

Cognitive inertia in mathematical thinking on students with intellectual disability

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Abstract

This research delves into cognitive inertia within mathematical cognition among students with intellectual disabilities, uncovering pivotal challenges in arithmetic operations and problem-solving. Numeric ordering tests reveal a preference for ascending order, signaling the necessity for nurturing reverse thinking and analytical skills. Notably, superior addition performance hints at a need for a heightened focus on subtraction. Problem-solving complexities intensify, especially with combined addition and subtraction tasks, accentuating challenges in managing operational shifts. The analysis underscores a decline in performance as tasks grow intricate, attributing this not solely to heightened difficulty but to the pronounced cognitive inertia. The intricate web of mathematical exercises exacerbates errors, demanding adaptive teaching methods and substantial support for complex problem-solving. While heightened complexities pose challenges, comprehensive analysis considers teacher support and methodologies. This study builds on existing research, shedding light on the impact of unsolvable tasks and cognitive exhaustion symptoms. Understanding these dynamics is crucial for tailored educational strategies, addressing cognitive inertia, and enhancing mathematical proficiency in students with intellectual disabilities.

Keywords: intellectual disability, cognitive inertia, mathematical thinking, mathematical proficiency

Introduction

Intellectual Disability is a significant sub-average intellectual functioning that occurs during the developmental period (before 18 years) and exists concurrently with deficits in two or more adaptive behaviors such as conceptual skills, social skills, and practical skills (APA,2013). Children with Intellectual Disability tend to be characterized by a condition including significant limitations in both intellectual functioning and adaptive behavior. Specifically, these limitations within executive functions become apparent through various manifestations: cognitive inertia (Dulaney & Ellis, 1994, Radu Ghe., 2000); a deficiency in inhibition processes (Bexkens & al, 2014); impaired motor control characterized by haste, stereotypical movements, and poor accuracy (Schabos & al, 2020); reduced attentive span or working memory, restricting the ability to consciously manipulate information (Lifshitz, Kilberg & Vakil, 2016); inadequate utilization of past experiences in problem-solving and action planning (Ferretti, 2019).

For Neveanu (2013), inertia indicates a tendency of higher nervous processes to unfold slowly, to persist in a certain structure, and to stagnate. Radu Ghe. (2000) suggests that cognitive inertia in individuals with mental deficiencies manifests through profound instability of new temporal connections, continuously constrained by older connections. This characteristic of reactions to mental deficiencies is closely related to one of the specific features of the knowledge process, namely, the difficulty of adapting to the continuous flow of new information in the face of the cognitive baggage present at a given moment (Radu Ghe., 2000). Cognitive inertia involves

pronounced difficulties in abstraction and generalization, which can be explained by the reduction of cortical capacity for analysis and synthesis (Bratu, 2014). It consists of excessive concretism in thinking, the pronounced inability of students with intellectual disabilities to detach from immediate concrete aspects, from the present situation, to make generalizations, and to verbalize (become aware of) their own experience (Radu Ghe., 1999). These students are also characterized by a reduced spirit of observation, insufficient curiosity, and weak manifestations of cognitive interest, aspects that negatively affect the training process in cognitive activity, including the process of scholastic learning (Verza & Verza, 2011).

Individuals with intellectual disabilities tend to exhibit a higher level of inflexibility compared to those without such conditions. This cognitive inflexibility, often referred to as cognitive inertia, has been observed to persist significantly among individuals with intellectual disabilities (Ellis & Dulaney, 1991). Cognitive inertia represents the tenacity of automated responses, which, despite no longer being adaptive, continue to endure and this phenomenon is akin to rigidity as defined by J.S. Kounin (1941). In individuals with intellectual disabilities, there is a notable relationship between cognitive rigidity and cognitive inertia. Research has revealed a positive correlation between cognitive inertia and chronological age in this population (Dulaney & Ellis, 1994).

Cognitive inertia, as a broad phenomenon primarily manifested in the learning process of students with intellectual disabilities, poses challenges both in the assimilation of knowledge by these students and in the methods of knowledge transmission employed by educators. It is crucial to emphasize that cognitive inertia constitutes one of the distinctive features of the knowledge-related activities of students with intellectual disabilities, and represents the most frequently occurring negative phenomenon among this group (Radu Ghe., 2000).

