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GRAPHOLOGY AND PERSONALITY: AN EMPIRICAL STUDY ON VALIDITY OF HANDWRITING ANALYSIS[1]

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Summary.—The aim of the present work was to examine validity of the graphological method to assess personality traits. The results of two studies are described. In Study 1, the Big Five Questionnaire was administered to a sample of 101 university students who provided a sample of a handwritten text. Two graphologists were asked to detect the same dimensions and facets measured by the Big Five Questionnaire using a 9-point scale. Correlations between the Big Five Questionnaire and graphological evaluations did not confirm the capability of handwriting analysis to measure Big Five personality traits. Also, interrater reliability was very low. Study 2 ($N = 102$) was carried out using handwritten texts with autobiographical content for the graphological analysis. Two different graphologists and two laypersons were involved. No evidence was found to validate the graphological method as a measure of personality.

The aim of this work was to examine the capability of handwriting analysis to assess personality traits. Validity of graphology is still a controversial issue. Its validity never has been clearly proven; however, in some European countries, studies and applications of graphology have continued to develop. From the forensic area, where graphology is used to prove the authenticity of documents and to sort out legally disputed signatures, nowadays it also tends to be used as a tool for evaluating an individual's personality, aptitude, skills, and potential. Over the past few years, graphology has been considered an emerging profession in various areas of social life and the working world.

Graphologists apply their method in many sectors: personality analysis, with emphasis on intellectual–behavioural and emotional–relational aspects in adults, psycho-emotive problems, studies of compatibility within married couples or families, evaluation of intellective and temperamental traits for academic and vocational guidance, business consultancy, and expert opinions on handwriting in courts of law. In various countries, graphologists have been involved in job recruitment sessions and personnel selection in the area of human resources (Hirsh, 1987). Sharma and Vardhan (1985) found that 85% of decisions in job recruitments in Europe were based on graphological methods. Klimoski and Rafaeli (1983) declared that more than 3,000 American companies employed an expert

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in writing analysis. Smith and Abrahamsen (1992), analysing the selection methods in six Western countries between 1983 and 1991, estimated usage of graphology of 52% in France, 16% in Israel, 4% in Holland, 3% in the UK, and 2% in Germany and Norway. Robertson and Makin (1986) showed that in the UK, 7 to 8% of major corporations sometimes asked for the collaboration of graphologists. Fowler (1991) estimated that graphologists in the UK "are providing employers with graphological assessments for between 5000 to 8000 candidates annually" (p. 40). Bruchon-Schweitzer and Ferrieux (1991) carried out a survey on techniques used by recruiting companies in France. Handwriting analysis ranked second, immediately after the interview, with 93% frequency.[2]

The debate about the use and validity of graphology is common in professional journals. The literature is clearly divided on the issue (Greasley, 2000). There is no doubt that when one carefully selects studies in terms of their methodological robustness, the evidence is overwhelmingly negative (e.g., Lester, McLaughlin, & Nosal, 1977; Rosenthal & Lines, 1978; Klimoski & Rafaeli, 1983; Eysenck & Gudjonsson, 1986; Furnham & Gunter, 1987; Beyerstein & Beyerstein, 1992; Tett & Palmer, 1997). The major strategies used to evaluate validity of graphology and its predictive capabilities are reviewed below.

Rafaeli and Klimoski (1983) evaluated the validity of handwriting used as a predictor of job success, the effect of graphology expertise in analysis of handwritten texts, and inter-rater reliability of the analysis of a handwritten text. Their findings demonstrated a rather good accordance among graphologists' evaluations, low coefficients of validity, and no significant differences in predictive capability between graphologists and nongraphologists (university students).

