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# Symptomatology of Graphomotor Disorders – Situational Determinants and Assessment Difficulties *

SUMMARY

The article deals with the problem of symptomatology of graphomotor disorders, focusing on the situational determinants of the observed symptoms of pathologies and on the related difficulties with the assessment of handwriting/writing activity. It is based on the example of my own patients under care of the UMCS Department of Logopedics and Applied Linguistics Logopedic Lab. Students with disordered graphomotor skills and without being properly diagnosed experience failures at school: when trying to prevent them, they follow the remarks made by teachers and parents which largely refer to the results of their students'work rather than the manner of performing the writing activities. Students with graphomotor disorders may sometimes achieve a comparatively high graphic level of handwriting, and the legibility of the text, at the same time, however, they are unable to function properly under school conditions and at home as writing is too time-consuming and exhausting, it engages the student's attention too much at the expense of other kinds of activities. The illustration of the phenomena in question is the patients' handwriting samples.

**Key words:** logopedics; diagnosis; graphomotor skills; dysgraphy

## INTRODUCTION

In logopedics, there is a need for in-depth reflection on graphomotor skills and graphomotor disorders. In speech pathology, relationships between an individual's verbal communication and written communication can be extremely complex: discrimination between the two spheres through the information transmission channel explains the phenomena occurring in the normal state (Grabias 2001); however, in cases of disorders, particularly developmental, there arise many detailed problems, important in the diagnostic and therapeutic aspects. This is illustrated inter alia by studies devoted to disorders of central auditory

processing (Przybyla, Wall 2012) or to ADHD (Stasik et al. 2009), which deal with the problem of determinants of various types of difficulties experienced by patients.

Graphomotor skills currently tend to be seen in many aspects and dimensions. The investigation trend oriented towards the kinematic analysis of writing emphasizes that the use of the digital drawing board for assessment of drawing and writing has changed the attitude to the problem: from product-oriented to process-oriented; apart from the quality of handwriting the automation of writing movements and their fluency is studied (Stasik et al. 2009). As these studies show, therapeutic management cannot always reconcile expectations and requirements concerning the product and process at the same time. It is certainly impossible to help all patients, especially in cases of too late intervention.

It is a fact that practitioners do not have the specialist apparatus enabling exact examination of the handwriting activity. This aspect of handwriting cannot however be disregarded in diagnostic procedures because this may adversely affect the development of writing skills and the whole school education in patients with graphomotor difficulties. A broad approach to graphomotor skills consisting in the combination of the process and product of graphomotor activities determines a multi-level assessment: the two aspects are equally important here (Domagała, Mirecka 2010b). Nevertheless, under school conditions, teachers and educators largely focus their attention on dysgraphy understood as "untidy and illegible handwriting" (Wrońska, Nowak 2007: 93) – "The term 'dysgraphy' usually applies to the low graphic level of handwriting, which makes it illegible or difficult to read" (Wrońska 2009: 336). J. Wrońska and E. Nowak stress that it is necessary to develop good criteria for dysgraphy and define standards (2007).

In the basic aspect, the problem is that the level of knowledge about writing and reading disorders is still comparatively low in society. M. Półtorak (2007) examined the level of knowledge on the subject among future educators and teachers (students about to complete their MA studies)[1] – even on these grounds one might think that difficulties of many students at school will not be noticed at the right time.

## THE GOAL OF THE ARTICLE

The article deals with the problem of symptomatology of graphomotor disorders, focusing on the situational determinants of the observed symptoms of pathologies and on the related difficulties with the assessment of handwriting/writing activity. It is based on the example of my own patients under care of the

[1] The highest level of dyslexia was found in future educators (42.35% of correct answers in the Dyslexia Awareness Questionnaire"), a lower level was reported in early-school education teachers (22.58%), the lowest in teachers of Polish (8.14%).

UMCS Department of Logopedics and Applied Linguistics Logopedic Lab. The goal of the article is to discuss and illustrate the phenomena that occur in the case of graphomotor disorders not identified at the patient's optimal time and hidden from the environment, i.e. from teachers and parents who understand the disorders in a different way, thereby depriving the child f appropriate support and specialist help. Under such conditions, graphomotor disorders are related to the growing problems in learning and the rise of general difficulties with many school subjects in the course of education.

## INVESTIGATION PROCEDURES

Investigation methods involved an analysis of the handwriting product carried out on large material (school notebooks, notes, handwritten texts made during therapy classes) and observation of subjects during classes, interviews with subjects and their parents, analysis of documentation and results of specialist tests. In the present study I present the results of investigation procedures applied to two selected patients:

1/ Konrad J., sixth grade, elementary school.

At the stage of early education the boy had great difficulties with reading and writing; he learned to read in fourth grade and has since read without errors, at the right rate and with understanding whereas writing difficulties still continue. Konrad did not consult a specialist until he was in sixth grade; at this stage the problem reported by his parents to the Logopedic Lab was orthographic errors. In the interview with his parents the issue of the lower level of handwriting was raised: difficulties in this sphere had long worried them but these were attributed to the child's lack of diligence and carefulness, and his unwillingness to make an effort, with the parents waiting for spontaneous improvement. The interview indicated that some teachers lowered his grades because of the condition of his subject notebooks but others had no reservations in this respect. Very positive remarks about the student concerned his many interests and his vast knowledge in selected fields. To the boy himself, writing is the source of growing frustration.

