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THE IDENTIFICATION OF ONE'S OWN HANDWRITING

Steuart Henderson Britt† and Ivan N. Mensh‡

In the field of law the principal problem concerning handwriting is the recognition or identification of samples of handwriting submitted as evidence. In decided contrast to the subjective analyses of graphologists are the objective investigations by examiners of questioned documents. Representative of the experts in the field is Albert S. Osborn who has introduced many techniques and refinements into the study of writing.¹ However, there apparently have been only two published reports of experimental studies of the identification of handwriting samples by non-experts.

In one of these studies Inbau proposed to test the accuracy of identification of disputed handwriting by lay witnesses, since such a practice is well established in the courts.²

The signatures of each of seven members of the law faculty of Northwestern University were obtained; and a spurious signature (made without any attempt at imitation), a free-hand forgery and a traced forgery were prepared for each signature on cards similar to those on which the genuine signatures had been written. Five groups of "witnesses" were asked to give opinions on the genuineness of the seven sets of cards. Only the first two groups consisting of the seven professors and five secretaries were acquainted with the signatures of the professors whose sample signatures were obtained. The third group was designated as the lay group, the fourth group consisted of seven bank employees whose work brought them in constant contact with signatures, and the fifth group was composed of three expert handwriting examiners. Because these three groups were not acquainted with the signatures of the professors, they identified the names on the basis of their own visual comparisons between the four "questioned" signatures and a set of "standard" (genuine) signatures.

The actual testing of each of the seven faculty members and the secretaries was done individually; the cards were viewed one at a time, an opinion as to genuineness obtained, the card removed from view, the next card presented, an opinion obtained, and so on, until the entire series of seven sets of four cards each had been presented and opinions obtained. This procedure simulated courtroom conditions in which juxtaposition comparisons are absent, and only comparisons based upon the subject's recollection of the genuine writing are allowed.

The results of Inbau's experiment indicated that lay witness identifications of disputed handwriting specimens, when based upon mental comparisons or recollections, were too unreliable to be considered acceptable as legal evidence. Visual comparisons between a standard and an alleged signature were productive of more accurate identifications, even though made by lay persons. The bank

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‡ Washington, D. C.

¹ Osborn, A. S., *Questioned Documents*. 2nd ed. (1929).

² Inbau, F. E., "Lay Witness Identification of Handwriting (an experiment)," *Ill. L. Rev.*, 34: 433-443 (1939).

employees, although exposed more often to many signatures, had about the same success in identification as lay witnesses; apparently such persons should not be considered as expert witnesses unless they have had special training in techniques of document examination. Experts, though not infallible, were most accurate in identification of handwriting, based upon visual comparisons of standard and alleged signatures.

The other published experimental study of handwriting concerns the problem of the identification of *one's own* handwriting—which is also the problem dealt with in the present investigation. Eagleson secured data on the success of sixty Negro college girls in attempting to recognize specimens of their own handwriting.³

All subjects were given the same materials and instructions, and submitted six specimens of their handwriting—a dictated prose passage on a ruled card, the same on an unruled card, copied verse on a ruled card, the same on an unruled card, the alphabet in separate small letters on a ruled card, and finally the numbers from 1 through 9 and 0 on a ruled card. No erasures, cross-outs, or extra marks were allowed. The purpose of the study was not divulged before or during the preparation of the specimens. After the specimens had been made, the names were removed from the cards by cutting off the lines on which they were written. Each card was numbered for identification purposes.

"The data were obtained from each subject individually. Before the cards were presented, the subject was questioned as to whether or not she thought she could recognize the specimens that she had written a week before. Then, the cards were shown for a particular specimen one at a time at the rate of one card every ten seconds until the subject selected a card as the one which she had prepared. The number of the card was recorded without the subject's knowing whether or not it was the right one. Then, out of sight of the subject, the card was mixed with the others for a second and third selection. At the end of the sitting the subject was questioned as to factors that aided in making the selections."⁴

Eagleson's results indicated that there may be many people who cannot identify their handwriting, and more still who are unable to recognize their numbers. His data also suggested the possibility that a larger number of people believe they can recognize their handwriting than really can. Apparently the more important factors enabling selection were the shape of the letters, slant of writing, and heaviness or lightness of writing, or the "general appearance" (as the subjects called the factor which they reported as their aid in the selections).