In this context, mathematical skills are of paramount importance in shaping the individual, impacting both academic outcomes and daily life, ensuring significant autonomy (Hord & Bouck, 2012). These abilities extend beyond merely solving mathematical problems or understanding abstract concepts; they have profound implications for how we manage and interpret the world around us. From calculating money and managing personal finances to measuring time, understanding graphs, and evaluating offers, mathematics is a competency that accompanies us in all aspects of daily life. It serves as an essential tool for making informed decisions and navigating successfully in the modern world.

In the academic context, mathematical competencies not only provide the opportunity to achieve performance and access a diverse range of educational opportunities but also contribute to the development of critical skills such as logical thinking, problem-solving, and effective communication. These skills are fundamental for subsequent personal and professional evolution. In the realm of education, addressing the unique needs and challenges faced by students with Intellectual Disability is of paramount importance. Particularly, when it comes to engaging with mathematical problem-solving tasks presented in word-based formats, these students encounter significant impediments predominantly due to constraints in their literacy and numeracy skills. These obstacles encompass various dimensions, including reading level, problem structure, quantities/content, and the vocabulary demands inherent in the task (Root, Clausen, & Spooner, 2021). This discourse delves into the intricate landscape of these challenges, seeking to shed light on the complex interplay of cognitive, linguistic, and mathematical abilities that define the educational journey of students with intellectual disabilities.

Acknowledging the diverse spectrum within the population of students with intellectual disabilities (Agheana, 2017) is fundamental. The research underscores that this group tends to demonstrate

lower math achievement and slower math growth rates compared to the general population (Dekker, Ziermans, & Swaab, 2016). Additionally, they grapple with effectively utilizing arithmetic operations (Djuric-Zdravkovic, Japundza-Milisavljevic, & Macesic-Petrovic, 2011) and often face difficulties in comprehending the fundamental principles of counting and solving math problems (Abreu-Mendoza & Arias-Trejo, 2015). Understanding these challenges is pivotal in devising strategies to enhance their educational experience and mathematical competence.

Despite the challenges in numeracy skills, it's imperative to recognize the potential of students with intellectual disabilities to learn and engage with mathematics. Certain instances even showcase their proficiency in fundamental mathematical domains such as elementary set theory, geometry, and algebra (Monari & Pellegrini, 2010). Noteworthy in this context is the role of language deficits, a key contributing factor to their mathematical struggles. Numerous studies affirm the correlation between language ability and performance on norm-referenced mathematics tests (Rhodes et al., 2015). Moreover, these students grapple with understanding and manipulating the abstract symbols pervasive in mathematical contexts (Hord & Xin, 2015). Understanding these nuanced dynamics is central to formulating effective educational strategies that empower students with intellectual disabilities to thrive in the domain of mathematics and beyond.

Method

The research aimed to highlight the manner in which cognitive inertia influences the process of operating with mathematical knowledge in students with intellectual disabilities.

Investigating the cognitive inertia manifested in the mathematical thinking of students with intellectual disabilities.

The objectives of the research were as follows:

- Analyzing student performance in arithmetic operations and problem solving.
- Assessing differences in student performance across task complexity and diversity.
- Examining the Impact of cognitive Inertia on Student Mathematics Performance.

In our approach we had the following research questions:

- How does cognitive inertia manifest itself in the mathematical thinking of students with intellectual disabilities?
- What are the difficulties encountered by students in arithmetic operations and problem solving?
- Are there significant differences in student performance based on task complexity and diversity?
- How does cognitive inertia influence student performance in mathematics?

The research was conducted over a four-week period at a specialized school in Bucharest (Romania).

The sample consisted of 30 students with varying degrees of intellectual disabilities, aged between 9 and 14, enrolled in a special school in Bucharest, Romania. Stratified random sampling was used to select the subjects. In terms of gender, the sample is predominantly composed of male subjects, totaling 20, while female subjects number 10.

Table 1. Sample distribution by age.

