

The relationship between learning difficulties and sensory integration: Developing a therapeutic program (A diagnostic field study on a sample of cases using the Stanford–Binet Intelligence Scale: Fifth Edition (SB5) and the Sensory checklist)

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Abstract:

This study aims to demonstrate the importance of training children with learning difficulties and slow learning, through the application of the therapeutic sensory integration program. The sample comprised 40 cases, consisting of 16 girls and 24 boys studying at the elementary level. The researcher followed the experimental method, and in his pursuit of achieving the study's objectives, he used the Stanford–Binet Intelligence Scale: Fifth Edition (SB5) Arabization and Codification of "**Safwat Farag**". And the sensory checklist "**Dr. Ahmed Mohamed Abdel Fattah**".

All cases suffering from learning difficulties exhibited signs of sensory integration disorder, with apparent gender differences in the prevalence of sensory integration signs favoring males. Therefore, this group needs to benefit from the therapeutic program based on sensory integration.

Keywords: Learning difficulty, slow learning, sensory integration.

Introduction

Learning difficulties have been one of the important issues since the sixties to the present day in the field of special education. It received a great attention from professionals in various fields, including doctors, scientists, psychologists, educators, sociologists, teachers, parents, and others. Previously, the focus of special education was mainly on other types of disabilities, such as mental, auditory, visual, and motor disabilities. However, due to the emergence of a group of children who are sound in their mental, auditory, and visual development yet they suffer from learning problems, specialists have begun to focus on this aspect in order to identify the signs of learning difficulties, especially in the academic aspects. This is achieved through the development of tools and diagnostic processes, as well as providing appropriate educational services through therapeutic programs.

The issue of diagnosing individuals with learning difficulties has received significant attention from experts and parents in order to increase awareness of the seriousness of the problem and its consequences, which lead to educational failure or dropout. However, it is important to note that the success of therapeutic programs for this group depends on their identification, as there are similar cases such as slow learning and academic delay.

In this context, the researcher "**Keddi Soumia**" addressed in her study the identification of students who suffer from difficulties in reading, writing, and arithmetic, and they study in the elementary school. The study was conducted on a sample of 150 male and female students from six elementary schools in the province of Mostaganem. The researcher concluded that there is variation among primary school students in academic learning difficulties depending on their academic levels, and this is due to the fact that as the student progresses to a higher grade, his academic learning difficulties tend to increase. In cases where the problem is not identified early by the teacher, the issue becomes more complex. These results are consistent with many researchers' results, including "**Barbra Jisler**" in 2002 and the study by "**Marta Angti**" in 2003, who found significant differences in the primary level, and others found that the main reason for the increase in learning difficulties is due to the lack of early detection, in addition to the teachers' lack of knowledge of the correct way to deal with this group and the mistakes made by parents in accompanying their children. For them, the important thing is for their children to progress to a higher academic level without caring whether they are proficient in reading, writing, or arithmetic. Since it has been evident in many research studies that the three academic learning difficulties are prevalent, and due to the spread of the rate of learning difficulties on one hand and the increasing

awareness of the seriousness of this problem and its consequences on the other hand, and neglecting learning difficulties leads to their worsening and spread, and the exposure to this problem is similar to contracting a disease; if it is not diagnosed and treated early, it worsens and intensifies. In addition, the effectiveness of therapeutic intervention diminishes significantly with delayed detection of those with learning difficulties. Therefore, the issue of early detection of individuals with learning difficulties has received attention from professionals, parents, and experts in special education, as the ability of this group to achieve any educational success decreases the longer the detection is delayed.

Regarding the diagnostic process, the researcher, “**Ben Youssef Hanane**”, conducted an applied modeling study on a sample of third-grade students aimed at identifying the most important steps to diagnose students who suffer from learning difficulties at the elementary level. She settled on the necessity of applying some important and fundamental steps, which she summarized as follows:

1. Making use of teachers in the initial identification of students with learning difficulties.
2. Implementing the exclusion criterion to exclude students who are not involved in learning difficulties.
3. Implementing the distancing gauge to determine the academic achievement level and intelligence level of the student.
4. Applying the diagnostic estimation scale for academic learning difficulties to confirm the presence of difficulty in the student and determine the level of this difficulty (mild/moderate/severe).

