

# The Process of forensic handwriting examinations

## Editorial

Handwriting is a complicated process. It takes the average person many years to become able to write so that others can decipher the words. It takes time to develop the coordination of arm, hand and finger movements necessary to write script. If we think of a person immersing themselves into a second language, they begin writing in that language after only a few lessons. The person is essentially applying the motor and coordination skills they know from their own language and using them artistically to draw the second. Writing skills learned over a short period of time will continue to develop and evolve as the writer develops further skills. Writing skills take a long time to develop in a person and as such they tend to exert a strong influence on the writing of an individual. It is difficult to change movements quickly in order to create different style letters. It is for these reasons that the handwriting of a mature individual is identifiable. Handwriting is a form of forensic science that is somewhat unique. With fingerprints or DNA, you have an absolute identification. Handwriting is somewhat subjective. It varies even within the same writer or written document. Think of your own signature. If you wrote it on a piece of paper 10 times, none would exactly overlay another. It is the subjective observations of a document examiner that determine whether two writings were made by one individual. That said, some experts may require more evidence or different material to reach a similar conclusion. It is a subjective test, totally affected by the examiner's experience level. Imagine the number of people in the world. Then imagine being able to rule every one of them, except one, out from having written an excerpt of writing. Tough one, but it is possible.

The action of writing requires a complex series of skills we begin learning in grade school. We are shown as children drawings of letters and asked to simulate them by drawing matching letters. The letters are often up on the board and we have models of lower case and upper case printed and script letters. In the US, the common handwriting style taught in the late eighteenth and early nineteenth centuries was the English Old Round Hand style. In the nineteenth century it changed to the Spencerian system. This changed to the Palmer and the Zaner-Bloser systems in the early twentieth century. Each current day system is similar with very slight variations. These represent copybook forms that we are taught to mimic. It isn't until many years later after we have mastered the skill of writing that we begin to deviate from the copybook form and develop individual characteristics. That said, you should expect that it is nearly impossible to identify a person's writing that is immature or that hasn't developed sufficient individual characteristics that deviate from the textbook design taught in school. One basic premise of handwriting is that no two persons write exactly the same. This supposition is based on a non-proven statistic. It is impossible to test everyone alive along with everyone who has previously died to see if anyone has extended handwriting that is completely identical. Short period of writing may be similar, but extended writings will always show sufficient deviation from the textbook design to allow for individualization. The same argument follows for fingerprints in that it is impossible to examine every live and dead person's prints, but statistics indicate that it is impossible that two people (including twins) have matching fingerprints. Another premise is that the same person never writes their own signature or

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extended writings exactly the same. This is based on our motor skills. As with any forensic science, handwriting can be broken down into two categories. The first is class characteristics, which are features that are found in the writings of groups of people. The second is individual characteristics which are features attributable to only one writer. Class characteristics can include the design of letters used in the Zaner-Bloser system on one hand and people with a debilitating disease on the other. Both group the characteristics of the writing into smaller groups than the entire world, but don't individualize it. Individual characteristics can be seen with deviations from the norm or the copybook we were all taught. These deviations can be identifiable with sufficient numbers and uniqueness. Examples include slant, loops, terminal strokes, flourishments, etc.

The writing of all people will have a combination of both class and individual characteristics. If enough individual characteristics exist, it can be identified. It is through the known writing specimens that a document examiner can determine the range of variation that a specific writer has. In other words, how many ways does the person make a letter "G" or how low do they cross their "t"? With enough non-questioned writing, these characteristics can be mapped. Typically, the more skilled the writer, the more individual characteristics develop. Differences are non-matching aspects of writing in two documents that render it impossible that the two writings were created by one person. Not all writers have the same natural ability. Some writers have more dexterity than others, giving them more freedom when they write. Some writers have better arm, hand, or finger coordination than others. Skills are learned and cannot exceed natural ability. Skill can be quantified by examining one's ability to control the size, slant, slope, spacing, shading and speed of their writing. Handwriting is also influenced by the physical condition of the writer. Age, disease, medication, drugs, alcohol or stroke can all affect a person's writing. Conditions that affect handwriting can be temporary (drugs or alcohol), static (paralysis), or progressive (a changing illness).

Typical indications of mental illness, drugs or intoxication affecting writing include distortions in spacings, relative size of strokes and letter formations. Physical problems tend to manifest themselves as trembling, pen slippage, and changed letter formations (for ease of creation). Nervousness and tension can also affect handwriting. The position of the writer can influence the writing, i.e. leaning, sitting,

standing, constricted space. The writing surface can affect the writing quality, e.g. a rough surface can create what appears as tremors in the writing. And finally, the writing instrument can affect the appearance of the writing. Habit is an important consideration in handwriting. After a person has learned how to write, it is their habits that tend to strengthen their skills. Habit is what moves us away from copybook toward individualization. The layout of the writing is another important feature. How is the handwriting placed on the document? Use of margins, alignment of signatures to text, and proximity of writings are all important considerations.