Age	9 yo	10 yo	11 yo	12 yo	13 yo	14 yo
Nr. subjects	7	6	7	3	4	3
%	24%	20%	23%	10%	13%	10%

Regarding the distribution based on the intelligence quotient (IQ), the sample consists of 7 students with an IQ between 40 and 50, 14 students with an IQ between 50 and 60, 6 students with an IQ between 60 and 70, and a total of 3 students with an IQ between 70 and 80.

To highlight cognitive inertia, several tests of logical-mathematical abilities were conducted, starting from the existing curriculum structure. Besides revealing the level of elementary mathematical knowledge acquired by students with intellectual disabilities, these tests of logical-mathematical abilities also provide the opportunity to capture manifestations of cognitive inertia in these students. Through these tests, we aimed to emphasize the degree of assimilation of basic mathematical knowledge (operation with the concept of number, addition and subtraction, and problem-solving) and cognitive level of functional adaptation in solving mathematical exercises by students with intellectual disabilities. All these tests were designed and implemented in such a way that the results obtained would highlight the manifestation of cognitive inertia in mathematics learning activities.

Findings and discussion

In order to clearly and systematically highlight the data obtained regarding the peculiarities of thinking in students with intellectual disabilities and some academic performances of the investigated students, the presentation of the research results will be conducted separately for each applied test or through the comparison or correlation of these results in specific tests. Ultimately, an overall assessment of the captured situations will be conducted.

Operating with the concept of number

Test 1.1 involved ordering numbers within ten number sequences in ascending order. Test 2.1 from the same category of non-standardized tests consisted of writing in descending order ten sequences of natural numbers. In this test, the students obtained the following results.

Table 2. The results obtained by students - series of numbers in ascending and descending order.

"Constantin Păunescu" Special Secondary School N=30	Correct answers	incorrect answers
sample 1.1	84,6%	15,4%
sample 2.1	79%	21%

Most students with intellectual disabilities managed to respond correctly to the requirements related to the series of numbers in ascending order, while their performance was slightly lower in the case of the series of numbers in descending order.

Test 3.1 consists of 20 sequences of numbers, and the task for the students is to arrange these sequences in ascending and descending order. It is noteworthy that on the worksheet, the sequences to be ordered in ascending order are presented first, followed by those that need to be ordered in descending order. Test 4.1 comprises twenty sequences of natural numbers, and students are required to arrange these sequences in both ascending and descending order. The sequences are arranged on the worksheet in such a way that five sequences to be ordered in ascending order alternate with five sequences to be ordered in descending order.

Table 3. Results obtained by students for random sequences of numbers in ascending and descending order.

"Constantin Păunescu" Special Secondary School N=30	Correct answers		incorrect answers	
	increasing sequence	descending sequence	increasing sequence	descending sequence
sample 3.1	69,8%	62,6%	30,2%	37,4%
sample 4.1	63,1%	54,3%	36,9%	45,7%

The data indicates that the performance of students with intellectual disabilities regarding random sequences of numbers in ascending and descending order varies, but overall, the percentages of correct responses are lower than those recorded for the presented ascending and descending sequences (from Table 2). From the interpretation of the results obtained by students in this test, an increase in incorrect answers was observed. The most frequent mistake made by students consisted of arranging the numbers in ascending order, even though the request was to arrange them in descending order. These responses are also due to the fact that the first exercises of the test involved arranging sequences of numbers in ascending order. These poor results find their explanation in the students' inability to orient themselves in the task, in the inability to transfer knowledge to new situations.

Addition and subtraction

The first part of this test involves students solving a set of ten addition exercises (Sample 1.2) and ten subtraction exercises (Sample 2.2), all with varying degrees of difficulty.

Table 3. The results obtained by students in the addition and subtraction exercises.

"Constantin Păunescu" Special Secondary School N=30	Correct answers	incorrect answers
sample 1.2	70,3%	29,4%
sample 2.2	63,3%	36,7%

These data reflect the performance of students with intellectual disabilities in addition and subtraction exercises. Although the percentages of correct answers are higher in the case of addition exercises than in subtraction exercises, both sets of exercises show significant variation in terms of results.

