patterns rather than qualitative textual data: the researcher became familiar with the score patterns, coded meaningful differences across the dimensions, grouped codes into themes, refined themes in relation to the numerical data, and reported themes as descriptive profiles. Because the thematic procedure worked on the quantitative patterns themselves, its role is interpretive rather than that of an independent qualitative analysis (see Section 2.1).

To indicate the practical magnitude of between-group differences, Cohen's d [35] was computed as the difference between the group means divided by the pooled standard deviation, $d = (M_1 - M_2)/s_p$, where $s_p = \sqrt{((n_1-1)s_1^2 + (n_2-1)s_2^2)/(n_1+n_2-2)}$. The pooled estimator is appropriate for groups of unequal size, such as the SEN group ($n = 7$) and the group without SEN ($n = 53$) in this study. No inferential significance tests were conducted because of the small and unequal group sizes; accordingly, all descriptions of group differences are descriptive and are not to be read as statistically significant findings.

Due to the small size of the SEN group, the analysis was mainly educational, rather than

drawing inferences for generalization.

3. Results and Discussion

3.1. Descriptive Profile of Mathematics Anxiety

Both groups reported mathematics anxiety, though the way it showed up differed considerably. Students with special educational needs scored highest on the behavioral dimension, while students without special educational needs scored highest on the affective dimension. Cognitive anxiety was relatively comparable across the two groups. All comparisons reported in this section are descriptive; no statistical significance tests were applied (see Section 2.5). Table 3 presents the full descriptive statistics.

Table 3. Descriptive Statistics of Mathematics Anxiety Dimensions

Dimension	Group	M (SD)	% max	% range
Behavioral	Students with SEN	5.29 (0.76)	88.1%	82.3%
Behavioral	Students without SEN	3.85 (1.85)	64.2%	46.3%
Cognitive	Students with SEN	8.00 (2.45)	66.7%	50.0%
Cognitive	Students without SEN	7.79 (1.89)	64.9%	47.4%
Affective	Students with SEN	4.00 (1.63)	66.7%	50.0%
Affective	Students without SEN	4.62 (1.41)	77.0%	65.5%
Total anxiety	Students with SEN	17.29 (5.40)	-	-
Total anxiety	Students without SEN	16.26 (3.37)	-	-

Note. % max = percentage of the subscale maximum. Because the scale is anchored at 1, a neutral response to all items corresponds to 66.7% of the maximum; scores should therefore be interpreted relative to this baseline. % range = (M – subscale minimum)/(subscale maximum – subscale minimum) × 100. SEN = special educational needs.

To indicate the practical magnitude of the differences, Cohen's d was computed from the descriptive statistics using the pooled-SD estimator (Section 2.5). The behavioral difference was large in descriptive terms ($d = 0.81$), the cognitive difference was negligible ($d = 0.11$), and the affective difference was small to medium, with higher scores among students without SEN ($d = -0.43$). The difference in total anxiety scores was small ($d = 0.28$). Given the small size and imbalance of the two groups, these values should be read as descriptive indicators within this sample rather than as estimates of population effects.

3.2. Behavioral-Dominant Profile among Students with Special Educational Needs

The first theme was a behavioral-dominant profile among students with special educational needs. Their behavioral score was 5.29 out of 6, or 88.1% of the highest possible score, corresponding to 82.3% of the possible range above the scale floor and lying well above the 66.7% neutral baseline; it was markedly higher than their cognitive and affective scores, both of which fell at 66.7% of the maximum, i.e., exactly at the neutral baseline. This pattern suggests that anxiety in this group was expressed more through observable behaviors than through reported emotional or cognitive distress.

At the item level, the clearest indicator was a preference to rest rather than engage with mathematics tasks ($M = 2.86$), with 85.7% of students with SEN selecting the highest response category. Task postponement also scored high ($M = 2.43$), with 71.4% of this group choosing the highest option.

Compared with students without special educational needs, the behavioral difference was descriptively large. The total behavioral score gap was 1.44 points, with Cohen's $d = 0.81$ (a large descriptive difference; no significance testing was conducted). The postponement

item showed a clear descriptive difference between the two groups ($M = 2.43$ vs. 1.57). Together, these results point to behavioral avoidance as the most distinguishing feature of mathematics anxiety in this group. This prominence of avoidance echoes previous descriptions of avoidance and withdrawal as behavioral correlates of mathematics anxiety [16, 17], and is consistent with recent studies indicating that mathematics anxiety is already prevalent and consequential among primary school children [25, 27, 36].

