

# “The feature, or — perhaps — the features” of handwriting development level in handwriting identification analysis

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Handwriting development level is one of the so-called evaluative features<sup>1</sup> of graphism. Since this “maturity” cannot be measured or presented in numbers, it needs to be properly evaluated.

The source literature devotes little space to describe this specific feature. The authors present various approaches where both some simi-

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<sup>1</sup> Feature — a parameter describing something or somebody, able to be distinguished from other objects, persons <https://pl.wiktionary.org/wiki/cecha> (access: 21.10.2017). A feature is an abstracted property; something which is declared about the object under analysis. In documents examination, the following features are distinguished: handwriting structure features (sign structure, graphic features, handwriting graphic structure level) handwriting substance features (covering material, document substrate) as well as linguistic features and content features. Depending on the assumed generalisation area, the abstracted features can concern an entire handwriting sample, a specific group of signs, single letters or smaller graphic structures. For each generalisation area, the feature separation process can be carried out according to numerous criteria and in several stages. A set of features forms the characteristics of an object which — in a certain case — can be an unequivocal characteristic distinguishing a given object from all the other ones. <http://prawouam-stp.home.amu.edu.pl/c.htm> (access: 21.10.2017).

larities and discrepancies can be observed. Although it may seem that interpreting this parameter should not be extremely difficult, a more detailed analysis shows that some difficulties arise mainly due to the lack of terminological uniformity.

The objective of the prepared material is an attempt to show the quality of handwriting development by comparison and clarification of the features reflecting its development on a low, medium, and high level. The present paper and the paper by Iwona Zieniewicz<sup>2</sup> should be treated as two harmonised parts of theoretical material which presents a synthetic overview of the Polish literature within the discussed scope, and the research part which is an attempt to evaluate the level of handwriting development over the period of twenty years.

Starting the literature overview, one should take into account the materials whose analysis will make it possible to analyse the initially selected element in chronological order.

One of the oldest authors to specify the parameters of handwriting development level was A. Kłęsk<sup>3</sup> who, by referring to the writing technique, offered a list of features which prove its maturity. In his opinion, skilled handwriting should be distinguished by connectivity of the signs, which was characterised by a high impulse. People who can write skilfully and fluently, lift their hand from paper only 3–4 times in a line. As the learning process progresses, the handwriting gradually departs from the calligraphic model and becomes fast — it acquires the so-called character. Well-developed handwriting displays such elements as speed, fluent and skilful connections between letters, even signs and line direction.<sup>4</sup> The frequency of writing by hand also affects the handwriting development level. People who often write by hand acquire some typical individualised features making up the essence of their writing.

W. Horoszowski is another author to analyse and describe the elements of handwriting development. The main assumptions of well-developed handwriting are the habits and automated patterns contingent on the writing person's physical and mental properties. According to the au-

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<sup>2</sup> The research paper by dr Iwona Zieniewicz was published in the same volume of *Nowa Kodyfikacja Prawa Karnego*.

<sup>3</sup> A. Kłęsk, *Psychofizjologia i patologia pisma*, Lwów-Warszawa 1924.

<sup>4</sup> *Ibidem*, p. 12.

thor, these patterns can be caused by conscious or unconscious imitation. The other elements connected by the author with well-developed handwriting are simplified movements, elimination of unnecessary movements, controlled muscle tension, coordinated speed change, and relaxed movements made in the course of writing. The processes specified above are highly individualised and they shape the individual handwriting design, simultaneously reflecting the technical progress level and skills in the use of the writing agent.<sup>5</sup>

Although the frequency of writing as the main factor contributing to the handwriting development level is debatable, Z. Czczot<sup>6</sup> — the next author presented — has a very clear approach. According to him, those who write often and a lot develop many distinctive and, at the same time, individualised features which are distinguished by high connectivity (word impulse, sometimes across the sentence), which is caused by the fast pace of writing. In persons writing on a rare basis, the amount of individual features is very poor, the impulse is weak and noticeable only in gramms, occasionally in letters, or seldom in syllables.<sup>7</sup>