The third part of this test consisted of combining the exercises from test 1 with the exercises from test 2 (the subtraction exercises following the addition exercises). In other words, within the same worksheet, students had to solve the addition exercises from test 1 and the subtraction exercises from test 2.

Table 3. The results obtained by students in combined addition and subtraction exercises.

"Constantin Păunescu" Special Secondary School N=30	Correct answers		incorrect answers	
	addition	subtraction	addition	subtraction

sample 3.2	68,8%	55,2%	31,2%	44,8%
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Regarding the combined addition and subtraction exercises, the percentage of students who obtained correct answers for addition exercises (68.8%) is higher than the percentage for subtraction exercises (55.2%). For addition exercises, performance seems to be relatively similar between separate and combined exercises, with a slight decrease in the case of combined exercises. For subtraction exercises, performance in combined exercises is significantly lower than in separate exercises, indicating additional difficulty for students in managing combined subtraction exercises. However, in both cases, more than half of the students managed to obtain correct answers. The difference between the percentages of correct answers for the two types of exercises (addition and subtraction) may indicate some variability in the mathematical skills of the students. The most common errors were related to performing addition operations when subtraction was required. These errors can be attributed to the rigidity of the thinking of individuals with intellectual disabilities, and low transfer capacity, which is reflected in this case in the assimilation and application of arithmetic operation algorithms.

The fourth test was somewhat a repetition of the third test, with the difference that subtraction exercises were interspersed among the addition ones. The exercises were arranged as follows: after 4 addition exercises, one subtraction exercise followed, then two addition and two subtraction exercises, one addition, one subtraction, one addition, one subtraction, two addition, and four subtraction exercises.

Table 3. The results obtained by students in interspersed addition and subtraction exercises.

"Constantin Păunescu" Special Secondary School N=30	Correct answers		incorrect answers	
	addition	subtraction	addition	subtraction
sample 4.2	62,7%	48,9%	37,3%	51,1%

For the addition exercises in the fourth test, the percentage of correct answers is 62.7%. This percentage is lower than that recorded for the addition exercises in the previous tests. For subtraction exercises, the percentage of correct answers is 48.9%. Similarly, this percentage is lower than that recorded for subtraction exercises in previous tests. In the fourth test, where addition and subtraction exercises were interspersed, the percentage of correct answers for both types of exercises was lower than that obtained for separate addition and subtraction exercises. This indicates additional difficulty when students have to manage the constant switch between the two types of exercises.

Integrating addition and subtraction exercises can pose an additional challenge for students with intellectual disabilities, as reflected in the lower percentages of correct answers in the fourth test. This type of exercise structure may require a higher level of concentration and context switching for students, which can negatively impact their performance.

Analyzing the results obtained by students, we observed an increase in errors in both addition and subtraction exercises. A common mistake in solving subtraction exercises was that, even though students were familiar with the operation, they continued to perform addition instead of subtraction.