In this case, in view of my own findings concerning his orthography and the graphic aspect of his handwriting, a complete diagnosis at the psychological-pedagogical counselling centre was recommended: as a result, the student was diagnosed to have developmental dyslexia (dysorthography, dysgraphy), and his above-average intelligence was emphasized at the same time. A significantly diminished manual dexterity was identified as one of the causes of his dyslexia. Konrad is thus an example of a patient who for years battled with graphomotor disorders by himself, without proper diagnosis and specialist help, with a reputation of "an able idler".

2/ Dominika K., fourth grade, elementary school.

At the stage of early education, growing difficulties in studying were reported in the student; in second grade she was sent by the school to a psychological-pedagogical counselling centre for diagnosis. It was found that the child's general intellectual development was in the lower range of average abilities and was disharmonious. After the next two years, her results in fourth grade were even worse: below-average general intellectual development, and numerous persisting partial deficits. During the period in question it was shown that the graphic level of her handwriting was significantly diminished (the student writes letters slanted in different directions, shows great fatigability, the rate of work is slow, the muscle tone of the hand being observed while writing. The characterization of her personality emphasizes that Dominika is very sensitive and reacts emotionally to her difficulties related to school failures.

The girl was under care of the Logopedic Lab from the end of third grade because of difficulties in learning to read and write. In this case, the analysis of school records points out the teacher's high assessment of the child's handwriting (here: the mid-year assessment of handwriting in third grade says "her handwriting is well-formed, careful and aesthetic"). Dominika is an example of the subject whose graphomotor disorders, from the standpoint of her teachers and parents, remain hidden, to the extent that the graphic level of her handwriting is regarded as the "strong point" of the child, who has general learning difficulties (she is a so-called "weak student"). The diagnosis of dysgraphia (developmental dyslexia) in the case of below-average intelligence is an unjustified diagnosis (Bogdanowicz 2009), but, consequently, writing difficulties become one of the girl's insufficiently diagnosed school problems which her environment failed to understand.

During the investigation procedure symptoms of graphomotor disorders were reported in the two students (in accordance with the categories defined in the "Profile of Graphomotor Skills" – Domagała, Mirecka 2009a, 2009b, 2010c); the situational determinants of the graphic level of handwriting was analyzed and the situationally implied difficulties with identification of pathological symptoms under school and domestic conditions were determined.

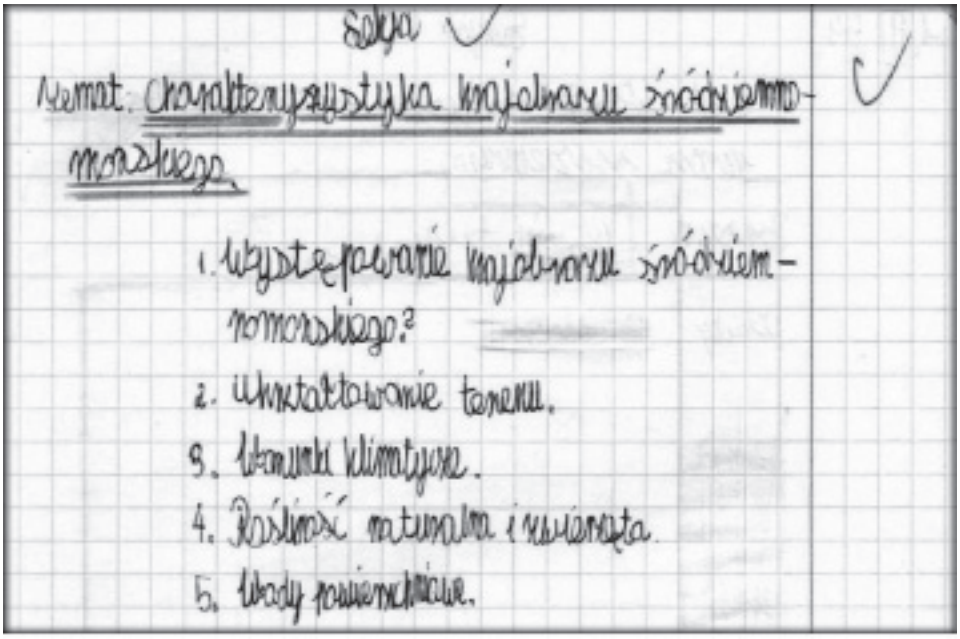
## RESULTS

Disorders of graphomotor skills in students who experience failures at school may remain undiagnosed for a long time. The symptoms of disorders in the graphomotor sphere tend to be situationally variable, which makes it difficult to assess growing difficulties in this field.

1/ The case of Konrad J.