These steps are suitable for researches and schools. In clinics, however; the process is as follows:

After conducting an interview with the parent to collect information, the intelligence test, represented by the Stanford–Binet Intelligence Scale: Fifth Edition (SB5) is applied as an exclusion criterion to differentiate between cases of learning difficulties/slow learning/academic delay. The scale allows us to assess their intellectual abilities, then determine the category to which they belong and identify their strengths and weaknesses to benefit from the former and develop the latter for training purposes. After extracting the results and confirming that the case is of individuals with learning difficulties, the remaining tests and scales are applied, most importantly the neurological sorting and the diagnostic estimation scale for academic and developmental learning difficulties. Finally, an appropriate individual educational treatment plan is developed for each case.

Through observing body movements, the presence of motor disorders, sitting posture, attention level, and activity level which are some behavioral indicators that lead us to assume that most cases suffer from hyperactivity and attention deficit; especially since many studies have indicated that symptoms of attention deficit and hyperactivity do not appear alone except in one-third of the affected sample, and they are accompanied by some disorders such as learning difficulties and pervasive developmental disorders (Holowenko, 1999 & Peter 2001).

The study conducted by “**Sultanah Bousbeih**” (2017) which concluded that attention deficit disorder leads to reading difficulties due to a dysfunction in the executive and auditory components of working memory among third-grade elementary students. This finding is corresponding with the results of many studies that support the role of attention deficit disorder in the emergence of reading difficulties, such as the study by “**Pickering**” (2006), the study by “**Scheepers**” (2009), the study by “**Zoulikha Batania**” and “**Fatima Boukassi**” (2013), and the study by “**Kauther Tajani**” (2015).

Through reviewing several topics in sensory integration and field practice in monitoring many cases, we noticed similarities between the symptoms of attention deficit disorder and the behaviors mentioned in the sensory checklist in the post-movement phase. Therefore, we attempted to further investigate this topic.

Research problem

Sensory integration is one of the most widely used treatment theories in learning difficulties and autism spectrum disorder. Which will be the specialty of the occupational therapist after identifying where the child’s sensory problem lies. Sensory integration programs work on organizing the child’s senses to receive a correct information and to be analyzed properly by the brain, and on the other hand, connect different senses to function as a whole.

The relationship between sensory integration and learning difficulties lies in the fact that children with learning difficulties have difficulty receiving and integrating sensory information. The brain is responsible for modifying

and regulating sensory centers. Here, the importance of sensory integration theory emerges to explain the potential relationship between neural processes responsible for receiving, organizing, and integrating sensory inputs and outputs between the senses and the brain, where sensory integration theory and its various applications are used to enhance the use of behavior and senses and train individuals who need to address their learning difficulties. The theory has created a set of tests to assess sensory-motor processing, sensory processing, and sensory skills, and reaching solutions to help improve them, while the occupational therapist or the trainer in using sensory therapy works by guiding and directing the child through specific activities to test his ability to interact with sensory stimuli.

Some researchers have found that sensory integration therapy improves motor performance, language, and academic level (Bundy, Sheila, Oi, Miller, 2007), and a study by “**Dalia Tayyimah**” (2017) also indicated the effectiveness of the training program based on sensory integration in treating reading difficulties (Dyslexia) and writing difficulties (Dysgraphia) in children, and the study by “**Awatif Mohamed Hassanain**” and “**Khalaf Ahmad**” (2020), which demonstrated the effectiveness of a combined sensory and cognitive training program in treating children with learning difficulties accompanied by attention deficit and hyperactivity.

A study by “**Nadiba Abdullah Muhammad Ali**” on the effectiveness of a sensory integration program in reducing some visual perceptual difficulties in children with developmental learning difficulties.

In the Algerian environment, the studies are very limited, and if they exist, they are largely related to autism, such as the study conducted by “**Asmaa Ben Halilem**” on sensory processing disorders in children with autism spectrum disorders (field study at the psychiatric hospital institution in Sidi Bel Abbes).

Or among ordinary children, such as the study conducted by “**Belarbi Mohamed Ayoub**” and “**Ben Haji Tahar Abdelkader**”, which addressed the differences between those who practice physical education and those who don't in some aspects of sensory integration (field study among elementary school students in the province of Khemis Miliana, Algeria).

The scientists “**Adiban**” and “**Royce**” confirmed that sensory integration disorder leads to academic, emotional, and social difficulties (Raymond, 2014).