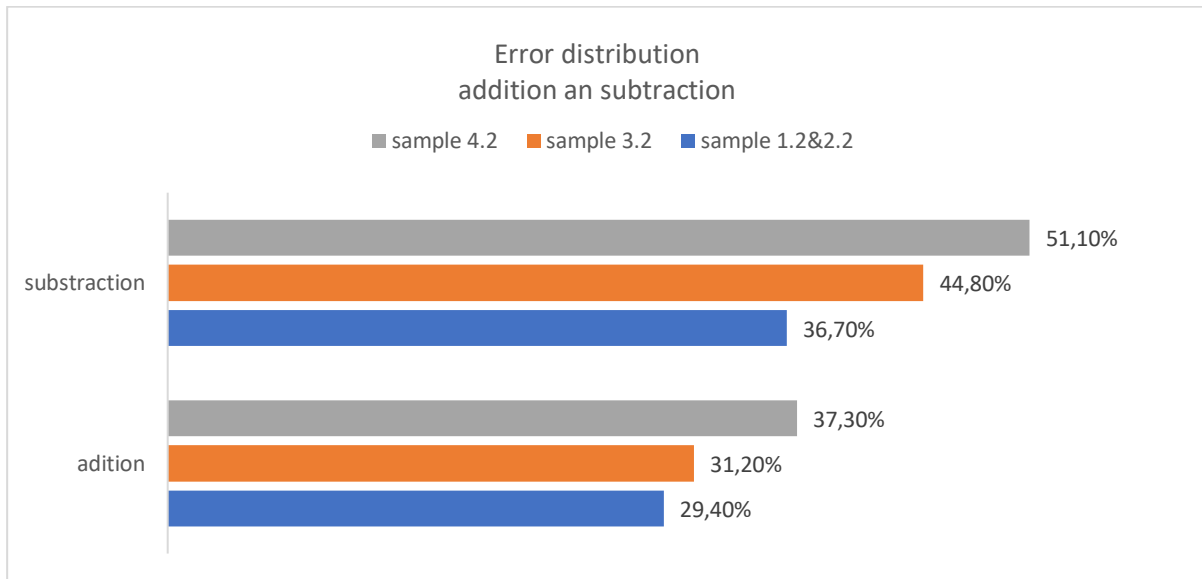


Figure 1. Error distribution on addition and subtraction exercises.

Analyzing the results of this test, specifically the four probes, we have reached the following conclusions: in the context of this test, focusing on arithmetic operations, the results are very good for the single-item probe. However, when dealing with two abilities (addition and subtraction) within the same probe (Probe 3 and Probe 4), the results are significantly weaker. In addition exercises, students performed comparatively better than in subtraction exercises. This can be explained, on the one hand, by the fact that addition, being the first operation they acquire, is the most well-consolidated, while subtraction, acquired later, is not as well-consolidated. On the other hand, it is attributed to the challenging adaptation of existing knowledge at a given moment to the continuous flow of new information, i.e., cognitive inertia. Students with intellectual disabilities tend to prefer applying the same calculation algorithm as in addition, a characteristic behavior due to their aversion to intellectual effort.

Solving problems

The first task within the problem-solving exercises consisted of a test comprising three problems, solved through addition (sample 1.3) and subtraction (sample 2.3) operations. The third problem posed a higher level of difficulty, incorporating terminology involving terms like "more" or "less" in its statement. The results obtained for these tasks are presented in the table below.

Table 3. The results obtained by students in the problem-solving tasks involving addition and subtraction.

"Constantin Păunescu" Special Secondary School N=30	Correct answers	incorrect answers
sample 1.3	26,3%	73,7%
sample 2.3	19,4%	80,6%

In task 1.3, students achieved a percentage of 26.3% correct responses and 73.7% incorrect responses. For task 2.3, the percentage of correct responses was 19.4%, while the percentage of incorrect responses was 80.6%.

These data indicate significant difficulties in solving addition and subtraction problems, especially in the context of using terminology such as "more" or "less." We observed that exercises involving problem-solving might be too complex for their cognitive development level. The high level of

difficulty in the third problem, which involved specific terminology, also represented a significant obstacle.

The third task consists of six problems (problems from task one and task two, arranged hierarchically: first, problems solvable by addition were presented, followed by those solvable by subtraction). The results obtained by intellectually disabled students are as follows:

Table 3. The results obtained by students in the problem-solving tasks involving combined addition and subtraction.

"Constantin Păunescu" Special Secondary School N=30	Correct answers		Incorrect answers	
	addition	subtraction	addition	subtraction
sample 3.3	16,4%	8,7%	83,6%	91,3%

The data presented in the combined addition and subtraction task indicate suboptimal results for students with intellectual disabilities. There is a significant difference between the percentage of correct and incorrect answers. The addition task had a percentage of 16.4% correct answers, while the subtraction task had a percentage of 8.7% correct answers. This indicates difficulties in understanding and applying both mathematical operations. From the analysis of the results, it was observed that many intellectually disabled students solved subtraction problems using addition, partly due to the fact that the preceding problems were solved using addition. Other students, although they identified the operation to be performed (subtraction), did not carry out the operation itself, copying the answers from the previous addition problems. This is due to insufficient analysis of the data in the problem, as well as a lack of cognitive flexibility.

The fourth task consisted of solving the same problems as in tasks 1 and 2, but unlike the previous task, these were arranged alternately.