THE PROBLEM

The present problem, suggested by Eagleson's experiment, concerned the identification of one's own handwriting. It was believed that carefully controlled experimental situations with a large number of subjects would furnish data which would be of value in the field of law. Also, the data would either support or tend to disprove

³ Eagleson, O. W., "The Success of Sixty Subjects in Attempting to Recognize their Handwriting," *J. Appl. Psychol.*, 21: 546-549 (1937).

⁴ *Supra* at p. 547.

Inbau's conclusion that "lay witness identifications based upon mental comparisons should not be considered as acceptable legal evidence."⁵

PROCEDURE

The present experiment was begun with 181 university students as subjects, all of whom were members of an evening class in General Psychology at The George Washington University, Washington, D. C. After the initial step of the experiment, during which handwriting specimens were obtained from each subject, the 181 students were placed in two groups for administration of the identification test series of which only 165 finally participated.

The "typical" subject was between 20 and 24 years of age, engaged in clerical or stenographic work for the United States Government, born in the United States, and living in Washington, D. C., at the time of this experiment. However, the range of differences among the subjects in respect to sex, age, occupation, employer, birthplace, and legal residence, presented an excellent cross-section of individuals of college age and older in the United States.

All materials—copy, paper, and pencils—and instructions throughout the entire experiment were uniform for all subjects. The samples of handwriting were obtained from the 181 subjects during 35 minutes of a regular 50-minute class period. The purpose of the experiment was carefully disguised. After discussing experimental psychology and its applications, the instructor gradually led over into the experiment. He introduced it by an announcement that a large pencil manufacturer was testing a new pencil and had asked the cooperation of this class.

The subjects were instructed to put away all pens and pencils, and then each was given a "special pencil." Emphasis was placed upon using only the pencils distributed by the pencil company's "representatives," who were actually assistants unknown to the members of the class. Four specimens of writing were obtained from each subject under conditions identical for all.

The first specimen was copied from a printed sample which read:

I saw his most recent inquiry and will send at an early date the catalog he requested. This present order has been shipped and an itemized bill is in the carton as before.

All papers were collected and the second series was begun. The subjects copied the following numbers from printed models:

597
124
907
543
286

⁵ Inbau, *op. cit.*, p. 443.

Both the third and fourth specimens were written while the instructor slowly dictated to the subjects. The third sample was:

We thank you for your letter and wish to advise that we maintain offices in your city. An agent will call on you in the near future and furnish the information you desire.

This second worded passage, was *exactly equal* to the first worded passage in number of sentences, words, letters, words per sentence, and letters per sentence.

The fourth and final specimen of writing contained these numbers:

486
013
896
432
175

Both series contained all the digits and the two sets were *equivalent* in form and number.

This initial phase of the experiment was closed with general remarks stating that the results could not be announced now but would be later in the semester.

That these instructions did result in successfully disguising the purpose of the experiment was evidenced by spontaneous remarks of the subjects as they later took part in the identification tests, and also by answers to specific inquiries.

The handwriting specimens were arranged in groups as they were collected. The 181 copied worded specimens were divided into two piles by equating them on the basis of the age and sex of the subjects who had written them, 91 in group A and 90 in group B, and the other specimens were divided into the same two groups. Group A was tested two weeks afterwards, and Group B, 14 weeks afterwards.

At the time the specimens were taken, the subjects had written on the upper lines of the sheets their names, ages, and sex. The specimens later were coded on the reverse side, and then the upper lines were removed. Key sheets were prepared with name and identifying code number for each subject, and the only identifying marks left on the specimens of writing were these code numbers on the reverse side of the samples. Through use of this control the experimenter, during the testing period, was not aware of the identity of the writer of any specimen; thus it was not possible for a subject to respond to "reduced cues" given by the experimenter.