According to Ben-Shakhar, Bar-Hillel, Bilu, Ben-Abba, and Flug (1986), one problem with most attempts to validate graphology is the use of a text which typically contains relevant information about the writer that can be used for the assessment of personality dimensions or for predicting behaviour. To overcome this problem, they used a control judge (a clinical psychologist with no knowledge of graphology) and a set of variables derived from the texts (e.g., years of schooling). They found that, although graphologists' evaluations were positively correlated with job performance criteria, these correlations were not larger than the psychologist's or those derived from the set of variables. Precisely, it was found that

[2]Claims regarding the extent and location of use of graphology are found in scientific articles as well as in professional journals of personnel management and popular press. Simner and Goffin (2003) reported a personal communication from an expert in marketing who compiled a list of more than 150 multinational corporations using handwriting analysis in making employment recommendations, and a statement from a practicing graphologist who claims to have worked for important firms. Increasingly, interest in the discipline is evidenced also by the international conferences organized in various parts of Europe.

the average correlation of graphologists' judgments was .19, the psychologists produced a correlation of .22, and a simple average of nine variables extracted from the texts produced a correlation of .28 (only the latter was statistically significant). This result, although statistically significant, may have little practical import (Meehl, 1990). This indicates, like other studies using similar methodologies, there is no evidence that graphological signs have validity for assessing personality and predicting behaviour.

Neter and Ben-Shakhar (1989) adopted a meta-analytic approach (Hunter, Schmidt, & Jackson, 1982) to evaluate the validity of predictions of handwriting analysis. Results of the meta-analysis showed that graphologists are not better than nongraphologists in predicting job performance based on handwritten texts. Predictions of graphologists ($r = .16$) showed lower correlations with criteria than those of nongraphologists ($r = .21$). The former achieved better results when an informative text (i.e., autobiographical; $r = .25$) rather than a noninformative text (i.e., copied; $r = .15$) was analyzed. This suggests that content may be more important than handwriting.

King and Koehler (2000) demonstrated the contribution of the illusory correlation phenomenon in the persistence of the use of graphology to predict personality traits. They found semantic association between the words used to describe hard writing features (e.g., bold) and personality traits was the source of the perceived correlation, which "may partially account for continued use of graphology despite overwhelming evidence against its predictive validity" (p. 336).

Lowis and Mooney (2001) investigated if specific components of students' handwriting were related to personality traits associated with achievement in written examinations. In a blind trial, 100 handwriting samples were analysed for the presence or absence of 12 characteristics deemed to be relevant for academic performance, and each of these aspects was tested for association with the grade points awarded. A computer-aided analysis of graphological signs showed that significant differences were found for two of the 12 characteristics: "carefulness" and "constancy." Therefore, the authors position their study among those with mixed results, i.e., with positive outcomes on some graphological characteristics.

More recently, Furnham, Chamorro-Premuzic, and Callahan (2003) examined the relations between graphology and measures of intelligence and personality and had to conclude "that the two are essentially unrelated. Whatever graphological analysis measures, it does not appear to be stable personality or ability traits" (p. 92). However, there are many other studies that claim to have found some evidence that graphologists can indeed recognise certain personality traits from handwriting samples (e.g.,

Lemke & Kirchner, 1971; Crumbaugh & Stockholm, 1977; Nevo, 1988; 1989; Oosthuizen, 1990). For a review on the topic, see also Dazzi and Pedrabissi (2006).

Oosthuizen (1990), in a study relating to academic success, asked 50 university students to provide a spontaneous handwriting sample of autobiographical content and to complete a personality questionnaire. A graphologist set about measuring 10 graphological signs (e.g., upper zone, lower zone, angle of the line, depth, and distance from the margins). Grade point average was the external criterion. Results showed a higher multiple correlation for graphology than for the personality questionnaire: one of the points relating to graphological signs significantly correlated with the average marks ($r = .34$). The authors' conclusion was that data provided some support for predictive value of graphology.

Satow and Rector (1995) investigated whether Gestalt psychologists, by analysing handwritten texts, could correctly identify good managers. Handwriting samples were obtained from two groups of 40 people each. The first group consisted of managers with proven success in business; the second was a control group of volunteers. The samples of writing from the two groups were paired randomly and presented to three graphologists who were asked to indicate which writing belonged to a manager or to a control participant. Results confirmed that graphologists were able to identify managers with higher accuracy with respect to causal predictions. Moreover, the accuracy of graphological assessments did not depend on the writing content, even though the handwritten texts were spontaneous. The question of whether or not content contributes to the validity of handwriting analysis is important (e.g., Nevo, 1989; Wellingham-Jones, 1989; Keinan & Eliat-Greenberg, 1993) and attempts to validate graphoanalysis must ensure that potential content effects are controlled.

