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Development and Validation of the Dysgraphia Scale of BOUZID Saliha (DSBS) Among Primary School Pupils

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Abstract:
Dysgraphia Scale of BOUZID Saliha (DSBS) is one of the most used tools for measuring writing difficulties for primary school pupils in Algeria. It was and still is used in researches, and there is a lack of psychometric studies conducted on it. So the current study came as an attempt for validation and re-standardization this tool, and amends it to fit the development of dysgraphia's scientific studies.
After selecting a sample of 191 pupils. We made some necessary adjustments on the tool by re-dividing its items according to three aspects. In addition, we used the coefficients system, and adopting three levels of graphical input instead of the only level adopted in the original version.
To check the effectiveness of this scale and the modifications that brought about it, we calculated the face validity by presenting the scale to a group of 15 experts, all of whom agreed -with a high rate of 83%- which the aspects re-divided by us, fit with their items. As for the texts, we obtained high agreement rates exceeded 87%. This makes them suitable materials for the dysgraphia evaluation scale. The researcher strengthened his confidence in the scale validity by calculating the Spearman's correlation coefficient for the grades of items weights; its value is estimated at 0.80, which indicates the relationship between the ranks is high. Therefore, its discrimination index is strong.
As for Reliability, it was confirmed by calculating the internal consistency value of the scale, with a relatively moderate value for alpha (α) coefficient equal to 0.58. The stability coefficient of scale was confirmed by retest after 10 days, on the same previous sample, where the value of the Pearson correlation coefficient between the two tests was 0.76.
Keywords: Dysgraphia, Learning Disabilities, Dysgraphia Scale, Reliability, Validity.

1- Introduction

The topic of acquiring writing skills gained a great deal of attention from scholars and researchers in different scientific disciplines; Such as the sciences of education, psychology, communication sciences, language sciences, and speech therapy. The importance of writing, and the multiplicity of variables affecting its acquisition make it one of the main human means of expression, communication, and transmission of knowledge. In the past, the Arabs said, "Knowledge is a hunt, and writing is a rope".

In this context (Perera, 1986, 496) suggests: "writing is an important aspect of linguistic sufficiency, for an individual who speaks a language and does not write in it is not considered to have fully acquired this language". Writing is a delicate, complex and difficult learning activity that requires certain conditions for its mastery, and not all children reach this skill with its various characteristics. Many pupils suffer from difficulties in writing that prohibit their academic achievement, the researcher (Jeannot,

1973, 15) confirms this by saying: "Writing remains a necessary means of communication; and lack of access to graphical ease disrupts written expression and makes other academic achievements weak".

In this way, several studies have emerged about the dysgraphia. For example, we find research conducted by (Malmquist, 1973), (Ajuriaguerra & Auzias, 1979), (Kirk, 1981), (Deuel, 1995), (Chung, Patel, & Nizami, 2020) ... and others. These studies have shown difficulties of writing are a phenomenon that exists in approximately 8- 15% of students in the school community, this ratio decreases as children rise on the educational scale; however, a percentage of them remains afflicted by these difficulties for life. There are some disturbances preventing them to naturally acquire perceptions like their colleagues; therefore this makes them unable to comprehend the written language symbols.

Dysgraphia is one of the most common types of learning disabilities in children, particularly in the primary stage, where writing plays a major role in the practice of school activities. Considering that, Psychologists have warned that the dysgraphia problem should be discovered at the beginning by paying attention to the child's academic and developmental conducts.

The good diagnosis of dysgraphia is an essential input for success in graphical re-education. In this way many scientists have produced several scales, in order to assess this disorder and diagnosing it differentially. They were based on a set of diagnostic dimensions, and according to multiple levels of this diagnosis.

The first who develops a tool for writing assessment was Hélène de Gobineau (graphologist) and René Perron (psychologist) in 1950, which is a scale for measuring the written level that allows evaluating the graphical components in the writing and intelligence of the writer child, and they called it (graphical measurement / Graphométrie). The concept of the developmental growth of writing has been incorporated into this graphical measurement, and the components that measure them are: (motor, mental, cultural, emotional, social, and age) (Ajuriaguerra & Auzias, 1979).