Table 3. Results obtained by students in problem-solving tasks with alternative addition and subtraction.

"Constantin Păunescu" Special Secondary School N=30	Correct answers		incorrect answers	
	addition	subtraction	addition	subtraction
sample 4.3	9,3%	3,6%	90,7%	96,4%

The results obtained in the fourth task, where students were assessed in the alternative resolution of the same problems presented earlier, reflect a continuation of difficulties in understanding and applying mathematical operations. The low percentage of correct answers for both types of operations (addition and subtraction) indicate the persistent challenges students face in managing these mathematical concepts, even when the problem is presented in an alternative manner. The results obtained by students in this task were considerably poorer compared to the previous task.

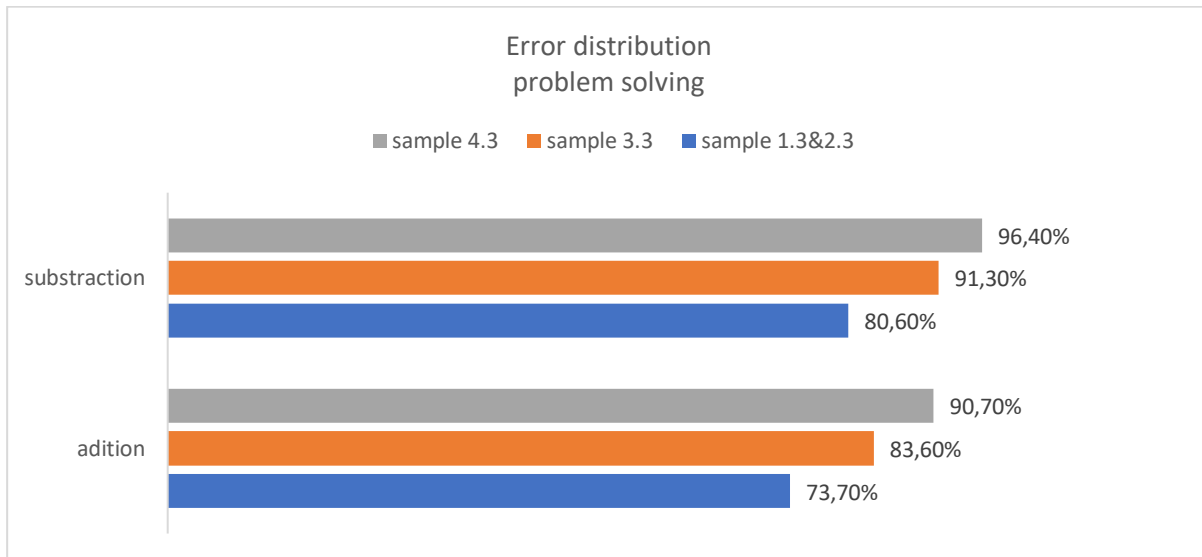


Figure 2. Error distribution on problem solving exercises.

The data regarding the percentage of errors made by students with intellectual disabilities in solving problems, specified for different tasks, highlight a progressive increase in the number of recorded errors.

There is a consistent rise in the percentage of errors from the first task (Sample 1.3 & 2.3) to the fourth task (Sample 4.3). This may show that some students not only face difficulties in solving problems but also that these difficulties tend to intensify throughout successive tests. The fact that the error percentage in task 3.3 is higher than in tasks 1.3 and 2.3 and that it further increases in task 4.3 indicates the persistence and complexity of the challenges faced by the students.

In the data analysis, it was observed that the majority of problems that required subtraction were solved through addition. Some students, although correctly solving the problem through the appropriate operation and the correct execution of the operation, for example, instead of the correct answer of 14 swallows, wrote down 14 trees. These responses demonstrate that, despite some students being familiar with the terminology and the operations to be performed, they do not sufficiently emphasize the data of the problem, not knowing what they are determining. The weak results obtained by students in this test indicate their limited ability to apply existing knowledge independently in new situations, as well as their lack of discernment, as they are not surprised by the absurd outcomes they reach.