Given the subjective nature of handwriting analysis, agreement between judges is also important. Adequate reliabilities have been reported in previous research (e.g., Peeples, 1990; Mandeville, Stutler, & Peeples, 1992). Furnham and Gunter (1987) found a reliability coefficient of .89 between evaluations expressed by two graphologists on 13 graphological variables. In contrast, Keinan, Barak, and Ramati (1984) found very low reliability coefficients, ranging from .20 to .37. Rafaeli and Klimoski (1983), by correlating evaluations made by 20 graphologists regarding 32 handwriting samples, found an average agreement coefficient for the variables of .45. The results of these studies suggest very often graphologists provide different evaluations and interpretations of the same samples of handwriting. Despite this, graphology has become a highly competitive tool compared to more traditional psychological procedures. In Europe, there are universities teaching graphology in the UK, Germany, Italy, and Spain.

Graphology as a method has developed over time within different

contexts. It has been promoted by various authors and different schools of thought as a method able to match particular features of handwriting with personality traits. This leads also to several definitions: graphology is "an experimental science which, merely as a result of the graphic display of the human hand, reveals the tendencies endowed by nature or innate" (Moretti, 1980, p. 3). Another author defines it as "a science—and an art—which enables us to find out about the personality of an individual thanks to the study of his/her handwriting. It is to be regarded as a science insofar as it obeys a certain number of laws and principles established on a theoretical level, and also as an art, since it requires a particular type of intuitive knowledge which enables to capture human nature in its entirety" (Moracchini, 1996, p. 9).

On the other hand, an analysis made by Greasley (2000) about the principles upon which graphology is founded, that is, where the rules of interpretation come from and what evidence they are based on, shows how handwriting analysis mainly adopts analogy, symbolism, and metaphor. As long as handwriting analysis is founded upon the above-mentioned interpretations rather than on empirical findings, this method may continue to be "popular" but have little validity. Therefore, the aim of this study was to examine the validity and reliability of the graphological method. The ability of graphologists to accurately assess personality traits was investigated. The relations between handwriting interpretation and scores on standardized personality scales were analysed. The personality test used in this study is the Big Five Questionnaire (Caprara, Barbaranelli, & Borgogni, 1993), a questionnaire for the measurement of the Big Five Factor Model (FFM). It includes five factors and 10 facet scales and is currently one of the most widely used personality tests. Also, interrater reliability of graphological measurements was examined. In Study 1, a text with neutral content was used; in Study 2, the effect of graphology expertise and the influence of a content-laden handwritten sample were investigated.

STUDY 1

Method

Participants and Procedure

Participants were 101 students (82 women, 19 men), ages 19 to 66 years ($M = 30.0$, $SD = 8.7$), enrolled in psychology courses. Participants were asked to answer a questionnaire during class time and to produce a handwriting sample. Each participant was handed an envelope containing a blank sheet of chemical paper (which highlights the pressure applied by the writer) together with the Big Five Questionnaire and its accompanying answer sheet. The samples of handwriting consisted in taking dic-

tation of a title and narrating a story. The participants had to write down the full title; this included all the letters of the alphabet to allow a complete graphological analysis. The short and simple story was read out aloud and participants had to summarize it in half a page in cursive writing. This content ensured the absence of autobiographical elements.

Afterwards, participants went through the questions of the Big Five Questionnaire. To guarantee anonymity and to make sure samples would not get mixed up with others at the end of the tests, each participant was asked to insert the sample of handwriting and their answers to the Big Five Questionnaire in an envelope and to seal it.

Measures

Big Five Questionnaire (Caprara, *et al.*, 1993).—The Big Five Questionnaire is a self-report measure of the Five Factor Model (FFM). The scale consists of 132 statements on a 5-point scale ranging from complete disagreement (1: Very false for me) to complete agreement (5: Very true for me). Authors provided extensive support for reliability and validity of the scale. Internal consistency reliabilities were .81, .73, .81, .90, and .75 for the five factors: Energy/Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and Openness, respectively; reliabilities of the 10 facet scales (dynamism, dominance, cooperativeness, politeness, scrupulousness, perseverance, emotion control, impulse control, openness to culture, and openness to experiences) ranged from .60 to .86. Each facet scale contains 12 items, half of which are positively phrased with respect to the scale name and half negatively phrased, to control for a possible acquiescent response set. In addition, there is a Lie scale designed to measure dissimulation. The 12 items of the Lie scale are all positively phrased. Factor structure showed a high stability across different groups of subjects with different demographic characteristics. The construct validity is supported by strong correlations with standard measures of the Five Factor Model (NEO–PI: Costa & McCrae, 1985) and personality factors of alternative taxonomies (e.g., Eysenck Personality Questionnaire: Eysenck & Eysenck, 1975).