In 1960 (Ajuriaguerra & Auzias, 1979) took this scale, focusing on the motor side and the graphical trace, and built on them two new scales: the (E) scale for the child's writing, and the (A) scale for the adult's writing. The age of a child determined on the (E) scale between sex to 12 years; This scale establishes two main components: the EM (Enfant Motricité), which is related to the deformation due to the child's movement performance, and the EF (Forme d'Ecriture) which is related to the form of writing.

This scale is based on assessing the presence or absence of transcription components of writing (subject writing) and acquisition, by speeding up the child writing. It has been added to the previous two scales (E) and (A) - the dysgraphia-scale (D), which is designed to measure dysgraphia by three axes:

- Poor exploitation of the page.
- Clumsiness.
- Mistakes in the form and the proportionality.

It consists of 30 items, 15 pertaining to the child's position and 15 in the form of writing, each item has its own coefficient according to its importance, the sum of the two components points gives the child's point; The evaluation is based on the graphical age of the child and the actual age. Depending on the outcome of each component, we clarify the possible cause, whether it is positional or graphical.

In (1987) a new scale called BHK or the Concise Evaluation Scale for Children Handwriting, appeared by Lisa Hamstra-Bletz, Hans De Bie and Berry PLM den Brinker. This scale was prepared for early and rapid detection of dysgraphia, developed in the Dutch environment (Charles, Soppelsa, & Albaret, 2004). Because of its effectiveness, this scale has been adapted to several other environments, including the French and Algerian environments.

In Algerian environment, researcher (Bouzid Saliha) prepared in 1992 a scale for writing difficulties for primary school pupils. This measure was considered the cornerstone of most studies conducted in Algeria about dysgraphia. It was highly respected by several researchers. However, and despite its repeated use, the strange thing is that the research did not try to verify its metric validity and reliability, except for Sedkaoui (2007) study. She tried to calculate the reliability of this scale in a way of re-test on a sample of 354 pupils and found that the scale is reliable, the correlation between the two tests amount to (0.99).

The scale (Bouzid, 1992) was and still is used in researches of the dysgraphia in Algeria, and there is a lack of psychometric studies about it. So the current study came as an attempt for validation and re-standardization this tool. In addition, the study amends it to fit the development of dysgraphia's scientific studies.

2- Theoretical framework

1. Definition of Dysgraphia

Dysgraphia has faced for many years a lot of disregards, where it was considered a disorder accompanied with dyslexia. This was reflected in the various definitions presented about it, despite the widespread prevalence of this disorder, Where Shaywitz and Shaywitz, (2005); Hawke et al. (2009) refer that the prevalence of reading and writing impairments is reported to be about 7–17%.

After recognizing its independence as a special disorder, its definition was revised, where two basic generations of definitions have emerged. We will suffice here to introduce the second generation of dysgraphia definitions.

Diana, Klaus and Stefan (2018) define Developmental dysgraphia as a disorder characterized by difficulties in the acquisition of writing/spelling skills, despite adequate schooling, visus and normal IQ. It is noted on the previous definition that the judgment on dysgraphia should take into account the absence of imbalances in the learning process and mental impairment. These criteria were the focus of other definitions. McCloskey and Rapp (2017) developmental dysgraphia we mean impairment in acquisition of writing (spelling, handwriting, or both), despite adequate

opportunity to learn, and absence of obvious neuropathology or gross sensory-motor dysfunction.

Add to Ajuriaguerra (1979) who defines the child with dysgraphia by saying "We say that a child has dysgraphia, when his writing level is low with an absence of neurological trouble or mental retardation that explains this impairment, this means that child from a mental aspect is normal, but his writing is unreadable or very slow, These difficulties often impede the proper functioning of this child's education" (Ajuriaguerra & Auzias, 1979, 224)

In addition to what was presented by Ajuriaguerra & Auzias (1979), Hamstra Bletz & Blote (1993) define dysgraphia as “mechanical mechanisms disorder of written language, and this is evident in the weak capabilities of the child with normal intelligence, with the absence of all forms of neurological, cognitive, motor, and sensory disorders" (Charles, Soppelsa, et Albaret, 2004, 8).

