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Welcome to the first semi-annual issue of the “Scientific Journal of the International Association of Document Examiners.” This organization has been founded for the purpose of providing various types of training for document examiners. This Journal is one method of providing continuous training. It will also offer information on new innovations in the field as they become available.

We are an open organization meaning that anyone who has an interest in becoming a member of our organization will be welcome as long as that person does not have a criminal record. The reason for excluding convicted fellows is that they have no credibility in court and credibility is essential for expert witnesses.

The editorial staff invites all members to submit articles for publication in our Journal. There is value to being published in the Journal. Articles related to document examination should be sent to Katherine M. Koppenhaver at fordocexam@aol.com. Articles are also being accepted for publication in our newsletter, “Under the Microscope.” Send entries to Diana Mears at DianaJ.Mears@comcast.net. Articles will be published based upon their suitability for the newsletter or the journal.

Thanks to all of you who have joined our association. I look forward to spending time with you. Thanks to the contributors of this first volume. We will be publishing a second Journal after our Annual Seminar and Interactive Workshop later this year. We will need articles for the Second Volume by the end of September. Thanks especially to the staff who have been assisting me. You are making my work easier.

Katherine M. Koppenhaver, Editor
Value of Graphological Training for the Handwriting Identification Expert
By Patricia Siegel
Presented at the American Society of Professional Graphologists, February, 1994;
Printed in the Journal of the American Society of Professional Graphologists, Vol. IV,
Winter, 1995/96.
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Abstract

Handwriting identification experts generally come from either of two backgrounds, those trained by the government specifically in document examination and those trained from a graphological perspective. Each have experience in observing the detailed graphic components of handwriting, but graphologists emphasize viewing the details within a broader context than do government trained experts. Graphologists are trained to evaluate the expressive entirety of handwriting. This training provides a wide frame of reference for analyzing the dynamic individuality in handwriting, thereby reducing chance of error in coming to an opinion regarding identification.

The Issue of Training

The handwriting identification expert who is a graphologist discovers, early on, that graphology can become a handicap in the courtroom due to uninformed negative perceptions about graphology in the legal community. Questioned documents experts trained in handwriting identification by police departments or other government agencies, who have not studied graphology, are often thought of as the pure experts. The purpose of this paper is to challenge the perception that graphological training has little relevance for handwriting identification and, also, to demonstrate that graphological training improves the understanding and accuracy of the identification expert. Such training adds another dimension to the analytical process and is superior to instruction which ignores the psychological factors influencing graphic movement.

A handwriting identification expert compares different samples of writing to determine whether they were written by the same person. The graphologist or handwriting analyst is primarily concerned with evaluating the personality of the writer. The methodology applied by a handwriting identification expert in coming to an “opinion” is essentially different from that used by a graphologist in developing an “analysis.” Yet, the handwriting itself and the graphic manner in which it is delineated is the same for both methods of evaluation. There are in fact, common tasks that the handwriting identification expert and graphologist perform, such as those of observation, measurement, and evaluation of motoric response.

There is general skepticism in the American community about the accuracy of graphological analysis relative to personality descriptions. Europeans, who have had long-term exposure to well-trained graphologists, are much more accepting of it as a diagnostic technique. The focus here is not to defend handwriting analysts’ personality evaluations, except to point out that graphology is based on a large body of systematic research and study going back to the 1800’s. The first book on the subject actually appeared as early as 1622.
Value of Graphological Training for the Handwriting Identification Expert

Psychological influences on handwriting have been recognized by well-known handwriting identification experts. Hanna Sulner writes in Disputed Documents that examination of handwriting may be used to determine the mental state of the writer, and A. J. Quirke devotes a chapter to “The Psychology of Handwriting” in Forged, Anonymous and Suspect Documents. Karl Aschaffenburg, a document examiner who was initially trained as a graphologist, states that the “forensic examination of documents and what is called ‘graphology’ are simply two branches of the same root: the analytical exploration of the handwriting itself.”

In a recent text, Fundamentals of Document Examination, Edna W. Robertson writes, “A review of the literature indicates that handwriting experts in a number of cases have testified as to the writer’s state of mind.” In the classic text, Law of Disputed and Forged Documents, J. Newton Baker states, “Proceeding on the basis that all impulses directing action come from the intellectual faculty of the individual and that every movement, therefore, is controlled by his mental condition, it is indisputably true that a person’s mental condition must have a very decisive influence on the character of his writing. This feature has often been confirmed and proved conclusively by circumstantial evidence in legal controversies.”

There is also judicial precedent for recognizing the psychological influences behind handwriting. The Council of Graphological Societies has published a listing of court cases in which handwriting experts have testified with regard to the mental state of the writer.