After all the aforementioned, we attempted to highlight the relationship between learning difficulties and sensory integration in order to develop an appropriate therapeutic plan for cases by making sensory integration programs an essential part of the therapeutic plan for children with learning difficulties, considering that many studies have confirmed the success and effectiveness of sensory integration programs in developing and improving many cases of children with autism, as these programs work to improve the deficiencies experienced by this group.

From here, we can pose the following questions:

- **Is there a statistically significant relationship between learning difficulties in children and their sensory integration?**
- **Are there statistically significant differences in sensory integration aspects attributed to gender variable among elementary school students who experience learning difficulties?**

Based on these questions, we proposed the following hypotheses:

- **Hypothesis 1: There is a statistically significant relationship between learning difficulties in children and their sensory integration.**
- **Hypothesis 2: There are statistically significant differences in sensory integration aspects attributed to gender variable among elementary school students who experience learning difficulties.**

Study significance

The importance of the study lies in:

- Confirming the existence of a relationship between learning difficulties and sensory integration disorder.
- Emphasizing on the necessity of focusing on the sensory processing and integration aspect, particularly as a therapeutic intervention.

Study Objectives

The study aims to determine:

- Identifying the effect of intelligence quotient (IQ) on the rate of sensory integration disorder (manifestation of behaviors).

- The most common behavioral aspects of sensory integration disorder among children with learning difficulties in the motor dimension.
- Incorporating sensory integration programs into the therapeutic plan for monitored cases suffering from learning difficulties.

Study Terminology

Procedural definition of academic learning difficulties

it's the academic difficulties related to reading, writing, and arithmetic. In this study, it can be identified through the overall intelligence score obtained by the student in the Stanford–Binet Intelligence Scale: Fifth Edition (SB5).

The procedural definition of sensory integration disorder

It is a neurological disorder arising from the brain's inability to integrate and process specific information received from sensory systems, and a disruption in the continuous relationship between behavior and brain function. Therefore, some odd behaviors may appear with the lack of a clear logical explanation. Procedurally, it is identified as various sensory problems experienced by children with learning difficulties, determined through the sensory checklist by “**Sue Larkey**”, translated and adapted by “**Dr. Ahmed Mohamed Abdel Fattah**”.

THEORETICAL FRAMEWORK

The Definition of learning difficulties

"Learning difficulties" is a broad term used to describe a group of students in a regular classroom setting who exhibit lower academic performance compared to their peers, despite possessing normal to above-average intelligence. However, they encounter challenges in various learning processes such as comprehension, critical thinking, perception, attention, reading, writing, spelling, pronunciation, and performing arithmetic operations. Individuals with mental disabilities, emotional disturbances, as well as those affected by hearing and visual impairments, and those with multiple disabilities, are not typically included in the diagnosis of learning difficulties, as their impairments may directly contribute to the challenges they face in learning (Osama Mohammed Al-Bataineh et al., 2007, p. 191).

While numerous definitions have explored the concept of learning difficulties from different angles, our study focuses primarily on the educational aspect.

Types or Classification of Learning Difficulties

Due to the variety and diversity of problems exhibited by children with learning difficulties, scientists and researchers have attempted to classify learning difficulties in order to facilitate the study of this phenomenon and propose appropriate diagnosis and treatment methods for each group. However, the most common and accepted classification among learning disabilities professionals is that proposed by “**Kirk**” and “**Calvante**” (1988), which classifies learning difficulties into two categories: (Bashir Maamariya., 2007, p. 105)

1. Developmental Learning Disabilities.
2. Academic Learning Disabilities.

Firstly: Developmental Learning Disabilities

it's the difficulties related to brain functions, and with mental and cognitive processes, which learners need for their academic achievement. Some scientists attribute these difficulties to functional disorders related to the central nervous system. These difficulties can be divided into two subtypes: (Boutros Hafez Boutros, Teaching Children with Learning Difficulties, 2009, p. 19)

- a. Primary difficulties: such as attention, perception, and memory.
- b. Secondary difficulties: such as thinking, speaking, comprehension, and oral language.

Developmental learning disabilities affect three main fields:

- Linguistic growth.
- Cognitive growth.
- Visual-motor skill growth.

Secondly: Academic Learning Difficulties

These problems usually arise after entering school and are related to core academic subjects namely: reading, writing, and arithmetic.