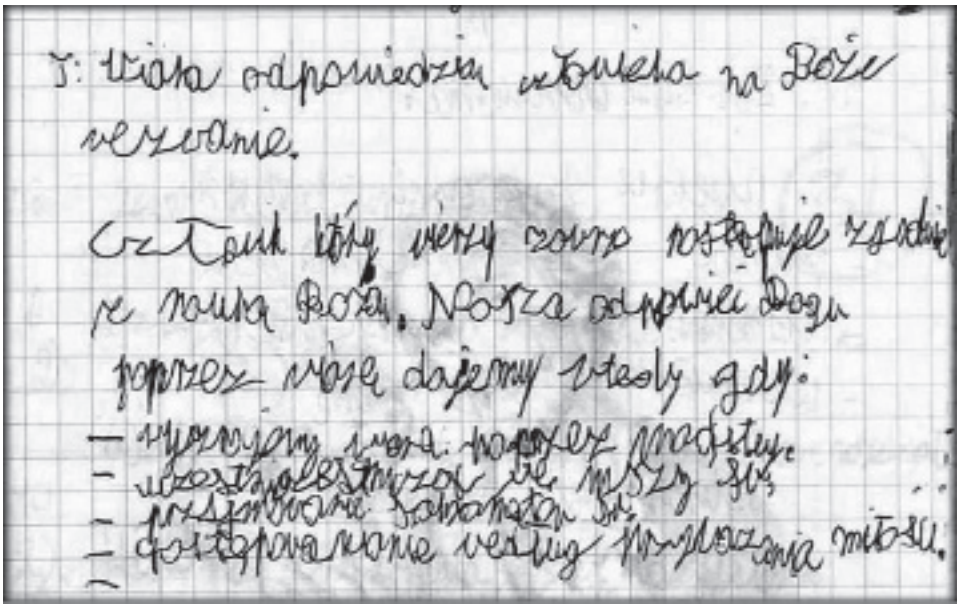
Konrad's case demands that we focus attention on the highly differentiated graphic level of his products: the texts written down in school notebooks during

lessons may even arouse doubts whether they were written by the same person (cf. example no. 1a and no. 1b).




Example 1a. Konrad J. – the writing in the geography notebook, fifth grade

The collected handwriting samples from different subject notebooks (from the same period of learning) obtain higher or lower grades during the analysis of products of graphomotor activities, which comprises the categories contained in the *Chart of Assessment of Handwriting and Letter-like Designs* (Domagała, Mirecka 2010c). The student's abilities may thus have been perceived in a different way by teachers of particular subjects. What determines the diversity of the samples is here first of all their writer's inner motivation: the assignment will most certainly be checked/not checked by the teacher, or graded/not graded; this will have an effect on the final grade/will not. As a result a legible written entry can be produced, which cannot be accused of negligence (cf. example 1a – the student gains in the teacher's opinion, taking care for example of the correct placement of writing in the ruling and on the page, using colorful underlining and preventing the crossing out of letters below their body, or the handwritten entry is hardly legible/ illegible in places, showing a total lack of care over the graphic level of handwriting (example 1b). In the case of a significantly diminished manual dexterity (which was diagnosed in Konrad) the graphic aspect of the texts written at

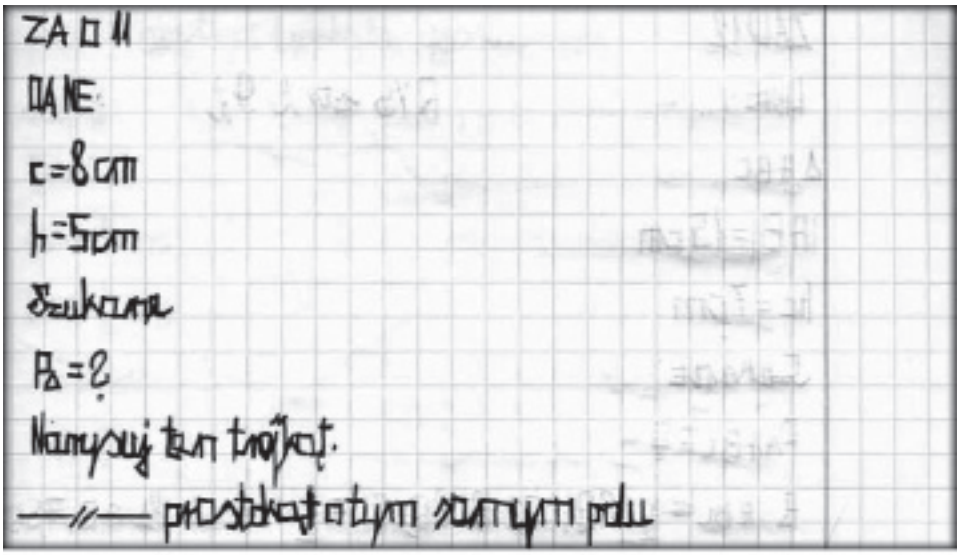


Example 1b. Konrad J. – the writing in the religion notebook, fifth grade

school and at home depends on the effort that the student can make in writing, and on the time that he currently has. Konrad complains of being quickly tired while writing, of exhaustion, and time consumption: he often has the impression that the writing movements are getting out of control (one might guess this by assessing writing samples such as 1b). His Polish notebook (often checked by the teacher) looks comparatively good – a higher graphic level of notes in this exercise book is achieved, however, at the expense of other, not inspected notebooks, which patently reveal the student's inefficiency during lessons (as shown in example 1b), in particular when many texts are written down. In this case, the student's special endeavors made in fear of a negative grade make it impossible for the teacher of Polish to notice the scale of the boy's writing difficulties.