Gelbert, (1996) referred to dysgraphia as "a difficulty in acquiring writing in a child without any motor, nervous, or cognitive disabilities. This appears as writing lines that are wavy, uneven in size, contiguous, and intermittent, accompanied by a poor sitting position, incorrect head position and incorrect pen holding position"(Gelbert, 1996, 291). Previous definitions have shown a new idea not presented by the old definition. It is the issue of exclusion of the cases that suffer from mental, neurological, cognitive and sensory disorders, taken out of the definition of dysgraphia. Ajuriaguerra & Auzias (1979) adds another aspect of dysgraphia, which is not mentioned in appearances identified by Gelbert, (1996) in his definition, which is a slow-writing aspect. Postel (1993) adds to the previous exclusions, the grammatical aspects in dysgraphia, so he defined dysgraphia as "an injury at the level of graphic functions, manifested in the space components of writing. This produces a dynamic disorder in the space coordination of graphic elements, whereas the grammatical components are not injured" (Charles, Soppelsa, et Albaret, 2004, 8).

In addition, to exclude grammatical disorders from dysgraphia, Postel presented a new evaluation aspect of dysgraphia, which is the graphic space.

As a summary of the various previous definitions, we can provide the following definition of the developmental dysgraphia.

It is a distortion affecting the letters form that make the writing syllables, or the suitability of these letters and syllables in relation to: each other or to the area designated for writing, or through unsuitable pressure on the writing instrument; or unsuitable speed for copying these syllables.

These previous imbalances include: writing by spelling input (hearing), visual input (seeing), or by memory input. Thus, we exclude from this description all children who suffer from a sensory, mental, and cultural disability.

2. Dysgraphia Scale of BOUZID Saliha (DSBS)

The dysgraphia scale of (Bouzid, 1992) is one of the most used tools to measure writing difficulties in Algeria. It is a diagnostic test directed to pupils of the first stage of primary school, contains three texts characterized by simplicity, ease and clarity. Each text directed to one of the three levels, which depends on two of the writing inputs, which are spelling and direct capture, and it consists of two main parts. The first includes eleven items, the first items relates to the general form of the text and its organization on the paper (the organizational side). The remaining items from 12 to 25 constitute the second part of the distortions that appear in the letters that make up the texts (distortion of writing).
In this test, each item is given a score on three (0/1/2), depending on the degree of its appearance, where score (2) reflects a presence of this appearance, thus the presence of a problem, the zero score reflects an absence of a problem.
In designing the scale items, Bouzid (1992) relied on the studies of Peugeot (1979) and (Ajuriagurra & Auzias, 1979). This scale is the oldest tool prepared according to the characteristics of the Algerian environment and the manifestations of Arabic writing.

The items of this scale were re-standardize to pupils of the second stage of primary school (fourth, fifth, and sixth year) by Sedkaoui (2007). This researcher has re-standardized the items of the third text directed to pupils of the third year because the previous test did not include this school level, Sedkaoui (2007) has made some changes to the scale items, which necessitated the re-standardization of this tool.

3- Methodological procedures

1. Participants:

Using the achievement test prepared by the teachers, the researcher selected a sample of pupils estimated at (191 pupils), including 91 pupils with poor writing (representing the upper group) and 100 pupils with typical writing (representing the lower group). According to the following characteristics:

Table (1) ***the characteristics of the study sample according to gender, school level, and writing levels.***

		Typical writing				Poor writing					
		Male		Female		Male		Female			
School level	fourth year	25	%50	25	%50	34	%55.73	27	%44.26	111	%100
	fifth year	28	%56	22	%44	19	%63.33	11	%36.66	80	%100
Total		53	%53	47	%47	53	%58.24	38	%41.75	191	%100
		100				91					

2. Procedures:

A. Repartitioning the scale items according to three aspects instead of the previous two (organizational side and distortion of writing), and thus the new aspects will become the following:

- Writing space (Items: 1/2/3/4/6/7)
- Writing format (Items: 12/13/14/15/16/17/18/19/20/21/22/23

- Speed and Pressure of Writing (Items: 5/8/9/10/11/24)

B. The use of the coefficients system, where it was not reasonable to treat all the previous items on the same degree. Because there are items more important in the writing of the individual than others; this procedure will be done after measuring the discrimination index of these items.

