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Diagnosing Dysorthography in Patients with Graphomotor Disorders

SUMMARY

In this article we discuss the problems of so-called apparent spelling errors. We orient the diagnostic process towards identifying them in the text structure, using the method of phenomena analysis defined in our original technique developed for diagnosing graphomotor difficulties – the *Profile of Graphomotor Skills*. We present the results of empirical studies carried out on the material covering 600 text samples obtained while testing primary school pupils, grades one to six. On the basis of the *Chart of Assessment of Handwriting and Letter-like Designs* we show which phenomena pertaining to the graphic aspect of handwriting may formally appear as spelling errors, and illustrate them with examples. These findings are useful in interpreting the determinants of errors in writing.

The presented empirical studies were conducted as part of the research project ‘Written Communication Disorders. The Profile of Graphomotor Skills as A Technique for Diagnosing Children Aged 7-13 Years. The Development of Graphomotorics - A Risk of Dysgraphia’ (The Ministry of Science and Higher Education 33rd Competition for Research Projects, project no. NN 106 1885 33; project manager – Dr Urszula Mirecka, principal executors – Prof. Dr Habil. Stanisław Grabias and Dr Aneta Domagała).

Key words: dysorthography, dysgraphia, graphomotor skills

INTRODUCTION

Dysorthography, dysgraphia and dyslexia as part of the broadly understood developmental dyslexia, make it necessary to orient diagnosis of writing disorders towards two aspects: orthographic (spelling) and graphic (M. Bogdanowicz 2006, M. Kwaśniewska 2000, I. Pietras 2009).

Our professional experience shows, however, that the assessment of handwriting skills is usually oriented towards spelling, sometimes entirely disregarding the graphic aspect of handwriting, even when pathological symptoms relate to the two aspects in question and overlap with them. The cases of identifying graphic errors as spelling ones are not uncommon, for example: the teacher, when assessing a primary school third-grader's dictation, seeks the cause of the erroneous spelling of the word: *spi* [sleeps] → *sni*, [dreams] in perception or auditory memory disorders, whereas the text written by the pupil demonstrates that s/he permanently deforms the letter *p* in writing by shortening its lower part (as a result, this makes letters *p* and *n* look alike in handwriting). The erroneous identification of the causes of writing difficulties leads, consequently, to incorrectly planned and implemented therapeutic measures; in such cases the child's actual problems also escape attention of teachers and re-educators, who are guided by the diagnostician's recommendations defining the character of disorders observed (U. Mirecka 2009). When assessing handwriting, many people are first of all guided by the criterion of writing legibility and by esthetic reasons, which, as the foregoing example shows, can be misleading. Disorders in the graphomotor sphere are a serious problem; like dysorthography they can impair written communication, leading to the wrong understanding of the written message, inconsistent with the writer's intentions.

The assessment of writing skills, made by logopedists in accordance with their competence and according to the established procedural standards (A. Domagała, U. Mirecka 2008), should be more thoroughgoing when spelling and graphomotor difficulties co-occur - both in the spheres of symptoms and etiology. The diagnostic-therapeutic process should take into account the fact that the handwriting aspects distinguished above are closely interconnected: the graphomotor development plays a significant role in the development of children's spelling skills (A. Domagała, U. Mirecka 2011; A. Domagała, U. Mirecka – in press).

THE AIM OF THE ARTICLE

The aim of the present article is to discuss the problem of graphic errors that may be formally perceived as spelling errors. Because of their determinants we term them 'apparent spelling errors'. As such, they may be wrongly interpreted at the stage of diagnosis of disorders.

In patients with spelling difficulties we orient the diagnostic process towards identifying so-called apparent spelling errors in the written text structure, using the method of phenomena analysis defined in our original technique developed for diagnosing graphomotor difficulties – the *Profile of Graphomotor Skills*. (A. Domagała, U. Mirecka 2009, 2010a, 2010b).