The analysis of school writing products permits the conclusion that the boy usually tries to achieve a legible level of writing for him: this was confirmed during the interview with the subject. Alterations in the notes, crossings-out, careful writing down of the most important information, e.g. instructions for homework, are signs that the boy wants to make use of his texts - he wants to be able to read them. With regard to studying, Konrad is an ambitious boy: his parents, both with university education, impress him with their professional achievements; that is why he would like to do as best at school as he can, which he treats as a condition for acquiring a good profession and developing his interests. With the lack

of specialist help (in the period prior to the dysgraphy diagnosis) he often tried to cope with his difficulties on his own. Examples no. 2a and 2b, the samples from the same notebook, illustrate his striving to achieve the legibility of handwriting: through a special, angular form of graphic signs and regular writing, modeled after technical lettering (2a) or through writing large signs with distinct shapes, and with rounded lines.

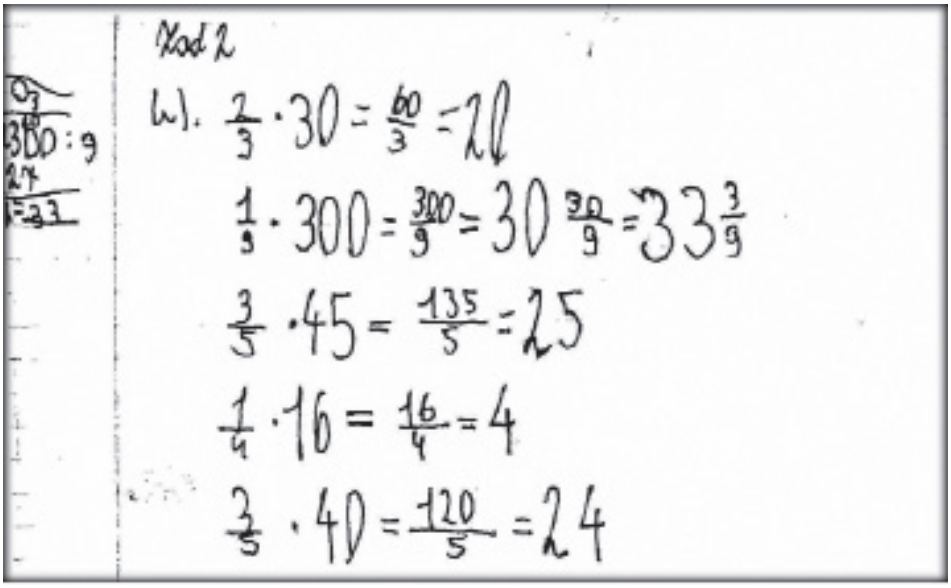


Example 2a. Konrad J. – striving for the legibility of writing in the math notebook; angular letters and figures

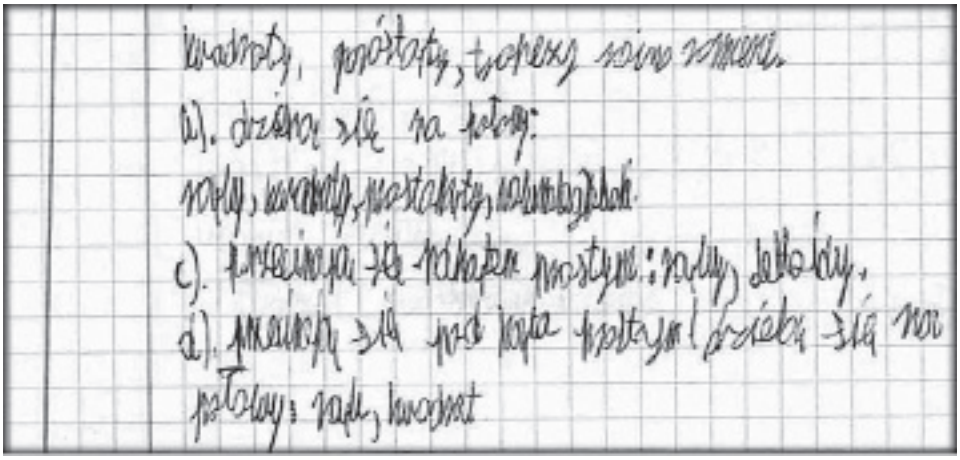
The ways of writing graphic signs illustrated with examples 2a and 2b can be only short-term solutions used by the student: they require too much work and are not useful as such, especially under school conditions (the manner of writing down in the form as in example 2a appears only in several notebook pages). The attempts to minimize effort are understandable in his situation. This is illustrated with examples nos. 3a and 3b: at the level of the handwriting product the striving for economy of the manner of writing manifests itself here first of all in the size and direction of writing as well as in the choice of the tool, which is expected to make writing less tiring (attempts to write with a fine-tip pen – 3b). However, letter forms are thus lost and distortions occur in the structure of words; consequently, texts are difficult to read.