Perhaps the most comprehensive explanation of the benefits of graphological study for the questioned document expert is the article “Behavior Factors in Handwriting Identification,” written by the late Dr. Ari Naftali and published in The Journal of Criminal Law, Criminology and Police Science. Dr. Naftali was a physician, graphologist/handwriting identification expert, and one-time head of the Criminal Identification Bureau and Laboratories of the Israeli Police. He states, “Although there is general agreement that individuality of handwriting is somehow related to the unique personality pattern of the writer, the forensic examiner of Q.D. (questioned documents) is still shying away from the utilizing the findings of the more serious students of handwriting as a medium of personality assessment...It would certainly be useful, for example, to be able to distinguish between natural expressive movements and ‘role-playing’ in handwriting, an achievement better accomplished with the aid of serious graphology.”

My objective is to explain what graphologists learn and how this knowledge empowers the handwriting identification expert with greater understanding of how writing is achieved. Graphological training enables the identification experts to approach handwriting from a wider scope than those from government backgrounds. This is a generalization, of course, but it is important that the graphologist is trained to look at handwriting as a dynamic process which changes with time and specific situations but also maintains an inherent consistency of structure which expresses the individuality of the writer. The graphologist is trained to look at writing globally and to evaluate individual details and micro movements as they relate to the whole. The neurological complexity which produces handwriting, with its physical and psychological determinants, demands attention to a broad perspective. Without such breadth, the identification expert may miss important cues in coming to a conclusion.
The basic roots of the word “graphology” mean the study of handwriting, and graphologists study the entirety of handwriting -- the letter, number and diacritic forms; the spatial patterns and proportional relationships; the direction and movement of the ink trail; and the texture, speed and pressure of the pen stroke. The graphologist is trained to understand the neurological influence of handedness on the writing trail, and of hand hold and paper position as they relate to the resulting graphic projection. Most important, along with measurement and observation of details -- such as size and proportion of letters, spatial distances, alignment and relative degree of letter slants -- the graphologist is trained to look at the stylistic and expressive aspects of the writing, the maturity of the writing, and to study the impetus behind the graphic gesture.

Handwriting is a three dimensional trail of movement frozen in time and space and one of the most complicated tasks we learn. It involves intricate muscle coordination, concentration on approximating model letter forms and the simultaneous organization of the page -- writing in straight lines with correct word and letter sequencing.

With practice writing gradually becomes automatic, particularly with regard to executing signatures. Each person develops a pattern of movement which is individualistic. Our signatures have been considered our bond as far back as the Roman Empire. And, of course, signatures continue to legally represent the writer. The graphological principle that individuality is expressed in handwriting is precisely what lies behind the assumption that handwritings can be identified one from the other. By searching out the reasons behind the writing process, graphologists are able to understand individual differences more completely.

Furthermore, graphological study often incorporates examining various samples of a single person over time and at different moments or moods. Handwriting changes with life’s cycles, from childhood beginnings through the teenage years, young adulthood, maturity and elderly decline. A subject’s handwriting can change when he or she is angry, relaxed, rushed, fatigued, ill, or after having a few drinks. The more experienced an examiner is at scrutinizing the different faces and phases of a writer, the more extensive is an examiner’s mental data base for recognizing changes and habitual unifying dynamics. Graphological training gives the handwriting identification expert a great breadth of knowledge and experience.

In the Courtroom

Traditionally and typically, handwriting experts prepare exhibits for court in which individual letters and words from questioned and known writing samples are cut out and placed side by side on a single board. The experts want the judge or jury’s attention focused on specifically narrow areas of comparison. Exhibits clarify testimony and allow the court to better understand the basis for an expert’s opinion. Two examples, one from Wilson Harrison and another from Ordway Hilton demonstrate how this is done. (Figures 1, 2 and 3.)
Value of Graphological Training for the Handwriting Identification Expert

Extracts from Writings from:

<table>
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<th>Miss Cobb</th>
<th>Questioned Cheques</th>
<th>Mrs. Rookyard</th>
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![Image of samples](image.png)

**Figure 1.** Wilson Harrison exhibit of comparison of individual letters.
Although such an exhibit is useful for portraying specific details of the writing, it can have limitations and drawbacks in certain situations. Isolating individual elements prevents the court from seeing the stylistic environment from which these details come. By using exhibits in
which words and sentences are fragmented from the whole, the expert cannot show the full trail of movement, spatial dynamics or relative sizes or slants of letters, to name just a few. The continuity of the contracting and releasing finger movements, which create a rhythmic pattern as the pen crosses the page, cannot be presented in a segmented exhibit. When the court is shown only fragments, it then has to rely on the unseen judgment of the experts’ observation of the whole. The court cannot directly view whether this judgment is reasonable.