The Theory of Sensory Integration (A Historical Overview)

The theory of sensory integration seeks to explain learning and behavioral problems that do not stem from central nervous system damage. The American occupational therapist “**Jean Ayres**” was the first to establish the foundations of sensory integration theory. She added to our known five senses another set of hidden senses, such as the vestibular sense associated with the inner ear, which provides information about gravity, (void, balance, and movement), and that is due to the head and body’s position to the Earth’s surface, the sense of balance located in the inner ear. It informs us about the position of the head, whether leaning forward or backward, even with closed eyes. Ayres’ focus on neural function and learning processes helped to the development of understanding “intelligence” as a result of sensory perception, sensory integration, and sensory processing. Her work led to numerous studies aimed at improving learning abilities through sensory integration therapy, which helps children progress towards higher cognitive utilization.

The First Discoverer of Sensory Integration Theory

“**Jean Ayres**”, an occupational therapist, in 1972. To simplify her theory, it is known that the basic senses are the sense of sight and the sense of hearing, but Ayres focused on three additional senses that were perhaps overlooked by specialists in child development which is “Tactile” through the skin, the sense of touch, and it falls under the sense of touch through the skin, light touch, pressure, pain sensation, and temperature sensation (Proprioceptive) whether it was muscles or joints, body movement sensation (Vestibular), balance sensation which is present in the inner ear and it informs us about the head’s position whether it was facing forward or backward even if we had our eyes closed and it helps for a better understanding of the last two senses.

Example:

Learning to ride a bike: When a child learns to ride a bike, good coordination of body movement and balance is essential to ride without falling. Even the fetus in the mother’s womb uses these senses before the sense of hearing and sight, accordingly, it reacts to external pressure and moves inside the womb, and at birth it feels his mother’s touches, and becomes quiet when being held by her. At six months old, he starts to synchronize the sense of sight with movement and balance when he starts learning how to sit and control his balance without support. The child receives different tactile sensations, the sense of touch and the sense of movement of the body, the balance, the sight, the smell and hearing are considered as a vital sensory brain fuel, since the brain’s function is to continuously receive all sensory inputs and integrate them comprehensively.

Therefore, sensory integration therapy lies in improving the child’s nervous system effectiveness in interpreting and using sensory information received from the environment in a way that helps the child overcome his sensory difficulties. Thus, the child learns to select the integration of senses that helps him achieve his goals.

Now that the concept of sensory integration is clearer, the question arises: What is its relevance to various disorders? The answer is that children with autism, learning difficulties, and pervasive developmental disorders have dysfunction in the sensory system (Dysfunctional sensory system). This dysfunction may manifest as either the lack of interaction or the increased interaction in one or more senses. Some children are overly sensitive to sound (increased interaction), while others behave as if they cannot hear at all (lack of interaction). Some dislike being touched, even lightly, and may have aversions to certain textures of clothing because they feel rough. Even with food, they may prefer soft, smooth-textured food in their mouths. Therefore, in this case, there is sensory dysfunction, either hypersensitivity or increased interaction of the child to the sense of touch.

There are also some children who react intensely to pain, while others are unaffected by it. Some children enjoy balance-stimulating movements, such as spinning around, rocking back and forth, constantly jumping, or climbing on furniture. Here, there is sensory dysfunction (lack of interaction with the sense of balance).

On the other hand, some children dislike balance-related movements and experience severe fear from ordinary movements like swings, slides, or even descending stairs, which means they’re scared of the external void. Here, there is sensory dysfunction (hypersensitivity), increased reaction. As we mentioned, this sensation includes the awareness of the body’s presence from muscles and joints. When this sense works appropriately (proprioceptive), it allows us to control sitting posture or hand movements, such as when writing with a pen or holding a spoon. However, when there is dysfunction, we notice that the child stumbles a lot while walking, falls

frequently to the ground, and finds it difficult to control movements, such as feeding himself or buttoning his shirt.

When there is dysfunction in the three senses that Jean Ayres focused on, there will be difficulty in the functioning of both small and large muscles working together, leading to a loss of sensory integration.

The concept of sensory integration

It involves humans receiving information from various senses, and their transmission to the brain followed by processing, and giving appropriate responses. Each sense works with the others to form an integrated picture of our physical state, our location, and what's happening around us. The brain is responsible for producing this complete picture as a sensory information system that is continuously utilized. Effective sensory integration occurs automatically, unconsciously, and effortlessly through our sensory experiences. The process of sensory communication includes the following components: sight, hearing, touch, smell, taste, movements, and balance (physical position).