3.3. Affective-Dominant Profile among Students without Special Educational Needs

The second theme was an affective-dominant profile among students without special educational needs. Their affective score reached 4.62 out of 6, or 77.0% of the maximum possible score, corresponding to 65.5% of the possible range above the scale floor and lying above the 66.7% neutral baseline; it was higher than both their behavioral (64.2%) and cognitive (64.9%) scores. This pattern suggests that anxiety in this group was more felt than acted out.

The most prominent item was nervousness before completing mathematics worksheets ($M = 2.38$), and fear of making mistakes also contributed noticeably ($M = 2.24$). Both affective items were, on average, endorsed above the scale midpoint.

Importantly, this affective pattern looked quite different from the behavioral pattern seen in the SEN group. Students without special educational needs generally remained involved in mathematics activities even when anxious. Their anxiety appeared as emotional discomfort during participation, not as withdrawal from it. This pattern is consistent with the wider literature on evaluative concerns in mathematics anxiety among school students [13, 14, 22].

3.4. Cognitive Anxiety as a Shared Area

The third theme was the relative similarity of cognitive anxiety across both groups. Students with SEN reached 66.7% of the maximum cognitive score, while students without SEN reached 64.9%. The difference was small, Cohen's $d = 0.11$, indicating that cognitive anxiety was not a meaningful differentiator between the two groups. Both means also fell close to the neutral baseline of the subscale (8.0), indicating moderate rather than pronounced cognitive anxiety in both groups. Item-level results supported this pattern (see Table 4). Across both groups, the highest-scoring cognitive item was forgetting mathematical concepts. Students with SEN scored a mean of 2.86 on this item, compared to a mean of 2.34 for students without SEN. Thus, difficulty recalling content was a widespread concern for third-grade students in this inclusive classroom, irrespective of SEN status.

Table 4. Selected Item-Level Indicators of Dominant Anxiety Profiles

Item indicator	Score pattern	Interpretation
Prefers rest rather than mathematics	SEN: $M = 2.86$; 85.7% agree Non-SEN: $M = 2.28$.	Stronger avoidance among students with SEN
Postpones mathematics tasks	SEN: $M = 2.43$; 71.4% agree Non-SEN: $M = 1.57$.	Clear behavioral difference
Nervous before mathematics worksheets	SEN: $M = 1.86$ Non-SEN: $M = 2.38$	Stronger affective response among students without SEN
Fear of making mistakes	SEN: $M = 2.14$ Non-SEN: $M = 2.24$	Both groups reported concern
Forgets mathematics concepts	SEN: $M = 2.86$ Non-SEN: $M = 2.34$	Common cognitive concern

Note. SEN = special educational needs.

3.5. Discussion

The descriptive results indicate that total scores may conceal differences in patterns of responses across mathematics anxiety dimensions. Although the total mean score was 17.29 for students with SEN and 16.26 for students without SEN (Table 3), the highest-scoring dimension differed. This contrast does not establish population-level group differences, particularly because only seven participating students were classified as having SEN. Rather, it illustrates the potential value of examining anxiety dimension by dimension within this classroom, consistent with multidimensional accounts of mathematics anxiety [7–9, 37].

Among the participating students with SEN, behavioral responses were particularly pronounced ($M = 5.29$ of 6; 82.3% of the possible range). Students frequently endorsed the statements about preferring rest to mathematics lessons and postponing mathematics tasks. If persistent, avoidance may reduce opportunities for practice, corrective feedback, and confidence building [16, 17]. However, these items measured self-reported tendencies; this study did not directly observe avoidance or establish whether anxiety caused it. Thus, the term behavioral-dominant describes the response pattern in this sample, not a general characteristic of students with SEN.

Among students without SEN, the affective dimension was highest ($M = 4.62$ of 6), reflecting reported nervousness before mathematics worksheets or tests and fear of making mistakes. This pattern is consistent with literature linking mathematics anxiety to evaluative pressure and concerns about performance [13, 14, 22, 38, 39]. The present data cannot establish how students behaved during lessons because participation was not systematically observed. Nevertheless, this finding suggests that teachers should attend to reported emotional discomfort rather than assuming that students who complete tasks are necessarily comfortable with mathematics.