C. The use of the three levels of writing input, instead of two levels as before (spelling and direct capture) where we will add to them the memory input (from the child's memory). Therefore, we must put three texts, each text follows a special input level, in the spelling input we used the original text of the test, which is entitled (Today is Mustapha Birthday -عيد ميلاد مصطفى اليوم), in the direct capture input, we used one of the texts of the textbook, which is entitled (a decisive day-يوم حاسم). In the memory input, the text was (the first part of the Algerian national anthem- المقطع الأول من النشيد الوطني الجزائري), where, we collect at the end the result of the three texts and divide it by three to get the whole evaluation of the writing.(*)

D. Standardization the Item No. 26 of writing speed, where previously it has been just a qualitative judgment (slow/moderate/fast) that does not include any quantitative evaluation. Here, we will standardize this item to obtain numerical values based on measuring the time of completion to judge the child's writing with the three descriptions previous.

4- Results and Discussion

Bouzid (1992) has previously verified the validity of her test by measuring the Criterion-related validity, by calculating the coefficient of concurrent validity, where the external criterion was the teachers' assessments for writing of pupils. Bouzid (1992) found a strong correlation between the pupils' results in the criterion test and their results in the scale. As for the reliability of the scale, she verified the coefficient of internal consistency by calculating the correlation between the two scale parts (spelling and capturing). This consistency was estimated at 0.95.

Sedkaoui (2007, 81) has also reconfirmed the psychometric sufficiency of this scale. She tried to calculate the reliability of this scale in a way of re-test on a sample of 354 pupils; she found that the scale is reliable, the correlation between the two tests amount to (0.99).

After all this, we could not be satisfied with the previous researchers' estimates to infer the validity and reliability of this scale, due to the weakness in the evaluation method adopted by (Bouzid, 1992) and (Sedkaoui, 2007), in addition to the need to make some changes on this too. On this basis, we have re-estimated the psychometric properties of this scale, and our procedures have come as follows:

(*) Note: In selecting the previous texts, we relied on the following considerations:

- The first text: It was chosen by Bouzid (1992) in the original version.

-The second text: This text is distinguished by containing most of the letters, in addition to it is one of the prescribed texts in school, then it is a medium-sized, characterized by clarity and reasonable ease.

-The third text: The Algerian national anthem has been chosen, because it is among the most important texts memorized by most pupils in the Algerian school, it is very suitable for test the memory input.

1. Validity of the scale

We have made some modifications in the general form of the scale, by changing the names of the measured aspects and reclassifying the items on them. After this, we needed to present these changes to a group of experts for calculating the face validity of these changes. We relied on an experts group consisting of 11 experts, we added them four experts in the Arabic language, for a total of 15 experts (three psychomotor-therapists, three specialists in speech therapy, five university professors in the sciences of education, four specialists in the Arabic language). Their opinion was taken in two stages; the first is for the following matters (compatibility between the aspects and their items, and the suitability of the texts to this scale) the second is for determining the relative weights of the various items. The response of experts in both stages was distributed through three levels (strong, average, weak) for the first stage, the results are as follows:

Table (2) ***Agreement level among the experts on the aspects and texts validity of the BOUZID Saliha (DSBS)Dysgraphia Scale.***

	Assessment aspects	Strong	Average	Weak
The agree between items and the aspects.	1. Writing space.	%90	%7	%3
	2. Writing format.	%97	%1	%2
	3. Speed and Pressure of Writing.	%83	%17	%0
The suitability of texts	• Today is Mustapha Birthday.	%87	%10	%3
	• A decisive day.	%87	%12	%1
	• The first part of the Algerian national anthem.	%93	%5	%2

Through the previous table, we realize that most of the experts have agreed with high percentages exceeding 83% that the aspects -which the researcher has reclassified- fit their items. Therefore, we can confirm that there is a logical (face) agreement between these items and the aspects that they contain them. As for the texts, they also had high agreement rates, which exceeded 87%, on their suitability as for the dysgraphia scale.