The importance of Sensory Integration

1. It helps individuals to adapt naturally to their surrounding environment by understanding environmental stimuli and issuing appropriate responses.

Examples: When a young child touches a hot cup and feels pain, he quickly withdraws his hand, and learns.

2. **The distinctive tactile system:** This system allows us to identify the location and nature of the touch. The protective touch system alerts us when we're exposed to danger, resulting in responses such as fleeing, fear, or even aggressive reactions. A dysfunction in the tactile system may cause the protective system to interpret ordinary contact as threatening, in the case of children whose sensory system provides incorrect information, they will constantly be on high alert, The reaction may include the child running away, having extreme panic, displaying aggressive behavior, or sometimes verbal reaction.

Sensory Integration Disorder

It is a neurological disorder arising from the brain's inability to integrate and process specific information received from sensory systems, and a disruption in the continuous relationship between behavior and brain function. Therefore, certain behaviors may appear unusual, and we may not find a clear logical explanation or apparent cause for them. These behaviors directly impact the child's learning process, as it represents a barrier to the child's learning and integration into the educational environment in which he is a part of. He struggles to communicate effectively with educators and teachers and also with his classmates within the classroom, and he will find it difficult to do homework assignments. This leads to a series of family and educational problems for the child. Consequently, understanding and dealing with these problems become challenging. Therefore, it can be said that sensory processing disorders in children have a direct and strong impact on their learning, requiring specialized intervention to identify it, and develop a therapeutic plan to reduce their negative effects on the child. It has been observed that children with such problems may excel in other areas and may possess normal or above-normal intelligence.

THE APPLIED FRAMEWORK

Case Study

First: Methodological Procedures for the Basic Study

The study aims to identify the relationship between sensory integration and learning difficulties on one hand and to identify sensory integration and its characteristics on the other hand. furthermore, it seeks to determine if there are statistically significant differences in sensory integration attributed to the gender variable.

1- Study Methodology

The researcher relied on the experimental method to investigate the phenomenon and identify the relationship between two variables: sensory integration and learning difficulty. Additionally, a case study methodology was employed, which is a research method that focuses on in-depth examination of a specific case, then generalizing its results to the entire study population. Therefore, we decided to use an intelligence test and a sensory checklist as tools for the case study. We analyzed the results obtained from conducting the intelligence test and the sensory checklist on the study sample.

2- Research population

The study population consists of students with learning difficulties (academic underachievement) who were diagnosed using diagnostic tools for students with learning difficulties, and it also includes elementary school students who visited a specialized clinic in Oran province to improve their academic performance.

3- Study Sample

The study sample was formed after the process diagnosis and selection from the study population where Forty male and female students have been selected, distributed across the five grades in elementary school, and those diagnosed with learning difficulties at the specialized clinic based on an intelligence test. The sorting process resulted in the final sample, which was distributed according to the following table:

Table (1): Distribution of the study sample according to the gender variable

Gender	Repetitions	The ratio
Female	16	40 %
Male	24	60%
Total	40	100%

Source: Prepared by the researcher based on data from the private clinic.

A preliminary reading of the data in **Table (1)** leads us to conclude that the majority of the study sample consists of males, as the percentage reached 60%, while for females, the percentage reached 40%.

Therefore, we conclude that the male category is the most common group experiencing learning difficulties and cognitive achievement.

4- Study Tools

In this study, we used the following tools:

A. **Stanford–Binet Intelligence Scale: Fifth Edition (SB5):**

This scale was designed to measure individuals' cognitive abilities and intelligence from the age of two to 85 years. It is applied to diagnose various conditions such as (intellectual disability, slow learning, learning difficulties, and others more). In our current study, this scale was applied by a psychologist at the private clinic. The study results related to the aspect of learning difficulties that were obtained by measuring the intelligence quotient (IQ) of the sample individuals, were as follows :

Table (2): Distribution of Study Sample According to IQ

IQ	Repetitions	The ratio	Named
[80 to 89]	17	42.5%	Below average
[90 to 109]	23	57.5%	Average
[110 to 119]	-	-	High average
Total	40	100%	-

Source Prepared by the researcher based on the observations of the psychologist at the private clinic.