The cognitive dimension showed relatively similar mean scores for the two groups (8.00 and 7.79 of 12), both near the neutral midpoint. Claims of pronounced cognitive anxiety in either group would therefore be unwarranted. At the item level, however, the statement about forgetting mathematical concepts had a mean of 2.86 among students with SEN and 2.34 among students without SEN (Table 4), indicating that recall-related concerns warrant attention. Prior research has connected mathematics anxiety with working-memory demands [10–12], and longitudinal research has examined its developmental relationship with achievement [25, 26]. These mechanisms were not directly tested in the present study.

The contrasting response patterns suggest possible directions for differentiated classroom support, not interventions shown to be effective by this study. For students who report postponement or avoidance, teachers might consider smaller tasks, structured choices, positive reinforcement, and timely feedback to encourage participation. Where nervousness and fear of errors are more prominent, teachers might prioritize emotional safety, normalize mistakes, and reduce unnecessary evaluative pressure. Any such approaches would need to be evaluated in practice, as the study included no instructional intervention.

These findings also have implications for inclusive pedagogy. Learners in the same classroom may report different concerns, and teaching that responds to individual experiences should look beyond SEN status or a single total anxiety score [18–20, 40, 41]. A dimensional profile may help teachers decide whether to explore avoidance, emotional discomfort, or difficulty recalling concepts more closely. At the same time, the limited internal consistency of this brief scale, particularly its cognitive subscale (Section 2.3), precludes using the profiles as diagnostic classifications [32, 33]. Larger and more diverse studies using stronger measures and independent classroom observations or interviews are needed to evaluate how useful this

approach is in other inclusive settings [15, 21].

3.6. Limitations

There are a number of limitations worth acknowledging. The study was conducted in one inclusive school. The findings should therefore be read as contextual profiles, not as generalizable conclusions about inclusive classrooms more broadly. The data also relied completely on student self-reports.

There were researchers and teachers present to support understanding but responses of young children can still be influenced by how they interpret questions, their emotional state at the time, or their desire to give socially acceptable responses. Furthermore, the study did not gather information regarding students' specific diagnoses, prior mathematics achievement, general anxiety levels, teacher practices, or classroom dynamics. Any of these factors could help explain why some students expressed anxiety through avoidance and some expressed anxiety through emotional distress. Future work would be aided by larger and more diverse samples, longitudinal designs, and more robust data sources such as teacher ratings, classroom observations, student interviews, and achievement records.

A further constraint concerns the composition of the SEN group. With only seven students, the group is too small for inferential comparison, and the SEN label itself covers heterogeneous learning and developmental needs; the behavioral-dominant profile observed may therefore reflect the characteristics of these particular students rather than a general property of students with special educational needs, and no subgroup analysis by type of need was possible. Relatedly, the thematic interpretation was applied to quantitative response patterns rather than to independent qualitative data, which limits the interpretive depth that a full mixed-methods design with interviews or classroom observations could offer. Finally, the eight-item instrument, while feasible for young children, restricts the depth and reliability of measurement for each dimension, particularly the two-item behavioral and affective subscales [32, 33]; it should be regarded as a brief screening profile rather than as a diagnostic measure.

4. Conclusion

This study described mathematics anxiety across behavioral, cognitive, and affective dimensions among 60 third-grade students in an inclusive classroom in Surakarta. The seven students with SEN reported their highest mean on the behavioral dimension ($M = 5.29$ of 6), whereas the 53 without SEN reported their highest mean on the affective dimension ($M = 4.62$ of 6). Cognitive scores were similar and near the neutral midpoint. These descriptive findings show how dimensional profiles may reveal concerns that total anxiety scores obscure and suggest that teachers consider both avoidance and emotional distress when supporting pupils. However, the small and heterogeneous SEN group, single-school setting, self-report responses, and limited scale reliability restrict interpretation to this classroom. Larger studies are needed to examine these profiles and evaluate instructional responses.

Declaration of Artificial Intelligence (AI) Use. The authors used Google Gemini (NotebookLM) and GLM (Z.ai) to assist with exploring ideas, brainstorming, and English language editing during the revision of this manuscript in response to the reviewers' comments. The AI tools did not determine the scientific content of the manuscript: all AI-assisted material was independently reviewed, verified, and approved by the authors, and the writing and final content of the manuscript were determined solely by the authors, who take full responsibility for the manuscript.

Author Contributions. **Intan Rofi'ah**: Conceptualization, methodology, formal analysis, investigation, data curation, writing original draft preparation, writing, review and editing, visualization, supervision, project administration. **Amin Sulistyowati**: Investigation, data curation, writing review and editing. **Dian Kurniasari**: Investigation, data curation, writing review and editing.

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