At a later class students were informed that the class had been divided into two groups and each group would take part in a separate psychological experiment. Nothing was said at any time to indicate that there was any connection between the experiments being scheduled and the earlier "pencil test." The statement, repeated verbally, that "some members of the class will take part in

one experiment, other members in another experiment," apparently was successful in disguising the relation between that test and the identification series.

Eighty-eight of the 91 subjects designated for Group A were tested one at a time for the identification of their handwriting. The four groups of handwriting specimens (364 in all for the 91 subjects of Group A) were concealed under a blank test form which was spread out on a desk. The subject was asked to sit to the right of the experimenter, facing him. The experimenter began: "Do you remember writing some sentences and numbers in Dr. Britt's class in Psychology about two weeks ago?" "Do you believe that you can identify the sentences you wrote then?" "The numbers you wrote?" The answers to each question were recorded.

The experimenter then removed the group of copied worded handwriting specimens from beneath the blank test form and asked the student to select his handwriting. This was the first indication that any subject had of the purpose of the experiment. After a selection had been made, the experimenter placed the sheet selected on the bottom of the pile and put the group into a desk drawer out of sight of the subject. Three types of errors were recorded as the subjects attempted to identify their handwriting:

- a. *Outright errors*—the subject identified as his own writing, specimens which had been written by fellow subjects.
- b. *Possibilities*—the subject selected several specimens of handwriting and reported that all "possibly" were his, although of course only one sample in any one series was written by the subject.
- c. *Misses*—the subject examined all samples of a series, reported his writing was not among the ones he had seen, and then after volunteering to re-examine the samples (the experimenter did no prompting), identified his writing on a second or third trial.

The same method of testing and scoring was followed with each of the three remaining groups of specimens—copied numbers, dictated words, and dictated numbers. All the remarks made by the subjects as they examined the groups of written samples were recorded on the test forms.

After the subject had gone through each of the four groups of specimens and had selected those he said were his own, he was asked, "What factors helped you pick out your handwriting?" The experimenter recorded all remarks. At the conclusion of the session he cautioned each subject that it was important to the success of the experiment not to tell his classmates anything about the interview. Indirect inquiries revealed that the subjects cooperated in this respect.

When the subject left, the experimenter recorded the code numbers of the bottom sheets of each of the four groups, and then placed them under the concealing test form as before. The number of minutes required for the identification test and the date were

recorded. The next subject was called in and the procedure was repeated. Every effort was made to preserve uniformity of test conditions for all subjects.

After the subjects in Group A had been tested, there was a 12-week interval at which time Group B was tested with the same procedure. However, there was considerable difficulty in maintaining contact with 23 of the 90 subjects originally constituting Group B. Despite extension of the testing period, 13 subjects did not report at all because of longer and more intensive working hours brought about by the outbreak of the war. Group B, then, consisted finally of 77 subjects. Inasmuch as Groups A and B had been equated originally for age and sex, the results of the identification test series were eventually computed in percentage values instead of in absolute numbers. With 88 subjects in Group A and 77 in Group B, the sizes of the groups were still large enough to be significant. Since the equating had been done by 5-year age intervals (20-24, 25-29, 30-34, etc.), the results of the identification tests of 11 of the subjects of Group A were not deleted; this would have been justified only if the subjects had been matched individual for individual.

It should be noted that the legal procedure in presenting handwriting to a witness for opinion evidence generally does not permit the lay witness to make visual comparisons.⁶ In a courtroom situation a single document is presented to the witness, and he does not have the privilege of examining a series of documents among which is the alleged handwriting. The subjects of the present experiment had the advantages of the latter conditions, and therefore a more favorable opportunity to identify their own writing.

In summary, the experimental procedure satisfied the following conditions:

1. The subjects, of both sexes, had diverse backgrounds with respect to age, birthplace, legal residence, and occupation.
2. All subjects were students in the same course.
3. Use of pencils meant that there were no cues of color of ink or type of pen point.
4. Pencils were uniform in length, thickness, and manufacture.
5. The experimental groups were equated for age and sex.
6. Paper used by the subjects was uniform in size, ruling, and quality.
7. Instructions used by the experimenter during the identification tests were typewritten and were read aloud to insure uniformity of the experimental situation with all subjects.
8. Subjects were not aware of the purpose of the experiment until the identification test was administered.
9. The experimental groups were of sufficient size to be of significance in the treatment of the data.
10. Dictated and copied materials were equated.
11. In the identification tests, the experimenter was not aware of the identity of any of the handwriting specimens; hence, it was not possible for the subjects to respond to "reduced cues" given by the experimenter.