This is particularly pertinent when identifying the writer of anonymous notes where, very often, there is an attempted disguise. For example, as an expert in a case in which there were two conflicting expert opinions regarding the author of several printed anonymous notes, I was convinced that the defendant did not execute them and testified to that effect. My background includes graphological training. An experienced handwriting expert trained by a government agency testified for the prosecution, claiming that the defendant did execute the notes.

The prosecution expert’s exhibit consisted of a board, the top half of which displayed an enlarged hand-printed address from the envelope of one of the anonymous notes. On the bottom half there were enlarged, cut out letters, supposedly from the defendant’s handwriting, which were pasted in the same positions as the anonymous address directly above. The expert for the prosecution claimed that the address on the top half of the exhibit was written by the same person who executed the letters on the bottom half, namely the defendant.

Only a few of the cut out letters on the bottom half resembled the defendant’s printing, however. It was clear to me that most of the supposedly known documents the prosecution’s expert used for comparison with the anonymous notes were executed by several different people and only signed by the defendant. By narrowly focusing on individual letters, rather than on the documents as a whole, the prosecution’s expert made erroneous assumptions. A jury would not be able to detect different writing styles in the known standards by looking at isolated letters on his exhibit. In addition, the comparison letters were applied to the exhibit in a spatially similar manner to the anonymous address. But the defendant’s printing had spacing and organizational patterns which were much more irregular than the printing on the anonymous notes.

In contrast to the prosecution expert’s exhibit, the exhibits I prepared for testimony as the defendant’s expert were an attempt to reflect the expressive writing styles on both the anonymous notes and the defendant’s known standards. Entire pages of anonymous notes (also referred to as questioned documents) were placed next to full pages of the defendant’s printing (Figures 4 and 5). The presentation focused on specifics but within the context of the overall graphic patterning on the page. In another exhibit, (Figure 6) small blocks of questioned and known writing were enlarged and contrasted so that individual letters could be seen more clearly. Yet, the spatial relationships between letters, several words and lines remained true of the individuality of the writers. No distortion was created by cutting out separate letters and pasting them on a board with arbitrary spacing determined by the expert. The density of the writing on the page and the degree of consistency of organization is retained when blocks of writing are captured as a whole. In this manner, visual bias in presentation can be reduced while allowing focus on specific details.
THIS IS A NOTIFICATION —
YOU’VE NEVER BEEN A COP AND
YOU’LL NEVER BE A DEPUTY INSPECTOR! WE TALKED TO YOUR MOTHER
IN FLORIDA AND SHE SAID NOT TO
GIVE YOU THREE-QUARTERS SINCE
YOU'RE NOT REALLY SICK. YOUR
BROTHER, THE MAN OF THE
FAMILY, WAS EVEN LAUGHING. HE
SAYS YOU WANT LINE-OF-DUTY
THREE-QUARTERS WHEN YOU NEVER
DID LINE-OF-DUTY WORK, YOU
LESS THAN A MAN. WITHOUT YOUR
CAPTAIN’S BARS, YOU'RE NOT EVEN
A WOMAN — YOU'RE A PARASITE!

YOURS TRULY,
A SECRET ADMIRER

Figure 4. The questioned document, an anonymous note.
By providing exhibits in which the court could see the continuity and overall expressive style of the writing, the jury could easily see that the defendant’s graphic ability was less mature, less aesthetic and far more inconsistent than that of the anonymous note writer. The anonymous notes were all written in block cap letters while the defendant combined block cap with some manuscript letters. The defendant’s known writing contained spelling errors not appearing on the anonymous notes, and the enlargements also showed significant differences in how letters were formed. Most notably, the anonymous note writer crossed the “A”s releasing from right to left as is typical of left-handers, whereas the defendant, a right-hander, crossed his A’s from left to right.

The defendant could not have executed the notes because his writing was graphically inferior to the writing on the anonymous notes. One cannot disguise writing with better form and style than one is technically capable of doing. The jury was able to see the expressive differences when pertinent details were presented in the larger context and, consequently, found the defendant not guilty.
The mistake made by the prosecution’s expert was not comparing standards presented as “known” documents with each other to verify that they were written by the same person. Some of the known documents were written by the defendant, but many were not. The wrongly identified standards contained, for instance, examples of “A”s in which the horizontal bar crossed from right to left, unlike the defendant’s natural handwriting. There were many graphic inconsistencies which were assumed by the prosecution’s expert to be the defendant’s known writing but were not. They included incongruities in stroke quality and stylistic expression which should have been obvious if the documents were examined and compared as a whole.
Value of Graphological Training for the Handwriting Identification Expert

The prosecutor’s expert focused narrowly on individual letters he observed while going through a large amount of employment material concerning, but not necessarily written by the defendant himself. In this case, the expert failed to evaluate the entire graphic context in which these individual letters appeared, thereby making incorrect assumptions. This case highlights the danger of myopically inspecting details without sufficient regard to the larger picture.