Handwriting analysis.—Two graphologists, well-known professionals and authors of various publications, were involved. They were asked to analyse independently the 101 handwriting samples and to give their own evaluations of the psychological characteristics of the person who wrote each handwritten text, according to the personality traits as measured by the Big Five Questionnaire and the 10 facet scales. Each dimension was evaluated by graphologists using a 9-point scale, in which 1 denoted the lowest score and 9 the highest, intended as the extent of presence of a particular personality characteristic. They used a method which consists of identifying graphological signs which constitute a set of graphological in-

dexes for each dimension. Evaluation of each index led to assignation of a value on a 9-point scale; then, the arithmetical average of each set of indexes provided the final value measuring the personality dimension. The same procedure was repeated for each personality dimension measured by the Big Five Questionnaire, so that each one had its own index.

The graphologists involved had already used the Big Five Questionnaire in previous research, but to ease the task, written information about the meanings of personality factors measured by the test was provided.

The handwritten texts were provided to graphologists for evaluation; the authors conducted the scoring of the Big Five Questionnaire. Data were analysed with the statistical program SPSS, Version 15.0.

Results

In order to assess the validity of judgments assigned by the graphologists to the various personality traits, Spearman's *rho* correlation coefficients were calculated between the scores on the Big Five Questionnaire and the graphologists' ratings of personality traits based on the handwriting samples (see Table 1). Validity coefficients given by the first graphologist varied from –.07 to .21, with a mean value of .07; those of the second graphologist varied from –.07 to .21, with a mean of .04. No single coefficient differed from zero in a statistically significant manner, except for the coefficient for Conscientiousness which, however, was still very low ($r = .21$; $p \leq .05$) and could have been obtained by chance (1 of 15 correlations). It is evident that these data show that the judgments of the gra-

TABLE 1

Study 1: Interrater Reliability and Validity Coefficients[a] of Graphologists

Trait	Interrater Reliability	Graphologist	
		1	2
Energy	–.01	.05	–.03
Agreeableness	.21*	–.01	.09
Conscientiousness	.28†	.21*	.21*
Emotional Stability	.03	.13	–.02
Intellectual Openness	.11	.08	.12
Dynamism	.16	–.07	–.03
Dominance	.10	.16	.01
Cooperativeness	.22*	.03	–.07
Politeness	–.06	.00	.07
Scrupulousness	.35†	.14	.09
Perseverance	.19	.12	.08
Emotion Control	.09	.16	–.01
Impulse Control	–.03	.04	–.03
Openness to Culture	.17	.07	.05
Openness to Experience	.01	–.00	.11

[a]Correlations between ratings of handwriting samples and Big Five Questionnaire scores. *$p < .05$. †$p < .01$.

phologists did not correlate with the factor and facet scores on the Big Five Questionnaire.

As clarified previously, the second purpose was to assess whether graphologists would, through an analysis of handwriting, express reliable judgments of the personality traits of the writers. To this end, correlation coefficients were calculated between the scores assigned by the two graphologists based on the five factors of the Big Five Questionnaire and their 10 facets. As can be seen in Table 1, the interrater reliability coefficients obtained varied from –.06 to .28, with a mean value of .13. Only the Friendliness and Conscientiousness factors differed, and in one of the respective facets (Cooperativeness and Scrupulousness) statistically significant coefficients were discovered. On the whole, only four significant correlations out of 15 were found, and these were of small magnitude, a highly probable outcome under the null hypothesis. The two graphologists' assignments of personality ratings based on the same sample were not similar.

STUDY 2

In several studies it was found that graphologists' evaluations are better if they analyse autobiographical handwriting (Rafaeli & Klimoski, 1983; Keinan, *et al*., 1984; Ben-Shakhar, *et al*., 1986; Neter & Ben-Shakhar, 1989; Peeples, 1990). The aim of the present study was to verify if by analysing texts with an autobiographical content, instead of neutral content, the evaluation capability of graphologists would improve. To this purpose, another two graphologists with long experience and publications on this matter were invited to participate.