The collected samples of Konrad's handwriting, as for example no. 3 (here: the boy does not want to be seen as an inept child just learning to write, hence his attempts to bend writing to the right, following the pattern of texts observed in

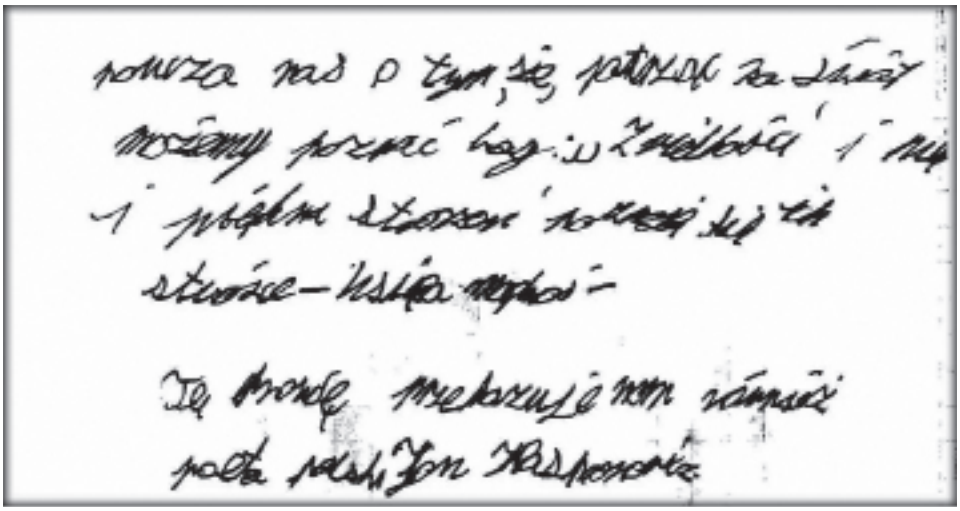
adults), are evidence of search for his own handwriting in the situation when the writing technique has not yet been mastered. With the disordered process of writing activity, the student has been oriented by his environment towards developing an appropriate graphic level of writing: the legibility and aesthetics of writing (the




Example 2b. Konrad J. – striving for the legibility of writing in the math notebook; large figures with rounded forms.



Example 3a. Konrad J. – striving for economy of writing in the math notebook; handwriting condensed, an attempt to achieve the perpendicular writing.



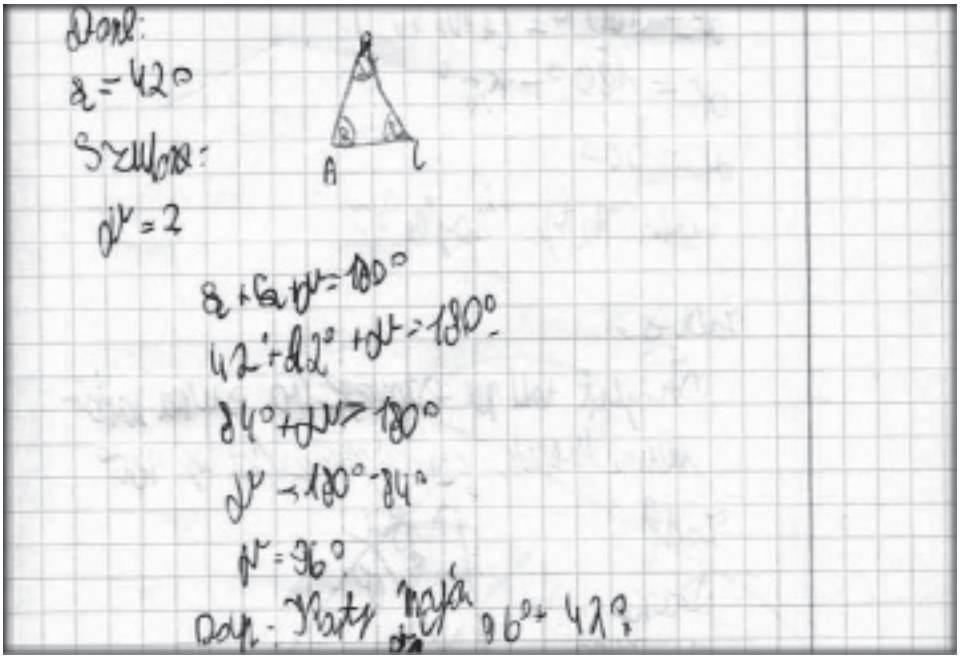
Example 3b. Konrad J. – striving for economy of writing in the religion notebook; handwriting condensed, right-slanting

product of graphomotor activities) cannot however be reconciled in this case with the economy of writing movements (the process of graphomotor activities).