In the second stage of validation for determining the relative weights of the various items (the logical importance of each item), the results showed that the items (7/24/8/5), which are, respectively, related to (completion time/ writing pressure/ writing spread/ continuity and interconnection) are the items that have the greater relative weights than the rest of items. They belong to the speed and pressure aspect, while the least weight items among all the items are (18/19/21), which are consecutively related to (Distortion of the letters (ط، ص، ض،ظ) by writing them as the letter (م) / Distortion of the letters (ت،هـ) the child writes them on the line when they are conjoined (ـــة), and under it when they are separated (ة) / Distortion of the letters (ص، ض) by deleting their cap. All this belongs to the aspect of writing format; Due to their low relative weight, we decided to give them up, so that the scale would contain only 21 items.

Accordingly, based on the study of the face validity determined by the expert's opinions, the scale consisting of 21 items was divided according to the following:

- Writing space (Items : 1/2/3/4/6/7)
- Writing format (Items : 12/13/14/15/16/17/18/19/20)
- Speed and Pressure of Writing (Items: 5/8/9/10/11/21)

After studying the opinions of the experts on the various items and aspects of the scale, we turn to determine the discrimination index of these items in order to give each item a coefficient equivalent to its ability to distinguish between different levels of dysgraphia, the discrimination index of items is usually calculated by adopting the technique of extreme criterion groups which are divided according to the total degree of the scale to three levels (the upper group, the middle group, the lower group) but due to the fact that our test has not yet been completed, we relied on an external criterion represented in Concise Evaluation Scale for Children Handwriting (BHK) where in the light of its application we get two groups consisting of 91 pupils with severe writing difficulties (representing the upper group) and 100 pupils with a typical writing (representing the lower group) then we applied the items of the scale on these two groups, trying to study the ability of each item to distinguish between these two groups, according to the following:

Table (3) ***The discrimination Indices of BOUZID Saliha (DSBS) dysgraphia Scale.***

Item	Upper Group	Lower Group	Discri Index	Item	Upper Group	Lower Group	Discri-Index
1	8	1	**0.7**	**12**	9	4	**0.5**
2	9	2	**0.7**	**13**	7	2	**0.5**
3	10	2	**0.8**	**14**	7	3	**0.4**
4	9	2	**0.7**	**15**	7	3	**0.4**
5	10	1	**0.9**	**16**	7	2	**0.5**
6	7	2	**0.5**	**17**	**7**	3	**0.4**
7	8	3	**0.5**	**18**	8	4	**0.4**
8	10	2	**0.8**	**19**	8	4	**0.4**
9	6	2	**0.4**	**20**	7	2	**0.5**
10	8	3	**0.5**	**21**	9	1	**0.8**
11	9	3	**0.6**				

By noting the previous table, we notice that most of the scale items have a strong discrimination index, 15 items exceeded a score of 0.5, while the rest items were distributed over a score of 0.4.

Given that we want to give coefficients for the items according to their metric sufficiency in this scale, we have calculated the correlation coefficient between the rank of items in the table of relative weights and the level of items in the table of discrimination indices in order to confirm that this step is an actual response to the particularity of these items; Accordingly; We calculated the Spearman's rank correlation coefficient estimated at 0.80, which indicates the relationship between the ranks of weights of items and the ranks of their discrimination indices are strong; Accordingly, based on the previous discrimination indices table, we can provide the following items coefficients:

• Items (3/2/8/21) give a coefficient of 3
• Items (1/2/4/11) give a coefficient of 2
• Items (6/7/9/10/12/13/14/15/16/17/18/19/20) give a coefficient of 1
Thus, the range of points becomes from 0 to 66 points, after multiplying each item by its coefficient.