METHODS

In our studies using the *Profile of Graphomotor Skills*, the analysis of the graphic aspect of the text written by the subject studied is conducted according to the procedure laid down in the *Chart of Assessment of Handwriting and Letter-like Designs*. It comprises six descriptive categories of the products of graphomotor activities in the order of analysis most convenient for the diagnostician: from particular to global phenomena, retaining the structural text arrangement and with a gradual broadening of the perspective of phenomena examination. This kind of structuring allows us to precisely assess graphomotor skills and assign phenomena to this sphere, distinguishing them from the phenomena at the spelling (orthographic) level. In the method in question, handwriting is carefully assessed in the following categories: I. THE HANDWRITING LINE (a/ force of the writing instrument; b/ line stability); II. LETTERS/ LETTER-LIKE SIGNS (a/ form of letters/ letter-like signs; b/ proportions within a letter/letter-like sign); III. LETTER IN A WORD/ LETTER-LIKE SIGN IN THE DESIGN STRUCTURE (a/ letter sizes in words/ letter-like sign sizes in designs; b/ letter slant in words/ letter-like sign slant in designs); IV. THE WRITING DOWN OF A TEXT/ LETTER-LIKE DESIGNS (a/ direction (slant) of writing/ slant of letter-like designs; b/ writing size/size of letter-like designs); V. VERSE ORGANIZATION (a/ spaces between words/elements of letter-like designs; b/ retaining the writing/designs within the ruling); VI. PAGE ORGANIZATION (a/ positioning of text/designs in the horizontal arrangement; b/ positioning of text/designs in the vertical arrangement). These categories, the manner of analyzing them and assessment criteria were determined on the basis of instructions in literature, our own experience gained from diagnostic and therapeutic work, and from findings in experimental research using the *Profile of Graphomotor Skills*. When compiling the *Chart of Assessment of Handwriting and Letter-like Designs* we drew upon T. Wróbel's classification of graphic errors (1980, 1985) and J. de Ajuriaguerra's *Dysarthria Profile* and the results of tests carried out with the use thereof under Polish conditions – B. Borysowicz et al. (1991), as well as on Master's theses defended in the UMCS Department of Logopedics and Applied Linguistics.

The analysis of writing oriented towards identification of so-called apparent spelling errors was carried out on the material covering 600 text samples copied by primary school pupils, grades one to six – a total of 300 pupils, 50 at each educational level, retaining the equal number of girls and boys in each group (the material contained two samples from each of the subjects tested). The empirical material served to find out what phenomena relating to the graphic aspect of writing might appear formally as spelling errors and in which categories defined by the *Chart of Assessment of Handwriting and Letter-like Designs* they might

be found. Consequently, this procedure enables us to make a record of so-called apparent spelling errors, useful in interpreting writing errors.

The empirical studies in question were carried out as part of the research project ‘Written Communication Disorders. The Profile of Graphomotor Skills as A Technique for Diagnosing Children Aged 7-13 Years. The Development of Graphomotorics - A Risk of Dysgraphia’ (The Ministry of Science and Higher Education 33rd Competition for Research Projects, project no. NN 106 1885 33; project manager – Dr Urszula Mirecka, principal executors – Prof. Dr Habil. Stanisław Grabias and Dr Aneta Domagała).

Results

The analyses show that so-called apparent spelling errors can be found in the following categories of phenomena description pertaining to the graphic aspect of writing II. LETTERS/ LETTER-LIKE SIGNS; III. LETTER IN A WORD/ LETTER-LIKE SIGN IN THE DESIGN STRUCTURE; V. VERSE ORGANIZATION.

Among the undesirable phenomena analyzed in category II. LETTERS/ LETTER-LIKE SIGNS, we recorded deformations of letter forms, irregularities in the connection of constituent elements, distortions in the proportions of structural elements of the letter, sometimes resulting in the impossibility of recognizing graphic signs, and in the assimilation of one letter to another. Here are some examples of this type of errors:

$c \rightarrow e$



jeiesce

$p \rightarrow r$



Sprytma

$a \rightarrow oc$



miactoc

$\acute{s} \rightarrow i$

Fr*an*ui

$a \rightarrow u$

f*an*tastyczne

$j \rightarrow i, y \rightarrow u$

Najchętniej daleko i na długo. Wszyscy mają
fantastyczne pomysły: Francja, Grecja, Indie,