Returning to the objective of the intelligence scale, which serves as a classification tool for individuals with learning difficulties compared to their normal peers in the classroom. We calculated the percentage through classification, and the results are as indicated in the table above. We found that 57.5% of the sample have IQ scores ranging between [90 to 109], classified as average. Meanwhile, 42.5% of the sample have IQ scores ranging from [80 to 89], classified as below average.

Therefore, we conclude that the current study aligns with several previous studies, which have shown results indicating that the intelligence quotient of children experiencing learning difficulties falls within the range of [90 to 109], indicating an average

B. **The Sensory Checklist:**

This scale allows us to identify sensory issues that the child is experiencing, thus enabling us to devise A well-structured therapeutic plan aimed at training the child to adapt to his environment. This scale is designed in the form of a questionnaire composed of 8 dimensions, which are as follows:

- Dimension 1: The Movement Dimension, consists of 22 phrases.
- Dimension 2: The Visual Dimension, consists of 15 phrases.
- Dimension 3: The visual Communication Dimension with people and objects, consisting of 10 phrases.

- Dimension 4: The Touch Dimension, consists of 33 phrases.
- Dimension 5: The Nutrition Dimension, consists of 14 phrases.
- Dimension 6: The Listening Dimension, consists of 11 phrases.
- Dimension 7: The Smell Dimension, consists of 8 phrases.
- Dimension 8: The Sleep Dimension, consists of 5 phrases.

The study relied on the Likert triad scale (often, sometimes, rarely), where only one dimension was considered, which is the first dimension (The Movement Dimension), 12 items were selected out of 22 items. The following table summarizes the selected items from the questionnaire applied to the study sample.

Table (3): Summary table of the statements in the questionnaire applied to the study sample

Number	Content of the phrase
03	He finds it difficult to remain seated for a long time
11	He loves to move a lot, for example, he stands, sits, and he’s constantly moving
12	He tends to engage in fast-paced movement activities like swinging
13	He appears enthusiastic in a room filled with movement
14	He spins around himself and never feels dizzy
15	He constantly moves objects with his hand
16	He constantly sways (with his whole body or a part of it)
17	Active and constantly moving
18	He seems afraid of heights and moving machines
19	He walks on his tiptoes
20	He gets tired easily with even the slightest activity
22	He avoids balance activities

5- Statistical Tools

The Statistical Package for the Social Sciences (SPSS) V23 was utilized. Additionally, the following statistical methods were employed: frequencies, percentages, arithmetic means, and standard deviations.

Secondly: Presentation of results

Presenting the results of the first hypothesis: “There is a statistically significant relationship between children's learning difficulties and their sensory integration”.

To test the hypothesis validity, the arithmetic means and standard deviations of the sample individuals' responses to the items of the sensory checklist scale were computed, as illustrated in the subsequent table:

Table (4): illustrates the distribution of the answers of the study sample members to the selected questionnaire statements

Number	Content of the phrase	A lot	Sometimes	Rarely	Arithmetic average	Standard deviation
03	He finds it difficult to remain seated for a long time	26	4	10	1.88	1.49
11	He loves to move a lot, for example, he stands, sits, and he’s constantly in motion	29	5	6	1.93	1.45
12	He tends to engage in fast-paced movement activities like swinging	30	4	6	1.98	1.21
13	He appears enthusiastic in a room	29	5	6	1.93	1.45

	filled with movement					
14	He spins around himself and never feels dizzy	8	22	10	1.03	0.95
15	He constantly manipulates objects with his hand	27	7	6	1.23	0.81
16	He constantly sways (with his whole body or a part of it)	26	8	6	1.19	0.86
17	Active and constantly in motion	28	5	7	1.88	0.81
18	He seems afraid of heights and moving machines	5	7	28	1.00	0.71
19	He walks on his tiptoes	6	9	25	1.09	0.53
20	He gets tired easily with even the slightest activity	3	23	14	1.03	0.46
22	He avoids balance activities	4	20	16	1.07	0.98

Source: prepared by the researcher based on the outputs of SPSS v23 software.