2. Reliability of the scale

After verifying the validity of the scale items and their discrimination indices, we now turn to calculate the reliability of this scale. This procedure was done on the sample of pupils used in the validity calculation procedures, which consisted of 191 pupils. The reliability coefficient was calculated first by the alpha coefficient (α) for the internal consistency of the scale. The alpha coefficient for this scale was 0.58, which is a relatively average coefficient.

Also, the stability coefficient of the scale was confirmed by re-test after 10 days, on the same previous sample, where the value of the Pearson correlation coefficient between the two tests was 0.76. To verify the significance of this relationship score, we converted the score to the binomial t-distribution, from the degree of freedom (df=n-2). Therefore, since the calculated (t) equals 5.68 that is, greater than the value of the tabulated (t) equal to 1.64, we realize that the relationship between the results of the first test and the second test of the dysgraphia scale is statistically significant. Accordingly it can be generalized this results. Thus, the dysgraphia scale is a strong reliability coefficient.

3. Standardization of Item No. 21

After we set the coefficients, for the different items in the first standardization step, we have to deal with item No. 21 regarding the time of writing completion, as it is an important item. Because it has a high coefficient (3 points) but it did not have a good standardization, and on this basis, we first devised a unit of measurement to estimate the speed of writing. We can call this unit (letter/second), which is calculated by the following law:

$$\text{Writing speed} = \frac{\text{time spent in seconds}}{\text{number of characters of text}}$$

Then, we did a written exam for three groups of children (25 got good marks, 60 got average marks, 25 got low marks) in order to get closer to the normal distribution, then we calculated their speed based on the aforementioned measuring unit. As a result, we get the following finding:
* A group with fast writing more than three letters per second.
* A group with medium-speed writing (normal) from one to two letters per second.
* A group with slow writing, less than one letter per second.

Accordingly, to calculate the child's writing speed, we divide the total time taken to write a text by the number of letters of this text. Of course taking into account the age of the standardization group, which is from nine to 12 years.

APPLICATION PROCEDURES: The application of this scale requires maintaining the general conditions that prevail in the classroom, and it depends mainly on a ballpoint pen, and sketchbook paper striped (due to the pupils' accustomed to it). In

addition to carbon paper placed between the two sheets for the pressure writing test, with the availability of a chronometer. After making sure that all the means and conditions are prepared, we start with the text of the capture input, by writing it on the closed side of the blackboard. Where the pupil is told that (he is in the writing lesson) in order to make him write at his fullest capacity. Next, we open the blackboard and let him write even, if he completes we stop the chronometer and carry his answer sheet. After a rest period, we give him the spelling text, then the memory text.

After evaluating the writing in the three texts, we collect their results and divide them by three. Then, we get the total point of the scale, which extends from zero to 66 points by calculating the coefficients since each item has the possibility of obtaining one of the following three points:

• Case (A) indicates good quality writing with no distortions, and a score of (0) is given to it.
• Case (B) indicates medium quality writing with the presence of minor distortions, and a score of (1) is given to it.
• Case (C) indicates low quality writing with the presence of serious distortions in the letter's formats, and a score of (2) is given to it.

DISCUSSION: To verify the effectiveness of the dysgraphia scale of BOUZID Saliha (DSBS) after the amendments made to it, we calculated the face validity by presenting the scale to a group of 15 experts, all of whom agreed -with a high rate of 83%- that the aspects that we re-divided them, they fit with their items. As for the texts, we have also obtained high agreement rates, which exceeded 87%, that make them suitable materials for the dysgraphia evaluation scale. We have strengthened our confidence in the scale validity by calculating the Spearman's correlation coefficient for the grades of weights of items. That value is estimated at 0.80, which indicates that the relationship between the ranks is high. Therefore, its discrimination index is strong.

As for reliability, it was confirmed by calculating the internal consistency value of the scale, where the alpha coefficient (α) for this scale was 0.58, which is a relatively moderate value. The Stability coefficient of the scale was confirmed by retest after 10 days, on the same previous sample, where the value of the Pearson correlation coefficient between the two tests was 0.76.