### Known handwriting

If a question is being asked as to whether a specific individual wrote a body of text or signature, then the first step is for the investigator to obtain known exemplars or samples of writing from that individual or subject. Some of the best exemplars are those that are obtained without the person's prior knowledge. In other words, if the investigator can obtain writing from business documents that aren't being questioned, then the chance of intentional alteration is minimalized. This virtually guarantees "normal" writing. These types of known exemplars can be found in checkbooks, diaries, ledgers, written letter, telephone directories and even grocery lists. The only problem with this type of writing is whether it represents the questioned writing. If the same letters and letter combinations don't appear, it is of little help. Also, it needs to be in the same style, e.g. cursive or block printing.

Since handwriting changes during our lifetimes it is important to try to obtain comparison samples from around the same purported time as the questioned writing. If it becomes problematic to obtain known specimens from business dealings, the investigator can dictate material to be written. Have the subject use similar paper and writing instruments to those used for the questioned material. Have them utilize either block printing or cursive and ask them to write based on reading them similar text to that in the questioned writings, or have the text typed out and ask them to write it. If you do this, you must be careful, if there are spacing exaggerations, unusual use of capital letters or misspelled words, that you don't influence the writer to right that away. Minimal direction is important as far as the court is concerned to ensure that you didn't tell them to write a "J" this way, etc. Never show the subject the questioned writing and ask them to "reproduce" it. The investigator should be certain that the subject is not using their awkward hand. Right-handed people should use their right hand when writing, etc.

A few points for the investigator obtaining specimens...

- a. Identify the writer through valid identity documents. Write down their name, and identification document data, e.g. passport number.
- b. Have them sign a waiver that they are providing their writing of their free will.
- c. Use matching materials for obtaining the samples. If the questioned writing is on a check, then provide the subject blank checks and a similar writing instrument to use. Have them write the standards using various backings, e.g. on a desktop, on a pad of paper, etc.
- d. Never show the subject the actual questioned writing. This is because if the person wrote the document using distortions you will be reminding them what to do.
- e. Once a writer is finished writing a sample, remove it, provide them a new blank page and ask them to repeat the action. Do

this numerous times to obtain their natural range of variation. Ten or more samples are desirable.

### The process

The first step is to assess whether the writing is "normal." An example of abnormal writing would be a body of text that continually changes in slant, size relationships and written hand.

Things to look for in the examination:

**Normal writing:** If the examiner determines the writing to be normal, then he can proceed with the examination. If not, he must stop and reassess. There should be a clear idea of the characteristics and variations.

**Characteristics:** Look at the general writing characteristics first when conducting an examination. What is the basic movement to create each stroke? Is the basic movement of the writer angular or more rounded, etc.?

**Letter formation:** To make a lower case "a," does the writer begin with a long beginning stroke and is the letter angular or round, etc.? Where do letters start and how is each one formed? Were the letters written in a clockwise fashion or counter-clockwise? Are certain letters connected and others not?

**Line quality:** Does the writer appear to be in control of his writing? Are there numerous pen lifts or is the writing continuous and strong? Is the writing fluent and are the letters smooth or awkward?

**Pressure:** Assess the pressure of the writer. Is it excessive? Is there more pressure on down strokes or up strokes?

**Shading:** Is there shading on certain letters and is it consistent?

**Slant:** Which direction is the slant? Are strokes made right to left or left to right? Is there no slant at all? Are the slant characteristics consistent?

**Proportions:** Look at the letters and how they are proportionate to each other. Every time a lowercase "t" is beside and "h," is the "t" higher or lower?

**Initial strokes:** Does the writer begin with an exaggerated initial stroke or a short beginning?

**Baseline:** Where is the writing in relation to the baseline? Is the writing physically above, on or below? Is it slanted in relation to the baseline? Note: "baseline" can be imaginary.

**Frequency of words:** Does the writer use abbreviations or shortcuts when writing?

Special signs or marks - How long are the exclamation mark or comma? Are the periods small dots, quick strokes that make a horizontal line or missing?