At this stage of education the effects of disordered graphomotor skills are already far-reaching and significantly impede the student's learning activities. Decoding his own text with a diminished graphic level is the easiest in Konrad's mother tongue (because of his knowledge of the language system and lexical and grammatical predictability, which helps correct errors and sometimes guess the meaning from the context, from that which has been written down before); in contrast, in learning foreign languages dysgraphy can become an insurmountable barrier[2]. A special problem in writing down a text in a foreign language are false spelling mistakes (graphic errors which may formally appear as spelling mistakes – Domagała, Mirecka 2010/2011); the student does not have the right visual models of words: under such circumstances learning new words and grammatical forms will be disturbed. The possibility of using graphic signs other than letters is also restricted, thus making it difficult to learn other school subjects (here: punctuation marks, figures, musical notation, etc. - in accordance with the adopted interpretation of the graphic sign Domagała, Mirecka 2010b). The above presented samples from math notebooks (examples 2a and 2b) characterized by the great-

[2] The key problems in teaching foreign languages in the cases of graphomotor disorders were indicated in the article *Trudności grafomotoryczne ucznia wyzwaniem dla nauczyciela języka obcego* [The student's graphomotor difficulties – a challenge to the foreign language teacher] (Domagała, Mirecka 2011).

est variability of the graphic level show that the student sees the graphic aspect as important in the process of learning – wrong encoding of figures will lead to errors in calculations. Regarding different types of graphic signs, one can observe Konrad's analogous problems with the process and products of graphomotor activities; example 4 illustrates difficulties concerning letters, including those newly learned (from the Greek alphabet, used in geometry classes: α, β, γ), punctuation marks, numerals, and symbols of mathematical operations.



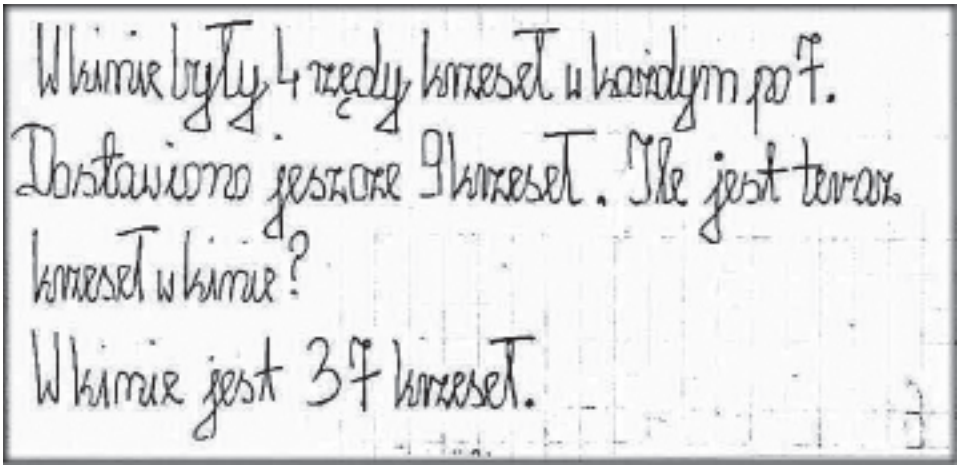

Example 4. Konrad J. – the writing of different kinds of graphic signs

The growing problems with learning various subjects despite the boy's high intellectual abilities, and his futile attempts to eliminate difficulties, illustrate the consequence of too late diagnosis - one of the myths cited by Bogdanowicz (2009: 34) concerning developmental dyslexia (as well as dysgraphy) that disrupt diagnostic management says: "an intelligent child will always cope at school".

2/ The case of Dominika K.

The case of Dominika requires that we focus attention on the high graphic level of her handwritten texts if we assess her handwriting in terms of legibility and the aesthetics of handwriting. This is how the results of her work were seen by the people around her at home and work, to recall the aforecited praise by the principal teacher in the third grade that her handwriting was well-formed, careful, and aesthetic.

An exemplification will be example 5a.




Example 5a. Dominika K. – the writing in the square-ruled notebook

The parents feel that problems with the graphic aspect of her writing appeared in fourth grade; while she was in her junior grades, they did not think that anything wrong was going on. The girl also boasted about her nice handwriting. Because the negative comments from the pedagogical-psychological clinic were inconsistent with the teacher's praises, the parents regarded them as unimportant. The remark about the slanting of the letters to different sides did not seem significant because the child, when supervised, was able to write them at right angles. It should be emphasized that the analyzed grade sheets did not allow the teacher to assess the process of graphomotor activities and inform the parents of difficulties in this respect. The descriptive assessment pertained only to the product of graphomotor activities, the teacher having no reservation in this area. In fourth grade the child performed increasingly poorly when writing in class and at home, she lagged behind her class, became tired very quickly, and the graphic level of her handwriting also began to raise doubts in her environment.