The purpose was to investigate the validity of graphological techniques, by assessing whether interpretation of handwriting is linked to specific theoretical constructions in graphology, or rather to information obtained from the handwriting content. Validity coefficients (correlations between ratings of personality traits based on handwriting with Big Five Questionnaire scores) obtained by graphologists were significantly different from those of laypersons (two university students without any graphological expertise). These students analysed the same handwriting samples as a control procedure.

Method

Participants and Procedure

Participants in this study were 72 women and 30 men ($N = 102$), ages 20 to 56 years ($M = 28.0$, $SD = 7.9$).

Procedures were similar to those of the first study. Each participant provided a sample of handwriting and was administered the Big Five Questionnaire. As autobiographical content they were asked to give a short description of their expectations and future plans.

Similarly to the first study, each of the four evaluators (two grapholo-

gists and two laypersons) was given a written presentation of the Big Five Questionnaire with a description of the five personality factors and the ten facets. Then they analysed independently each handwritten sample and rated the psychological traits of writers, in relation to 15 traits measured by the Big Five Questionnaire, on a 9-point scale where a rating of 1 denoted that the writer possessed the least amount of the characteristic.

Results

Spearman's *rho* correlation coefficients were calculated between the scores on the Big Five Questionnaire and the ratings of traits given by the two graphologists and two laypersons to the corresponding handwriting samples. Table 2 shows the validity coefficients for each graphologist for each of the five personality factors and facets. Validity coefficients of the

TABLE 2
Study 2: Validity Coefficients[a] of Graphologists

Trait	Graphologist		*M*
	1	2	
Energy	.10	.02	.06
Agreeableness	.03	.08	.06
Conscientiousness	.02	–.07	–.03
Emotional Stability	.05	.06	.06
Intellectual Openness	.08	.09	.09
Dynamism	.12	.11	.12
Dominance	–.11	–.09	–.10
Cooperativeness	.11	.13	.12
Politeness	–.07	–.01	–.04
Scrupulousness	.04	–.11	–.03
Perseverance	.14	.03	.08
Emotion Control	.09	.06	.07
Impulse Control	–.06	–.03	–.04
Openness to Culture	.20*	.14	.17
Openness to Experience	.04	.06	.05

Note.—*M* is the mean correlation (validity coefficient) for the two nongraphologists. [a]Correlations between ratings of personality traits from handwriting and Big Five Questionnaire scores. *$p < .05$.

first graphologist varied from –.11 to .20, with a mean of .05. Only one of 15 coefficients was statistically significant (*rho* = .20; $p < .05$). Validity coefficients of the second graphologist ranged from –.11 to .14, with a mean of .03. No single coefficient turned out to be significantly different from zero. Table 2 reports the means of validity coefficients of both graphologists in relation to the five personality factors and relative sub-dimensions of the Big Five Questionnaire. All 15 mean coefficients were nearly zero, and no significant correlation was found. Therefore, no evidence was found that writing signs measured by graphologists have validity for assessing personality traits.

Table 3 shows validity coefficients for the five personality factors and ten facets obtained by each of the two nongraphologists. The validity coefficients produced by the first nongraphologist varied from –.15 to .11, with a mean of –.00; none was statistically significant. The coefficients of the second nongraphologist ranged between –.10 and .23; their mean value was .08 and only one coefficient of 15 was statistically significant (*rho* = .23; $p \leq .05$), an outcome highly likely under the null hypothesis. Table 3 also shows the means of the validity coefficients obtained by the two nongraphologists for the five factors and the ten facets of the Big Five Questionnaire.

TABLE 3
Validity Coefficients of Two Nongraphologists

Trait	Nongraphologist		*M*
	1	2	
Energy	–.08	.08	.00
Agreeableness	–.05	.03	–.01
Conscientiousness	.02	.17	.10
Emotional Stability	.08	.15	.11
Intellectual Openness	.05	.02	.03
Dynamism	.02	.04	.03
Dominance	–.15	–.05	–.10
Cooperativeness	–.08	–.10	–.09
Politeness	–.00	.13	.06
Scrupulousness	–.00	.07	.03
Perseverance	.01	.23*	.12
Emotion Control	.11	.11	.11
Impulse Control	.01	.18	.09
Openness to Culture	.07	.09	.06
Openness to Experience	–.02	.04	.01

Note.—*M* is the mean correlation (validity coefficient) for the two nongraphologists. *$p < .05$.