On the contrary, A. Feluś<sup>8</sup> does not clearly indicate what he understands by well-developed handwriting, yet based on the description of material aberrations occurring in the handwriting, and presented by the author, unambiguous conclusions can be drawn. A reference to the smoothness of writing movements means adaptation of the muscle system to various external pressures such as the writing agent or the substrate.<sup>9</sup> In the material form, the handwriting line is rounded, continuous, demonstrates proper acceleration as well as deceleration, which reflects a transition between muscle tensions. This feature is an acquired skill and depends on the individual properties of the writer — their personal development. According to A. Feluś, the smoothness of handwriting can be treated as one of the features present in the well-developed handwriting

<sup>5</sup> W. Gutekunst, *Kryminalistyka*, Warszawa 1974, pp. 511–512.

<sup>6</sup> Z. Czczot, *Badania identyfikacyjne pisma ręcznego*, Warszawa 1974.

<sup>7</sup> *Ibidem*, p. 19.

<sup>8</sup> A. Feluś, *Odchylenia materialne w piśmie osobniczym z pogranicza grafologii i ekspertyzy pismoznawczej*, Katowice 1979.

<sup>9</sup> External factors also matter.

structure, which is spontaneous, coordinated, typical of persons who frequently use this form of expression.<sup>10</sup>

Referring to more current compilations, the provided classifications of handwriting features are noteworthy. The classification proposed by M. Owoc and A. Szwarz,<sup>11</sup> specifies two basic groups of features:

- identification properties of speech recorded by means of handwriting (content-related, formal and linguistic elements of handwriting),
- identification properties of graphism (formal features of handwriting). This group was divided into seven sub-groups, of which the first one illustrating the so-called general features<sup>12</sup> is crucially important for these reflections.

General features:

a) Handwriting development level:

- very-well developed
- medium-developed,
- undeveloped.

b) Handwriting legibility level:

- legible,
- barely legible,
- illegible.

c) general handwriting image:

- oval,
- round,
- sharp,
- awkward.

d) handwriting momentum<sup>13</sup> (brevity).

<sup>10</sup> A. Feluś, op. cit., pp. 55–59.

<sup>11</sup> M. Owoc, J. Purzycki, A. Szwarz, *Wybrane zagadnienia techniki kryminalistycznej*, part III, Poznań 1976.

<sup>12</sup> The other elements of the classification include: topography, geometric features, pen pressure, connecting strokes and specific features.

<sup>13</sup> “Momentum” is used by A. Szwarz to describe the distances between grams, letters, words, writing lines, with regard to e.g., condensed or expanded handwriting. M. Owoc, J. Purzycki, A. Szwarz, op. cit., pp. 11–27.

Based on the data provided above it can be concluded that the details distinguished in the sub-groups can be analysed from the perspective of handwriting development level.<sup>14</sup>

The current handwriting classifications progress towards increasing the level of their specificity. This results in separate classification of graphic features and linguistic-content features. The catalogue of handwriting graphic features developed by experts in the years 1984–1989 during the meetings at the Autumn School for Empiric Investigations of Handwriting<sup>15</sup> should serve as an example. The use of the catalogue with regard to the content of the analysed set of features and for the purposes of defining them is not obligatory for Polish experts. Nevertheless, a reference to the aforementioned catalogue as e.g., the reason for a certain set of handwriting elements being put under analysis serves as a strong argument in the course of preparing an expert opinion. Taking into account the topic of the presentation, the definition of handwriting development level can be found in *The Dictionary of Handwriting Terms*<sup>16</sup> [PL: *Słownik terminów pismoznawczych*] by reference to the handwriting class category. Three classes of evolutionary formation and stabilisation of the individual neuromotoric pattern can be distinguished:

undeveloped handwriting, medium-developed handwriting, well-developed handwriting. The basis for handwriting class evaluation comprises e.g., the following features: line smoothness degree, type of dominant impulse, number and type of repeated forms, steadiness of pen pressure, degree of angular size stability and proportions, type and standardisation of simplifications. The handwriting class is one of the synthetic handwriting features which are presented in the Catalogue of Handwriting Graphic Features<sup>17</sup> as follows:

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<sup>14</sup> Also A. Koziczak refers to the presented classification; idem, *Metody pomiarowe w badaniach pismoznawczych*, Kraków 1997, pp. 35–37. (This classification was first presented in the literature by A. Koziczak).