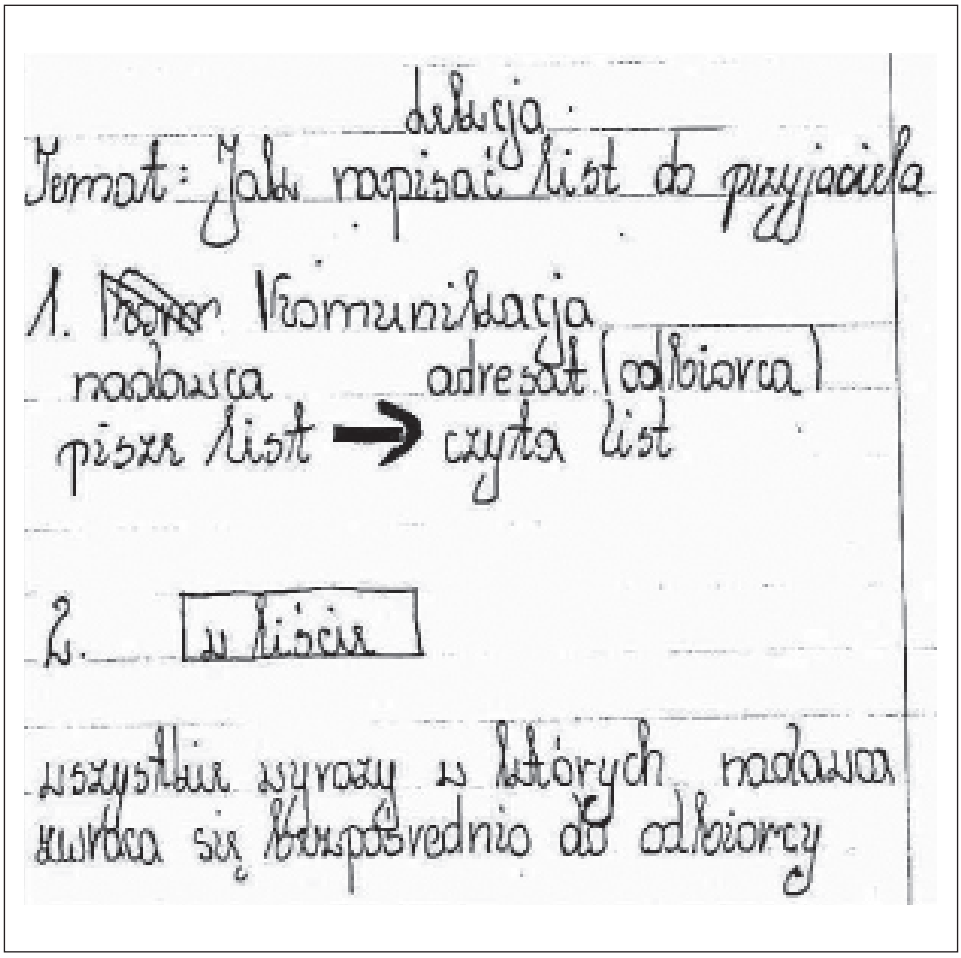
At this stage of education, in my evaluation noted that the process of graphomotor activities was disturbed in almost all categories defined in the "Observation Protocol" (Domagała, Mirecka 2010c). The child did not master the proper technique of writing, her prevailing behavior was to write down letter by letter (usually without connections, with collages or connections begun with the wrong part of the letter, also related to an undesirable modification of it), the direction of writing letters and their structural elements was often wrong and variable (circles were done clockwise or anticlockwise, vertical lines were written from bottom

to top or the other way round, e.g. the letter *f* was always begun from bottom to top). The writing movements were not fluent, disorganized, and uneconomical. The trace of the writing instrument was extremely strong, showing an increased muscle tone.

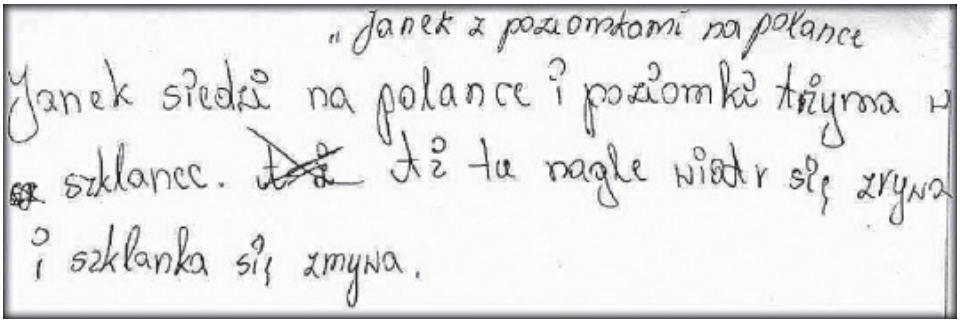
As far as the graphic aspect of writing was concerned, the ruling was helpful during writing (e.g. examples 5a, 5b, 5c – respectively: writing-down in the square-ruled notebook, in the ruled notebook, in the notebook without ruling) - the writing-down on a square-ruled sheet permitted the student to maintain regular writing at right angles; on the ruled sheet the slant direction was already highly variable, while on the unlined sheet, apart from problems with maintaining the permanent direction of writing letters, there were also growing problems with maintaining the verse line and with the organization of the page by the student. On the basis of the texts written down on different kinds of sheets the situational variability of symptoms of graphomotor disorders can be ascertained. In Dominika's case the graphic level of products of graphomotor activities is not highly diversified (her writing always remains legible) but it clearly depends on the ruling of the page.