**Speed:** Is the writing fluently created? Are there numerous pauses. If so, are they always in the same place?

**Spacing:** Spacing between words, letter combinations and margins should be noted.

When the examiner has completed the analysis of the known writing, there should be a clear understanding of the class and individual characteristics found within the person's writing. The range of variation and the repeatability of the individual characteristics should also be clear. Many examiners keep working notes to keep track of the many handwriting features they note. This can be done by

making a photocopy of the writing and using a highlight marker, note characteristics. To rely on memory is problematic and invites mistakes and courtroom questioning.

### Questioned writing

The first step in examining the questioned writing is to determine whether the entire body of writing was written by one individual. This isn't a simple step. If there is evidence that different pens, styles, slants, etc. were used in the body of the writing, then the examiner should exclude from consideration the areas not necessary for the examination. The next step is to determine if the writing is normal. There are at least three steps to determine this. They are:

#### Distortion

These are changes in the writing that might not be the fault or doing of the writer.

#### Disguise

These are conscience efforts to hide or change the appearance of writing.

#### Imitation

This is an attempt to create another person's writing by using a model or from memory.

If it is determined that the writing is not normal, the examiner can always request additional samples of writing for comparison. If the writing is deemed normal, then the examiner begins following the same procedure as used in analyzing the known writing to document the features of the writing. Examine the letters and letter combinations first by noting the general or class characteristics of the writing and then proceeding to the more individual characteristics. Determine the range of variation of the writer. At this stage, the examiner should be able to answer whether the writer of the known documents also wrote the questioned document. There should be a list of the class and individual characteristics found within both bodies of writing. These should be compared and evaluated for consistencies, importance and differences. By importance, I mean, how unusual and identifying is a particular characteristic. Is it one, based on your experience that you have seen dozens of times or never before? Sometimes it may be advisable to switch the order and examine the questioned writing first, typically in cases where there are many possible known writers. This way after looking for individuality within the questioned writing, the known writers can be quickly eliminated.

An examiner is not required to reach a conclusion in every case. There is nothing wrong with requesting more specimens or reach a conclusion indicating that there was insufficient material for examination. If there are unexplainable differences between the two writings, the proper conclusion is that there are two different writers. If the comparison showed sufficient identifying characteristics, then the two writings were produced by the same individual. Any differences require a less than positive conclusion. The more of these differences found, the less conclusive the opinion. Handwriting examiners vary as far as the number of conclusions they may reach in an examination. They range up to a maximum of 9 levels of certainty. Following is a description of those possible handwriting conclusions:

**Identification (definite conclusion of identity):** This is the highest degree of confidence expressed by document examiners in handwriting comparisons. The examiner has no reservations whatever, and

although he is prohibited by the Court from using the word Fact he is certain, based on the evidence contained in the handwriting, that the known writer actually wrote the writing in question.

**Strong probability (highly probable, very probable):** The evidence is very persuasive, yet some critical feature or quality is missing so that identification is not warranted; however, the examiner is virtually certain that the same individual wrote the questioned and known writings.

**Probable:** The evidence contained in the handwriting points rather strongly toward the questioned and known writings having been written by the same individual; however, it falls short of the virtually certain degree of confidence.

**Indications (evidence to suggest):** Some handwriting may have few features, which are of significance for handwriting comparison purposes, but those features are in agreement with other writing, suggesting that the same individual may have prepared them. Note: This is a very weak opinion and some examiners doubt the desirability of reporting an opinion this vague, but those examiners who are trying to encompass the entire gray scale of degrees of confidence may wish to use this or a similar term. Usually a statement that the evidence is far from conclusive follows this opinion.

**No conclusion (totally inconclusive, indeterminable):** This is the zero point of the confidence scale. It is used when there are significantly limiting factors, such as heavy disguise in the questioned and/or known writings or a lack of comparable writing, and the examiner does not have a leaning one way or the other.

**Indications did not:** This carries the same weight as the indications term above; that is, it is a very weak opinion.

**Probably did not (unlikely):** The evidence points rather strongly against the questioned and known writings having been written by the same individual, but as in the probable range above, the evidence is not quite up to the virtually certain range.

**Strong probability did not (highly unlikely):** This carries the same weight as strong probability above; that is, there is a virtual certainty that the questioned and known writings were not written by the same individual.

**Elimination:** This, like the definite conclusion of identity, is the highest degree of confidence expressed by the document examiner in handwriting comparisons. By using this degree of confidence, the examiner denotes no reservation in the opinion that the questioned and known writings were not written by the same individual. Often, this is the most difficult determination made by a document examiner, especially in limited writings, such as single signatures, when the only known writings are those provided by the suspect at the request of the investigator.

Through the understanding of the process of handwriting and proper training, a competent forensic examination is possible and accurate results are achievable.

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None.

### Conflicts of interest

The author declares there are no conflicts of interest.