⁶ Inbau, *op. cit.*, p. 433.

RESULTS

From data recorded at the time of testing and from the students' university records the following breakdown of data was effected.

1. *Time interval.*—The interval of time between the date on which the handwriting samples were obtained and the date of the administration of the identification test was not a significant variable with relation to the average number of errors per subject or the type of error. In Group A 63.6 per cent of the subjects, and in Group B 56.0 per cent of the subjects, made one or more errors of some type. The average number of errors per subject was 4.8 for Group A and 4.6 for group B. Despite the 12-week interval the percentage and type of error were fairly uniform for both groups:

TYPE OF ERROR	PERCENTAGE OF TOTAL NUMBER OF ERRORS	
	GROUP A	GROUP B
Possibilities	78.5	76.2
Outright errors	10.5	15.7
Misses	11.0	8.1

2. *Errors in relation to type of material.*—Listed in order of frequency of errors, the percentage of error was as follows:

TYPE OF MATERIAL	PERCENTAGE OF ERROR	
	GROUP A	GROUP B
Copied words and sentences	9.8	10.2
Dictated words and sentences	14.7	12.7
Dictated numbers	37.5	38.3
Copied numbers	38.0	38.8

3. *Time to complete identification test.*—Critical ratios between the average time (required to complete the identification test) of the subjects in both groups making errors, and the average time of those making correct identifications showed certain significant differences. These differences (critical ratios, Group A = 2.73; Group B = 5.17) were found between those in error and those correctly selecting their samples, the latter group requiring significantly less time to complete the identification tests.⁷ A critical ratio of 1.90 was found between the average identification time for subjects of Group A (13.1 minutes), and the average time for subjects of Group B (14.7 minutes). The ranges of time varied from 4 to 41 minutes.

4. *Age.*—In both groups of subjects, the 17- to 19-year old group made significantly more errors than the average per cent of error for the entire group of all ages from 17 to 42 years. The 17- to 19-year old subjects of Group A made 15.0 per cent more errors than the average per cent of error for all ages (63.6 per cent). This age group among Group B made 19.0 per cent more errors than the average per cent of error for all ages in Group B (56.0). On the other hand, the 25- to 29-year old group of subjects in Group A made

⁷ A critical ratio of 2.73 means that the chances are 99.7 in 100 that the obtained difference is significant.

25.1 per cent less errors, and in Group B 16.0 per cent less errors, than the respective average per cent of error for all age groups. The per cent of error of the 20- to 24-year old group approximated the average for all ages. The older age groups, 30 to 42 years of age, constituted 9.7 per cent of the entire number of subjects. Half of these older subjects made errors, but their number and the per cent of error were too small to be meaningful.

5. *Sex.*—There were no apparent sex differences in the ability of the subjects to identify their own handwriting. Deviations from the average per cent of error for all subjects were only 1.5 to 2.3 per cent for both sexes in Groups A and B, respectively.

6. *Legal residence and birthplace.*—Subjects whose legal residence was different from their birthplace had a per cent of error significantly larger than the average per cent of error for all subjects. Subjects of Group A in this category made 31.6 per cent more errors than the average for all subjects in Group A, and in Group B 16.0 per cent more errors than the average for their group.

7. *Occupation.*—Of the 165 subjects who took part, 64.2 per cent were engaged in clerical or stenographic work. The remaining 35.8 per cent were divided among five other occupational groups so that the number in each of these groups was small, ranging from 4 to 17 subjects. Of the 55 clerical employees, 72.7 per cent erred in identifying their writing; and of the 51 stenographers, 54.9 per cent erred.

8. *Employer.*—Of the 165 subjects, 79.4 per cent were employees of the United States Government. The variable of employer had no relation to the number of errors made in either group.