The fifth test encompassed a problem lacking a question, along with an additional task requiring students to compose a problem using given data. We administered this test as a consequence of the analysis of the results obtained by students with intellectual disabilities in previous problem-solving tests. Consequently, it was observed that a subset of students read the problem statement without sufficiently analyzing the problem data, proceeding to solve it without adequately investigating and scrutinizing the question. This problem was presented to students with intellectual disabilities to be resolved in writing, without drawing attention to the absence of the question. Out of the 30 students, only 8 read the statement and noticed the absence of the question. Among the 8 students who noted the absence of the question, 5 formulated the question correctly, and among these, only three also solved it correctly. The remaining students (22 in number) mostly proceeded directly to the solution without understanding what they were solving. As an incomplete problem lacking sufficient data (due to the absence of the question), many students ventured to solve it, engaging in various absurd calculations. The results obtained by students with intellectual

disabilities in this test once again demonstrate their failure to analyze the data of the problem, as they proceed directly to the solution without sufficient data analysis.

Through the second task of this test, we aimed to highlight the ability of students with intellectual disabilities to compose problems themselves. From the analysis of the obtained results and their interpretation, we observed the limited capabilities of mentally impaired students to independently formulate problems. In numerous cases, the formulations were mere repetitions, with only changes in the numerical data of previously solved problems. Other problems composed by students with intellectual disabilities lacked reasoning and logic, especially in terms of question formulation. Out of the 30 students, 6 formulated problems similar to those previously solved, merely altering objects (books with notebooks or pencils), numerical data, or only changing the names of children. Others changed only the question, posing one unrelated to the text itself, while some adopted the text from one problem and the question from another. Certain students combined data and statements from previously solved problems, leading to absurd outcomes. We attribute these illogical and rigid responses from students with intellectual disabilities to a lack of mobility in higher nervous processes, indicative of cognitive inertia.

Conclusion

Research on cognitive inertia manifested in mathematical thinking among students with intellectual disabilities has revealed significant aspects concerning their difficulties in arithmetic operations and problem-solving. In the numeric ordering tests, students achieved better results in ascending order, highlighting the need for support in developing reverse thinking and analytical skills. The superior performance in addition compared to subtraction indicated a stronger consolidation of knowledge in addition, suggesting the need for a particular emphasis on the subtraction operation in the learning process.

The results regarding problem-solving revealed significant difficulties, particularly in the context of specific terminology and problems with an elevated level of complexity. In a test where addition and subtraction were combined, performance decreased, indicating an additional challenge in managing the constant shift between the two operations. The progressive increase in errors recorded from the first test to the fourth highlighted the persistence and complexity of the student's difficulties, including in adapting their knowledge to new contexts.

Concerning the ability to compose problems, students encountered challenges in formulating questions and replicated previously solved problems without the addition of reasoning or logic. The illogical and rigid results suggested the presence of cognitive inertia, emphasizing the need for support in developing flexible thinking.

The comparative analysis of results concerning proficiency in number concept manipulation, mathematical calculation, and problem-solving reveals significant differences between the outcomes obtained in individual tasks and those obtained concurrently with others. Additionally, distinctions are apparent between the results of tests assessing overall quantity appreciation skills, set operations, number conservation, and solving simple calculations from 1 to 20, and those focusing on more complex abilities such as problem-solving. These observations indicate that, as tasks become more diverse and intricate, the performance of students with intellectual disabilities tends to decline. This decline is not solely attributable to an increase in task difficulty but is influenced by the cognitive inertia of cognitive processes, which may result from insufficiently developed and organized cognitive structures.

Thus, from the analysis of the results, it is evident that as the number of tasks related to acquiring the three mathematical abilities (manipulation of the number concept, mathematical calculation, and problem-solving with concrete support) increases concurrently with the level of difficulty in mathematics, the obtained performances diminish. This phenomenon is explained by the manifestation of cognitive inertia. Cognitive inertia, characterized by reduced transferability, difficulty in acquisition, and deficiencies in utilizing the algorithm for mathematical operations, becomes more pronounced when the experimenter provides no assistance in completing the task for mentally impaired students.