<sup>15</sup> The school operates at the Instytut Ekspertyz Sądowych (The Institute of Forensic Research) in Cracow.

<sup>16</sup> *Słownik terminów pismoznawczych* [*The Dictionary of Handwriting Terms*], <http://prawouam-stp.home.amu.edu.pl/> (access: 21.10.2017).

<sup>17</sup> <http://prawouam-stp.home.amu.edu.pl/> (access: 21.10.2017).

1. Synthetic features:
  - 1.1. Handwriting type:
    - ordinary,
    - block-shaped (technical lettering),
    - resembling print,
    - stencil-based,
    - other.
  - 1.2. Degree of naturalness:
    - natural,
    - unnatural (intentional or unintentional).
  - 1.3. Handwriting development stage:
    - school-age,
    - mature,
    - senile.
  - 1.4 Handwriting class:
    - well-developed,
    - medium-developed,
    - undeveloped.
  - 1.5. General handwriting image:
    - oval,
    - round,
    - angular.
  - 1.6. Neatness degree:
    - neat,
    - messy.
  - 1.7. Legibility:
    - legible,
    - partly legible,
    - illegible.
  - 1.8. Replenishments:
    - amendments,
    - retouch,
    - strikethroughs,
    - insertions,
    - underlinings.

### 1.9. Performance method:

- with a hand accustomed to writing,
- with a hand unaccustomed to writing,
- using other methods.

### 1.10. Other synthetic features:

- decorations,
- griffonages,
- mannerisms,
- initials,
- other.<sup>18</sup>

The existing reflections regarding the handwriting features and their classifications oscillate around the issues such as the division of the features into individual and grouped ones with regard to various objects under analysis, and which — at least in terms of handwriting analysis — seem to be slightly losing their importance. There is an idea proposed in the literature to replace the term “individual features”<sup>19</sup> with the notion of “specific features”, if in the so-called set of features they are used for individual identification.<sup>20</sup> Among the specific features, J. Moszczyński distinguishes a special category of features called by him basic ones, including features which — if gathered in an appropriately large set — allow for object identification.<sup>21</sup> Taking into account the specific character of handwriting, i.e., its relative stability, the following classification is proposed: quasi-group features (synthetic, topographic, measurable),

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<sup>18</sup> In the catalogue, 6 principal handwriting formal groups were distinguished: synthetic features, topographic features, motoric features, measurable features, structural features, and the additional features of signatures. This classification is quoted also in the literature, among others in: A. Koziczak, op. cit., pp. 37–44; M. Leśniak, *Wartość dowodowa opinii pismoznawczej*, Pińczów 2012, pp. 83–86.

<sup>19</sup> Individual feature — the term which can be used only for cases where this feature is sufficient to distinguish only one object and exclude the other objects. J. Moszczyński, “O wartości identyfikacyjnej graficznych cech pisma ręcznego”, [in:] *Znaczenie aktualnych metod badań dokumentów w dowodzeniu sądowym. Materiały XIV Wrocławskiego Sympozjum Badań Pisma*, ed. Z. Kegel, R. Cieśla, Wrocław 2010, p. 270.

<sup>20</sup> J. Moszczyński, *Subiektywizm w badaniach kryminalistycznych. Przyczyny i zakres stosowania subiektywnych ocen w wybranych metodach identyfikacji człowieka*, Olsztyn 2011.

<sup>21</sup> According to the Author, incompatibility of even one feature (from a set of features) gives negative results in the identification tests.

quasi-basic features comprising so-called complex features, and quasi-individual features which should specifically include the distinctive complex structural features. Undoubtedly, that is a new and — at the same time — interesting approach to the issue of handwriting features classification.<sup>22</sup> To get back to the heart of the matter, it should be highlighted that the elements from the synthetic quasi-group area, being part of the handwriting development level assessment, remain unchanged.