9. *Confidence of subjects.*—Confidence in their ability to identify their own handwriting was apparently slightly less among subjects of Group B than of Group A. Before seeing their handwriting 83.0 per cent of Group A, but only 75.0 per cent of Group B, reported that they were confident they could identify their writing. However, after seeing a series of specimens among which was their own, 88.6 per cent of Group A and 85.7 per cent of Group B were confident of their ability to recognize their handwriting.

10. *Confidence of subjects in relation to errors.*—The confidence of the subjects, a subjective factor, was not confirmed by the test results, an objective factor. Of the 88.6 per cent (Group A) who were certain of their selections in the identification tests, 63.6 per cent made errors of some kind; and of the 85.7 per cent (Group B) who were certain of their selections, 56.0 per cent made errors. Also, 70.0 per cent of the subjects of Group A, and 55.0 per cent of the subjects of Group B, who were uncertain of their ability to identify their handwriting, made errors. In other words, subjects in Group A who were uncertain made a larger per cent of errors than those who were confident; but this was not true in Group B in

which almost equal percentages of those who were confident and those who were uncertain made errors of some kind.

11. *Introspective reports.*—The reports of the 165 subjects as to the factors which aided them in identifying their writing ran the gamut of almost every characteristic of handwriting—curve, spacing, quality, round dots over *i*'s, no dots over *i*'s, "sprawly," legibility, "plain writing," neatness, "hard-to-read writing," funny letters," draftsman's figures, etc. The following six factors, in order, were most frequently mentioned:

FACTOR	PER CENT OF SUBJECTS MENTIONING FACTOR	
	GROUP A	GROUP B
a. "I just know my own writing," or "general appearance."	50.0	84.4
b. "certain letters and numbers" (<i>a</i> to <i>z</i> , <i>0</i> to <i>9</i>).	72.7	49.2
c. pressure of writing.	27.2	22.1
d. slant of writing.	21.6	23.4
e. size of writing.	11.4	10.4
f. method of writing (Palmer, Rosen- thal, Spencer, Wesco, Business).	5.7	3.9

Since the subjects usually mentioned more than one factor as aiding them in identifying their writing, the total percentages for the groups are more than 100 per cent. Because of the 12-week interval between the testing of the two groups, it is significant that the largest per cent differences are in the first two factors—"I just know my own writing," and "certain letters and numbers." Differences between the two groups in respect to the other four factors—pressure, slant, size, and method of writing—ranged only from 1.0 to 5.1 per cent.

12. *Handedness.*—Only four of the subjects of Group A and none in Group B were left-handed. Although each of the left-handed subjects made errors of some type in identifying his handwriting, the number of subjects is too small to be considered significant.

DISCUSSION

Some comparison of the results of the present investigation and the ones by Eagleson should be made, because of their similarity in purpose.⁸ However, since the two studies differed in so many experimental factors—method of obtaining handwriting specimens, types of specimens, method of identification test, time intervals, age, sex, and race of subjects, etc.—comparisons will be made only of the results based on similar factors. Only outright errors will be used in comparison, for this is the only type of error reported by Eagleson.

One of his samples of handwriting consisted of a dictated prose passage written on a ruled card, and he reported 78.0 to 92.0 per cent success of his subjects in identification. This may be compared

⁸ Eagleson, *op. cit.*, pp. 546-547.

to our dictated worded specimens, with 87.0 to 89.0 per cent success in the identification of this type of material. The sixth specimen of handwriting obtained by Eagleson consisted of dictated numbers on a ruled card, and these may be compared to the dictated numbered series used here. He reported 40.0 to 43.0 per cent success in identification of numbers as compared with the present 61.0 per cent.

In further comparison, 79.0 per cent of our subjects were confident that they could identify their handwriting, 65.8 per cent were more confident of identifying words than numbers, and 31.4 per cent were equally confident of identifying both. Eagleson reported that 83.0 per cent of his subjects were confident of identifying words, 43.0 per cent of identifying numbers. Also, 2.0 per cent of his subjects were confident that they could not identify their written words, and 14.0 per cent that they could not identify their numbers. By way of comparison, 4.7 per cent in the present study said they could not identify their words and numbers.