Out of the errors assigned to category III. LETTER IN A WORD/ LETTER-LIKE SIGN IN THE DESIGN STRUCTURE, irregularities in the size and slant of letters (variable sizes of letters in words, unstable letters) have a negative impact first of all on the clarity and legibility of the text, whereas the assessment of correct spelling is directly affected by the improper way of connecting letters in words. The examples below illustrate the problem of identifying this type of spelling errors: replacement and omission of letters in words, unhyphenated/ separate spelling, and the use of a hyphen:

- letters touching one another: omission of *r* in the first word – *poproszono*, *ol* → *d* in the last one - *psychologa*

Poproszono psychologa. Spotkanie psychologa

- letters separated from one another, 'spaced-out': *d* → *ol*

o l o p r o s z o n o

- use of the horizontal line as the way of connecting letters: $F \rightarrow E$

- letters touching one another and separated from one another: unhyphenated spelling *powpadali* → separated spelling *pow padali*

- use of a horizontal line as a way of connecting letters, the same as a hyphen and the sign of word division: *Wycieczka-ucieczka* → *Wy-cieczka-ucieczka*

- 5/ the wrong place of letter connection: $o \rightarrow a$

In category V. VERSE ORGANIZATION, as in the previous ones, there were phenomena that might result in different error interpretations: with incorrect spaces between words we might have doubts whether the pupil made a graphic error or an orthographic one in unhyphenated/separated spelling. Here are some examples in this subcategory

- too small spaces between words: *kraj świata* → *krajświata*

na kraj świata

- too small spaces between words with the simultaneous lack of connections between letters: *w nim* → *wnim*

Mysika Hipi zmalowała duży kawał złotego sera. Jaki co zrobiła? Wygrzyta *wnim* dziurę, a później powiedziała: „Będę teraz miała fajne i smaczne mieszkanko”.

- too small spaces between words with the simultaneous lengthening of connections between letters: *na siebie* → *nasiebie*

*Franuś i jego pies Łatek lubili się ścigać goniąc *po wąskiej ścieżce* *powypadali* *na siebie**

As the foregoing examples show, the positioning of words in a line is graphically significant (in the aspect of delimitation of a graphic signs sequence – the visual highlighting of words in the optimum way for reading the text) as well as orthographically (on account of the problem of unhyphenated and separated spelling of words: too small spaces, crowding and merging of words – these raise spelling doubts).

CONCLUSIONS

Graphomotor disorders may be manifested at the level of orthography (spelling) as so-called apparent orthographic (spelling) errors. Their occurrence may make written communication especially difficult, particularly in persons with

diminished language competence (lower lexical and grammatical predictability often prevents decoding of the incorrectly written text). Apart from the foregoing register of phenomena identified in categories: II. LETTERS/ LETTER-LIKE SIGNS; III. LETTER IN A WORD/ LETTER-LIKE SIGN IN THE DESIGN STRUCTURE; V. VERSE ORGANIZATION, graphic errors impeding assessment of the correctness of orthographic notation may concern the phenomena analyzed within other categories in the *Chart of Assessment of Handwriting and Letter-like Designs*. The basis for mastering the correct form of letters and the development of the skill of connecting them correctly in the word structure is to work out the right pressure of the graphic instrument and the steady writing movements (stable line). For the act of writing to run smoothly, it is essential to master the right movement patterns (the direction and order of handwriting letters and their constituent elements, the way of connecting letters in words) – the motor memory allows pupils to refer to the visual patterns of previously learned words and to implement them while writing, thereby determining the correct spelling of words. The lack of visual-motor patterns or their low automaticity may significantly impede learning to spell correctly. When seeking the causes of dysorthography and dysgraphia in partial deficits of perceptual-motor functions, we can often point out the common grounds of the difficulties observed, which allows us to perceive orthographic skills in the context of graphomotor development. As E. Polański (1987) demonstrated in his studies on the efficacy of teaching spelling, ‘the impeccable graphic aspect of the word has a more effective effect on the student’s visual memory: the more careful and proportioned the writing is, the better the spelling’ (p. 38): his recommended methods of teaching spelling include copying because during these exercises ‘a motor activity is combined with visual memory’ (p. 57). Developing graphomotor skills involving visual perception, visual memory and visual-kinesthetic-motor integration indirectly leads to greater efficacy in mastering orthography.

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