With regard to the writing technique, examples 5a and 5c also allow us to indicate different ways of writing down the text, used by the girl: in one text she strives to connect the letters, to fluently write several consecutive signs (example 5a), while in another she writes letters set apart and clearly separates them one from another (example 5c). In the latter case she writes down letters more quickly, without having to choose appropriate connections in particular cases (as a result this produces the so-called spaced-out writing). Dominika cannot cope with connecting of letters: in example 5a this is signaled inter alia by the word *Dostawiono* (the letter *o* in the first syllable is written as separate, while the letters in the next syllables: *Dost**a**wi**ono*** are connected with the preceding letters, they are written down with a continuous movement, clockwise, whereby they lose their closed form, the circles being modified in an undesirable way.

The results achieved by the student at the level of products of graphomotor activities are incommensurate with the effort put into the writing activity. The orienting of the child towards carefulness and aesthetics ("it is good if it is neat") does not take both aspects of graphomotor activities (the process and products) into equal account. Disorders of the process of graphomotor activities remain invisible to the environment, only the effect, i.e. the handwriting, is assessed. What attracts attention in the student's texts is the distinct shapes of letters (sometimes written down as printed ones e.g. the letter *a* → a) and embellishments (circles over letters instead of dots, unnecessary loops in the writing of letters, e.g. *l*, *k*, *t*). Ornamented letters with additional graphic elements, which are undesirable embellishments, are an undesirable phenomenon, in particular in students of ju-




Example 5b. Dominika K. – the writing in the ruled notebook




Example 5c. Dominika K. – the writing in the unlined notebook

nior grades[3]. In Ajuriaguerra's French dysgraphia scale (profile) this phenomenon was taken into consideration as a major pathological symptom pertaining to the manner of writing down letters in dysgraphy cases. As part of her homework the girl copies lengthy fragments of encyclopedia, she eagerly makes poems related to homework and writes them down in the notebook, additionally making drawings (the rhymed text given as example 5c was composed by Dominika, who likes being called a poet, which allows her to get rid of her role as "a poor student").

Because Dominika always put a lot of effort into writing and worked with commitment, she cannot understand that the neat handwriting, for which she was praised at the stage of early education, is now one more source of her learning failures. The psychological opinion confirms that the girl has growing emotional problems: the feeling of failure is very acute.

In her case, one of the most important effects of disorders in the graphomotor sphere are orthographic problems associated with the poor automation of the writing activity and the non-development of the visual and motor patterns of words – disordered motor memory makes it difficult to master correct spelling (Domagała, Mirecka 2010a). Thus, writing is disordered both in the graphic and orthographic aspects. The student cannot master one of the basic school skills.

Writing and reading disorders, if they cannot be qualified as specific (developmental dyslexia) make the student's situation at school extremely difficult: Dominika's case shows that problems of persons with below-average intelligence have not been sufficiently diagnosed and consequently they grow in the course of education.

## THE SUMMING UP AND CONCLUSIONS

1/ Graphomotorics is an important sphere in the child's development; in the course of education it is of essential importance to master the appropriate writing technique – a basic school skill (rather than master the art of writing beautifully if we refer to calligraphy in this sense; neat handwriting, its aesthetics, are not the goal in itself here). A student's graphomotor competence is determined by the process and product of graphomotor activities (Domagała, Mirecka 2010b), while graphomotor difficulties should be identified in both these aspects, rather than only when they suggest dysgraphy (developmental dyslexia) and criteria for its diagnosis have been fulfilled (neurological conditions, impaired sense organs, and below-average intelligence make a diagnosis of dyslexia illegitimate, but graphomotor disorders remain a fact in such cases, and as such they are marginalized, which has been demonstrated using the example of Dominika). Graphomo-

[3] A complete discussion of graphic errors together with illustrative material is contained in the monograph "Grafomotoryka u dzieci w wieku 7–13 lat [Graphomotor skills in children aged 7–13]" (Domagała, Mirecka 2010b).

tor difficulties should be diagnosed in the aspect of their determinants. Parents and teachers are still prone to explain graphomotor disorders in terms of laziness, neglect or negligence, entirely disregarding the fundamental questions associated with the child's psychomotor development (as was the case with Konrad), they also fail to see the relationship between graphomotorics and acquisition of orthographic competence.

2/ Students with disordered graphomotor skills and without being properly diagnosed experience failures at school: when trying to prevent them, they follow the remarks made by teachers and parents which largely refer to the results of their (students') work ("write neatly, write legibly") rather than the manner of performing the writing activities. Regardless of the determinants of these difficulties, students are generally told to write more carefully or neatly (whatever that means), which may only aggravate problems in some cases (e.g. with the already excessive effort put into writing, or a greater muscle tone, as is the case with Dominika). The lack of specific instructions causes students to try on their own to meet the environment's requirements in many ways (this has been shown with the example of the variability of Konrad's behavior). Accounts by patients with graphomotor disorders show that they are sometimes motivated to work with negative remarks, also during therapeutic re-education classes conducted by logopedists (even if they pertain to other problems in language communication) – they hear the everlasting comment: "your handwriting is like chicken scratch", as if this was their choice rather than the only possible behavior in this situation.

As has been shown in this paper, students with graphomotor disorders may sometimes achieve a comparatively high graphic level of handwriting, and the legibility of the text: at the same time, however, they are unable to function properly under school conditions and at home as writing is too time-consuming and exhausting, it engages the student's attention too much at the expense of other kinds of activities.

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