Wilcoxon's test (1945) was used to check the statistical significance of the differences among the mean validity coefficients obtained on the 15 scales by the graphologists and the nongraphologists. No significant differences emerged ($Z = -.03$, $p = .98$) between the validity coefficients of the professional graphologists or those of the two university students (nongraphologists).

The two professional graphologists were unable to produce valid inferences on the psychological traits evaluated by the Big Five Questionnaire: the validity coefficients they produced are substantially zero. Therefore, the personal content of the handwriting texts did not improve the validity of the graphologists' analyses. Their predictive ability also was not better than that of the nonexpert evaluators: no statistically significant differences emerged between the evaluations given by the graphologists

and by those given by the nongraphologists, as has been found in previous studies (Rafaeli & Klimoski, 1983).

Discussion

The present research was carried out to assess the validity of handwriting analysis by way of correlations between selected personality trait dimensions from a self-report questionnaire and evaluations of personality traits assigned by graphologists to handwritten samples. Results suggest that the graphologists involved in the study were unable to provide nonrandom inferences through an analysis of handwriting on the 15 personality traits measured by the Big Five Questionnaire. This raises serious doubts about the validity of graphology as an indicator of individual differences in personality.

Correlation coefficient distributions obtained by the two graphologists and by the two laypersons in the second study were very similar. The expertise of the graphologists does not necessarily improve personality evaluations when compared to those made by laypersons, not even when the handwriting samples also provide autobiographical content.

Another purpose of the study was to assess interrater reliability. Only four out of 15 reliability coefficients obtained by the raters were statistically significant. On the basis of these data, it appears that the two graphologists arrived at substantially incongruent conclusions when evaluating the same handwriting samples. These results seem to conclusively show that graphological assessment of personality is neither valid nor reliable.

The study has some possibly relevant limitations. First, the use of a self-report personality questionnaire might lead to socially desirable responses, but such bias was controlled with the Lie scale of the Big Five Questionnaire. Second, inclusion of a larger set of graphologists might have changed the results, although the very similar performance of experts and nongraphologists counters that possibility.

While evidence of reliability and validity of the Big Five Questionnaire are reported in international literature, in comparison, the psychometric properties of handwriting analysis are still a controversial issue. Different graphological methods have been studied, but none of them have sufficiently demonstrated validity, either when computer-aided analysis of handwriting was used to assess personality traits (Lowis & Mooney, 2001) or evaluation of handwriting followed specific categories like those proposed by Bunker (1979) or Hall (1999). Results obtained suggest that handwriting–personality relations occur at around chance levels (i.e., 5%; see Tett & Palmer, 1997; Furnham, *et al.*, 2003). The evidence in favour of graphology refers mainly to its ability in predicting job success (e.g., Keinan, *et al.*, 1984; Oosthuizen, 1990; Satow & Rector, 1995); but

results have not always been consistent. For instance, the International Graphonomics Society recommends that "firms who wish to continue employing the services of graphologists should exercise extreme caution in accepting their judgments" (Simner & Goffin, 2003, p. 361).

It may be questioned whether or not the graphologists had completely understood the rating tasks they had been assigned or whether having to use a metric scale to express their judgments was too limiting. To avoid this, professionals were involved who had previously used the Big Five Questionnaire and who provided key suggestions on how to proceed. This study follows a recent study that involved an important graphological method included in a university course. The poor results lead the authors to believe that either graphology is simply not a valid method or that the attempts to validate it using proven personality tests might not be possible. In other words, the failure of validating the method could be a question of symbolism, or analogy metaphors used in graphologists' analysis (Greasley, 2000). Alternatively, it must be considered that graphology could be a valid method to measure human characteristics other than Big Five personality traits.

In light of all these considerations, present findings seem most attributable to a lack of validity in the use of handwriting analysis in assessing Big Five personality traits. At least, current methods of handwriting analysis are not comparable to the personality measures commonly used by psychologists. The issue remains open for future studies using standardized methods to decode the graphic signs. Further studies should adopt this focus, because, at present, graphology lacks the proper validation to be fully recognized as a measure of personality traits.

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