Across all tasks, the data indicate that the complexity of mathematical exercises has a negative impact on the performance of students with intellectual disabilities, manifested by an increase in the error percentage as the exercises become more challenging. These errors stem from insufficient analysis of the requirements and inadequate orientation within the task concerning isolated elements detached from the context. This observation underscores the importance of adapting teaching methods and providing additional support to help these students cope better with more complex exercises.

These data suggest that students with intellectual disabilities may encounter heightened difficulties in coping with more complex mathematical exercises, which can be attributed to cognitive inertia. However, for a comprehensive analysis, other factors influencing the results, such as the level of support provided by the teacher or the teaching methods employed, should be considered. Existing research, such as the study conducted by Gacek in 2017, has highlighted the negative impact of exposure to unsolvable tasks on the cognitive performance of individuals with intellectual disabilities. This has been associated with difficulties in recognizing symptoms of cognitive exhaustion, implying an increased vulnerability in adapting to new situations and complex tasks. In addition to this aspect, Dulaney (1994) observed that individuals with intellectual disabilities exhibit more pronounced cognitive inertia compared to subjects without such disabilities. These findings indicate that individuals with intellectual disabilities may face significant difficulties in adapting to new tasks or unexpected situations, leading to cognitive rigidity and inertia. In contrast, students without intellectual disabilities demonstrate a rapid ability to adapt and solve complex activities and problems independently. This ability involves the capacity to shift attention promptly between various components of these activities. However, students with intellectual disabilities encounter significant challenges in developing this skill, and in some cases, it may even be impossible to develop, especially in the presence of more severe cognitive impairments.

The short-term solution to assist students with intellectual disabilities in solving mathematical problems involves guiding them through the resolution process using a sequential and directed approach. This entails gradually shifting their attention from one component of the activity to another to facilitate progress in task resolution. However, in the long term, developing this ability requires extensive practice of algorithmic solving schemes (Bratu, 2017).

Moreover, it should be noted that the thinking of these students is characterized by limited analytical analysis capacity, which may be associated with cognitive memory deficits (Palomino et al., 2019). These characteristics of thinking can negatively influence their ability to adapt to changing demands and solve complex mathematical problems.

We must emphasize that cognitive inertia is a serious issue in the learning of students with intellectual disabilities and can negatively influence their learning process. Deficiencies in thinking operations in children with intellectual disabilities lead them to possess fragmented and fragile knowledge, making the assimilation and acquisition of mathematical knowledge

challenging. However, relating knowledge to the daily experiences of these children helps to consolidate it, thus providing greater mobility to the thinking of children with intellectual disabilities and contributing to a reduction in the manifestation of cognitive inertia.

The knowledge taught must be rigorously selected to provide students with intellectual disabilities with clear and accurate information. Language is a critical component of student learning because students need to understand language receptively to learn new concepts and use language expressively to convey their thoughts and demonstrate understanding (Xin et al., 2020). The vocabulary should be clear, concise, and mathematically correct (Hughes, Powell & Stevens, 2016). It is important to note that sometimes children with intellectual disabilities do not respond to questions or respond incorrectly because they have not understood what is being asked of them. Therefore, the way we communicate is crucial, with key principles being clarity and simplicity (Agheana, 2017).

An important role in preventing manifestations of cognitive inertia is the application of knowledge and skills that students have acquired in real-life situations during lessons. Materials that interest and motivate students due to various presentation methods are more easily retained. Understanding perceptual or verbal material unrelated to the concerns, interests, and especially the level of understanding of a child with intellectual disabilities becomes a tiresome and unproductive exercise (Agheana, 2015).

In conclusion, cognitive inertia represents a significant challenge for students with intellectual disabilities concerning mathematical problem-solving and adaptability to complex tasks. Sequential approaches and extensive practice of algorithmic solving schemes can be effective short-term and long-term solutions. It is crucial to understand and address these cognitive difficulties to provide students with intellectual disabilities the opportunity to develop their mathematical skills and enhance their academic performance.

Moreover, these findings could serve as a starting point for developing specific educational strategies aimed at reducing cognitive inertia and improving the performance of students with intellectual disabilities in mathematics. Individualizing the learning process for these students and providing additional support when tackling more complex exercises is essential.

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