As emphasised in publications, the individual character of handwriting should be perceived as a group of identification features which distinguishes the graphism of one person from other persons' handwriting.<sup>23</sup> Therefore, it is justifiable to use the terms such as: “unique feature”, “invariable feature” or “habitual feature”, certainly with regard to the graphism of a particular person, rather than the notion of “individual feature”. The identification features themselves are treated as group features, narrow- or broad-group ones.<sup>24</sup>

Returning to the main idea, it should be emphasised that the aforementioned synthetic features including the handwriting development level offer a basis for its preliminary analysis and — since they constitute a “derivative of complex structural features” — they require reference to various groups of identification features, however excluding a deeper analysis of the structure of graphic signs.<sup>25</sup> If the features are not found compatible at this stage of analysis, it does not constitute a sufficient basis to phrase negative identification conclusions, i.e., the ones excluding a possibility that the record was prepared by the same person.<sup>26</sup>

In summary, it should be clearly specified which elements are characteristic of: well-developed, medium-developed, underdeveloped or undeveloped handwriting. Bearing in mind the above observations, one can make an attempt to identify the characteristic features of well-developed

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<sup>22</sup> This classification is not free from criticism. See M. Goc, *Współczesny model ekspertyzy pismoznawczej. Wykorzystanie nowych metod i technik badawczych*, Warszawa-Szczecin 2016, pp. 138–140. The Author quotes also other classifications. Ibidem, pp. 139–141.

<sup>23</sup> A. Koziczak, op. cit., p. 30.

<sup>24</sup> Ibidem, pp. 29–30.

<sup>25</sup> J. Moszczyński, *Subiektywizm w badaniach...*, p. 123.

<sup>26</sup> Ibidem, p. 124.



handwriting. Undoubtedly, this is a handwriting which displays numerous habits and routines. By means of fixed modifications, it clearly departs from the school pattern. The evaluation of the course of lines and hand coordination is high, which supports the conclusion that the graphism is smooth, relaxed, and regular. Any changes in the writing directions are undisturbed.

On the contrary, medium-developed handwriting is also individualised, nevertheless its external appearance is some sort of distinguishing feature which is worth observing. The course of graphic lines does not cause major difficulties to the writer, and it does not give rise to objections in the course of the analysis. The graphism image is smooth, unforced, and continuous, which allows one to ascertain that hand coordination is immaculate.

To respond to the elements of underdeveloped and undeveloped handwriting, one should clearly state that it has no so-called individual features. As a result, we deal with handwriting whose image is similar to school handwriting, although this situation is not always so unambiguous (no similarity to the school pattern). Although the handwriting may demonstrate some individual solutions, it does not bear the features of a strong habit. The quality of hand movement coordination is low, which is manifested in irregularity of the observable features, such as a varying inclination angle in the signs present in a single piece of writing. The lines are not smooth, which makes the handwriting barely-skilled. Due to the lack of stability, the records characterised by the properties specified above display low uniformity of graphic features.

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### Summary

As the handwriting process is a multistage action, we start learning it in pre-school and complete it during the graphic maturity period. We begin with expressing our thoughts and emotions by means of images, to proceed with imitating parts of the writing signs, and in the next stage — their complete patterns. While learning how to write, we try to precisely reproduce a presented model. At this stage, the graphism demonstrates no individual features. Individualised handwriting occurs only after the writing activity has become automated. It is only then that the writer does not produce the letters or letter groups in the same manner<sup>27</sup>.

The factors which affect letter shaping, expressed in handwriting features, have a respective impact on the value and quality of the written record. The handwriting features can be numbered among so-called communication features. Since they are defined by means of description, the vast majority of handwriting features belong to low-specificity features. This also refers to handwriting development — a feature presented without a comprehensive and unambiguous classification.

**Keywords:** handwriting analysis, identification analysis, handwriting features, handwriting features classification, handwriting development level.

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<sup>27</sup> With regard to the physiology of handwriting, the principles developed by Robert Saudek are quoted. B. Hołyst, *Kryminalistyka*, Warszawa 2018, p. 535.