Each of Eagleson's 60 subjects mentioned as the factor which enabled her to make the selection the "general appearance" of her writing; and, upon further questioning, answered that she considered the slant, heaviness or lightness of the writing, and the formation of certain letters as the principal factors. In the present study, 50.0 per cent of the first group and 84.4 per cent of the second reported "general appearance" as the factor aiding them in their selection; 21.6 to 23.4 per cent reported slant; 22.1 to 27.2 per cent reported pressure of writing; and 49.2 to 72.7 per cent reported "certain letters and numbers," mentioning every letter from *a* to *z* and every number from *0* to *9*. Eagleson's subjects did not report size and method or style of writing as other factors aiding in selection, but 3.9 to 11.4 per cent of our subjects reported these items.

The principal psychological significance of an experiment on the identification of one's own handwriting is based upon handwriting as overt behavior. Handwriting is expressive movement, as are gait, voice, facial expression, posture, gestures, mannerisms, and other types of behavior.⁹ Although these activities are distinctively individual, it is significant that 59.8 per cent of the subjects of the present experiment made some type of error in identifying their own handwriting. Furthermore, most subjects believed their handwriting so typical as behavior unique to themselves that 79.0 per cent were confident they could identify their writing. Even after seeing their own handwriting among other samples, more than half of the subjects selected samples written by others, and then reported that they were certain the selected samples were their own.

The results of the present experiment, with 59.8 per cent of the

⁹ Allport, G. W. and Vernon, P. F., *Studies in Expressive Movement*. (1933). 24-35.

subjects making some type of error in identifying their own handwriting, are consistent with those of Wolff who reported that self-recognition of the identity of expressive movements (profiles, hands, voice, gait) did not exceed 61.0 per cent (profiles) and was as little as 10.0 per cent (voice).¹⁰

A second psychological factor, which was prominent throughout the identification test series, was rationalization by the subjects. *Every* letter from *a* to *z*, and *each* number from *0* through *9*, was mentioned by some subject in justification of his selection of handwriting samples. Letters, numbers, words, positions, slants, pressures, systems, and sizes were offered by various ones among the 165 subjects as reasons for making their selections.

There are also certain legal implications in the outcome of the present experimental study. The position of the courts relative to handwriting has been well summarized by Inbau:

For many years our courts have held that when it becomes necessary to prove the genuineness or non-genuineness of a disputed document, any person having "previous knowledge" of the handwriting of the alleged author is competent to express an opinion that the document in question was or was not written or signed by him. This "knowledge" prerequisite is satisfied by the witness's experience in having seen the alleged author execute a specimen of his writing, or by the witness's observation of writing known (or, from various circumstances, presumed) to be that of the person alleged to have written the disputed document. In either situation the witness is permitted to testify on the basis of a mental comparison made between the questioned document and his recollection of what the writing of the alleged author looked like when observed under one or the other of these two circumstances. . . .

The infrequency of a lay witness's opportunity to acquire his knowledge of another person's handwriting is immaterial as regards the admissibility of his testimony. One observation (either of the act of writing or only of the writing itself) satisfies the requirement of admissibility.¹¹

The subjects of the present investigation were well acquainted with their own handwriting, far better than the usual lay witness can be acquainted with another person's writing. Yet 59.8 per cent of 165 subjects made errors in identifying their own handwriting. If these subjects make errors in identifying their *own* writing, how well can the lay witness succeed in identifying writing which is *not* his own? How well does his experience with the writing upon which he is called to make an opinion compare with the experience of the individual who has seen his own writing over a period of years, since he first began to write? The answers are obvious. The results of the present experiment well complement Inbau's conclusion that "lay witness identifications based upon mental comparisons should not be considered as acceptable legal evidence."¹²

¹⁰ Wolff, W., "The Experimental Study of Forms of Expression," *Char. and Pers.* 3: 327-344 (1935).

¹¹ Inbau, *op. cit.*, p. 433.

¹² *Supra* at p. 443.