In conclusion -as a recommendation- we encourage adopting this scale with the current amendments, without neglecting the considerations related to the diagnosis of dysgraphia. These considerations estimate that the use of diagnostic scales will only be sufficient by looking at the general educational situation of the pupils concerned with the diagnosis. As there are many considerations that must be taken into account according to the following frameworks:

A. The differential diagnosis of dysgraphia:

Although there are some handwriting mistakes that can be made by the child with dysgraphia, the quantitative analysis of them permits us judge their permanence, which confirms the existence of this disorder or not. As there are some writing problems that appear in children at the beginning of learning. They cannot be judged as dysgraphia because children can overcome them when they reach a certain age.

Some researchers use the term "the writing accidents" to indicate problems that emerge at the beginning. Trillat (1957) distinguishes between two types of writing accidents:

- Minor writing accidents: The confusion appears between similar letters in the pronunciation and between nasal letters.
- Serious writing accidents: The letters are flipped, which indicates there is no space balance, as well as flipped writing.

Due to this interrelated developmental situation, it is imperative for those who want to diagnose dysgraphia to undergo several criteria. They start with a medical examination, to verify the absence of sensory disorders. In addition to psychological tests, Debray has indicated that writing mistakes are not sufficient to diagnose dysgraphia. As it must rely on more accurate tests enable us to analyze all the difficulties appearing to us. (Rondal & Seron, 1977, 408).

B. The dimensions of the diagnosis of dysgraphia: After specialists complete the differential diagnosis of dysgraphia, they proceed to evaluate the child's writing itself, according to several dimensions.

At this point, we can present the diagnostic dimensions presented by Ajuriaguerra & Auzias (1979) in their study of dysgraphia, as follows:

1. **Poor exploitation of the page:** The unorganized page indicates there are potential difficulties for the child at the level of his space organization. We say that the page is irregular when the text does not have any formality unit, and is scattered at the page's level, the spaces between the lines and words are not regular, the lines are corrugated, the paper is more like a draft.
2. **The clumsiness:** It appears mostly in the form of distortions, and contusions during writing, where the child is not bound to norms and laws of graphical transcription. This disability is shown at the level of:
   • Combine traces (the lines are poor quality; the letters have a lot of patching and delisting)
   • At the level of the writing path (concussion, contusions)
   • At the level of the pattern of interconnection between letters (the edges of the pen point are multiple and cautious (in order to correct mistakes).
3. **Mistakes in the form and the proportionality:** Here we will be relying on the compounds of deviation from the normality, which are presented by (Helene D.G, 1950) in his study of the writing activities of the adult person, these compounds collect items related to:
   • Degree of clarity in letters (excessive accuracy or excessive negligence)
   • Letters dimensions (too small or too big)
   • Proportionality in letters (their legs or masts, whether they are atrophied or enlarged).

C. Levels of dysgraphia diagnosis: Keller (2001) indicates the diagnosis of writing difficulties requires passing through the following levels:

1. Psychological examination level: By applying IQ tests to estimate the pupil's mental and cognitive level, in addition to the emotional level.
2. Medical examination level: This includes assessing the child's general physical condition, to make sure the absence of disease or disability.

3. Social level of the pupil's family: in terms of their social, economic and cultural level, the prevailing climate in them, and the level of their follow-up to the pupil's performance in school.
4. Educational level; Condition and performance: This includes:
- Reproducing short sentences to find out if the child deletes, neglects or writes the letters incorrectly.
- Taking samples from the child's writing of letters and words, with form sentences revolving around a specific topic.
- Writing samples of similar letters (ب،ت،ث/ج،ح،خ/ص،ض ...)

E. The level of recognizing writing skills: It includes, in addition to the above-mentioned dimensions (Ajuriaguerra & Auzias, 1979) the following notes:

- Body, hand, head, arms and paper position while writing.
- Holding pens method while writing.
- Diacritics and sizes of letters.
- Straightening of the writing path on the line.
- The spaces between letters and margins.
- Quality of the script.
- Establishing the necessary coordination for writing to highlight its meanings.
- Completion or non-completion of letters.
- Intersection in writing letters and shapes.

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