From the table above, it's evident that the sensory integration aspects among the study sample children are captured by statements numbered (3-11-12-13, 15-16-17), which include: (He finds it difficult to remain seated for a long time, he loves to move a lot, for example, he stands, sits, and he's constantly in motion, he tends to engage in fast-paced movement activities like swinging, he appears enthusiastic in a room filled with movement, he constantly manipulates objects with his hand, he sways constantly (with his whole body or a part of it). These highlighted statements represent the most common manifestations of sensory integration in children with learning difficulties. The mean scores for these phrases ranged from [1 to 1.98] with standard deviations ranging from [0.46 to 1.49]. On the other hand, the remaining statements received lower occurrence levels among the study sample individuals, who are students experiencing learning difficulties, including: (He spins around himself and never feels dizzy, he seems afraid of heights and moving machines, he walks on his tiptoes, he gets tired easily with even the slightest activity, he avoids balance activities).

Presentation of the results of the second hypothesis: There are statistically significant differences in sensory integration aspects attributed to the gender variable among elementary school students experiencing learning difficulties.

To test this hypothesis, the researchers calculated the arithmetic means and standard deviations for the entire sample. Additionally, (t-test) was utilized on two independent, unequal samples to examine the presence of differences in the mean scores of sensory integration aspects between males and females among the category of students with learning difficulties, the results are illustrated in **Table (5)**:

Table (5): Results of the t-test to identify the significance of differences between genders in sensory integration aspects

Gender	Repetitions	Arithmetic Mean	Standard deviation	Calculated T value	Significance level	Difference function
Male	24	2.35	0.169	4.237	0.010	function
Feminine	16	1.28	0.054			Statistically

Source: Prepared by the researcher based on the outputs of SPSS v23 software.

It is evident from **Table (5)** that the arithmetic means for males reached (2.35) with a standard deviation of (0.169), while the arithmetic means for females reached (1.28) with a standard deviation of (0.054). It appears that the arithmetic means for the male sample are higher than those for females, and considering the calculated value of (T) which is estimated at (4.237) at a significance level of (0.010), and it has a smaller value than the significance level (0.05), which indicates the presence of significant differences between genders in terms of the spread of sensory integration aspects. Therefore, we accept the hypothesis stating the existence of statistically significant differences in sensory integration aspects attributed to the gender variable among elementary school

students experiencing learning difficulties in favor of males, and this can be attributed to social upbringing and morphological body structure, which leads the boy to feign movement, activity, and lack of balance in asserting himself in front of the opposite gender, while females are expected to display manners and proper behavior, which justifies their tendency towards tranquility, less movement, and shyness .

This study differed from previous studies as it is a recent and unique study which combined the variable of learning difficulties among elementary school children and their sensory integration. As for the second hypothesis, it investigated the differences between genders in terms of sensory integration aspects and which gender possessed these aspects more. There were differences in favor of males, which may be attributed to social upbringing in addition to the physical strength of males.

Thirdly: Conclusion

Learning is considered one of the issues that psychologists and educators have focused on, as it is the basis for acquiring skills. Learning difficulties and any obstacle hindering it prevent the achievement of its goals. There is no doubt that the academy is one of the most significant obstacles which is considered an educational problem that children in pre-school age struggle with, and it appears as a prominent problem in elementary education stage. Therefore, teachers must pay attention to this issue as they are the first detectors to it due to their proximity to students. If this problem is diagnosed in the elementary stage, it does not extend to subsequent educational stages, and through the obtained results and statistical investigation and analysis, we can say that the reality of academic learning difficulties in Algeria is continuously spreading. Therefore, it is necessary to overcome these difficulties as soon as possible.

This is accomplished through research and early detection methods, employing psychological and educational tests, which is what this study aimed to achieve through the visit conducted by the researchers to the private clinic, and monitoring, and observing the duration of applying the intelligence scale and the sensory checklist on elementary school students, where the field and statistical study proved that early and accurate diagnosis by specialists contributes to monitoring the child's medical condition and following up on him, thus reaching an effective treatment method. If these difficulties persist and are not diagnosed correctly with the student during the years of schooling, it will inevitably lead to academic failure.

Fourthly: Recommendations

Intensifying studies in the field of learning difficulties among elementary school children attributed to sensory integration variables.

Resorting to the application of the sensory checklist with its eight dimensions on children struggling with learning difficulties, to ensure the credibility of the study and the accuracy of the diagnosis.

Conducting awareness campaigns targeting families with children experiencing learning difficulties, especially at the elementary level, to encourage them to seek diagnosis from psychological specialists for their children.

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