Conclusion

No handwriting identification expert is infallible, but graphological training can reduce chance of error. It is important for the handwriting expert to understand the impetus behind the graphic projection. The graphologist’s training, in which similarities, differences and stylistic propensities are evaluated in terms of psychological and neurological impulse, gives the analyst a wide perspective of awareness. This, in turn, fine-tunes his or her ability to grasp the individuality of handwritings evaluated for identification purposes.

References


Zurbuch, Theophil, “Ein Job als Manager -- Nicht Ohne Graphologisches Gutachten” (Job as Manager -- Not without a Graphological Analysis), article in Basler Zeitung, Nov. 19, 1993.

Patricia Siegel, CFDE is a consultant for handwriting identification of questioned and anonymous documents, as well as for handwriting analysis and the study of handwriting. She has testified as a handwriting identification expert in Federal Court, New York and New Jersey courts.

Ms. Siegel received a B.S. from Cornell University, an M.A. from New York University, and studied the psychology of handwriting and handwriting identification for five years at the New School for Social Research.

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Once a writer has mastered the art of handwriting, his signature is executed smoothly and easily without conscious awareness of the characteristics of writing. Since your signature is the most frequently executed handwriting, habits become ingrained.

When a forger attempts to copy a signature, he must slow down the writing act in order to match the letter forms of a model signature. If he writes too quickly, he will not capture enough characteristics. If he slows his writing in order to imitate the model signature the line quality deteriorates and the writing contains tremor and may look drawn instead of written.

A document examiner is frequently asked how many exemplars (known signatures) are needed to make an identification of a questioned signature or a determination that a signature is not genuine. The document examiner’s needs will vary according to the circumstances. For example, more known signatures are needed if the writer has a wide range of variation or an oversimplified signature, while only a few signatures would suffice when the writer is consistent. Most people think that numerous signatures would be required in any case but there are circumstances in which a document examiner can give a definite opinion using only one known signature. There are also situations in which no known signatures are necessary. The type of problem addressed will influence the amount of comparable material needed for review.

One known signature would be acceptable in cases where the writer who denies his signature is very consistent and his identifying characteristics are obvious in both the known and the questioned when the questioned document is genuine.

In the State versus Jeffrey Lee Greenspan one known signature was compared to three signatures that the defendant denied writing. As illustrated in Figure 1 there is sufficient agreement in all of the questioned signatures when compared with the known signature. The document examiner had no trouble convincing the trier of fact that the questioned signature was genuine.

![Figure 1](image-url)
Enough Exemplars

In the case of The Federal Office Supply versus David Thomas AKA David Anthony, only one signature of David Thomas was available for comparison with a signature of David Anthony. The signatures matched even though the last names differed. Before the expert witness could be sworn into court, the defendant admitted that he had signed the questioned document.

When a fraudulent signature is a simple forgery, one exemplar should be sufficient to demonstrate the differences between the known and the questioned. It is prudent to obtain more than one signature, if available, but sometimes circumstances are such that it is not possible to obtain additional signatures.

When a questioned signature shows obvious signs of forgery not present in the known, one known signature is usually enough to prove non-genuineness. The signs of forgery are tremor, patching, pen lifts in unnatural places, and blobs of ink on the writing line. Forged writing often appears to have a drawn look.

![Figure 2 – Obvious Non-Genuine Signature](image)

Albert Osborn addresses this in his book, *Questioned Documents*, when he writes, "Forged writing often shows striking inconsistency with itself in movement and thus contains evidence of unnaturalness that indicate a lack of genuineness without comparison with any other writing whatsoever."

When a questioned signature is written with a higher skill level that the known writer could not execute, a single signature would be sufficient to determine the facts.

There are several types of cases in which it is possible to identify fraudulent signatures without any exemplars.

Occasionally a signature contains so many obvious signs of forgery that its spuriousness is apparent. In these scenarios it is probably better to have at least one known for comparison, although some knowledge of the writer would suffice to rule him out. Writers do not patch their signatures or write backward. Therefore, a signature that contains obvious patching is not genuine. A signature in which the lines cross in the wrong direction indicates that it was written backward is not genuine.

If a writer had an impediment that prevented him from writing in a normal manner, knowledge of that impediment would suffice to determine that a signature is not genuine. For example, the signature of a blind person was in question. The signature block on a form was very
small and contained some printed letters. The signature not only stayed within the very small box, it curved around the printed letters, something a blind person could not do.

Since no one can write his signature exactly the same way twice, identical signatures are always evidence of a copying process. This would include traced forgeries, scanned signatures or even free-hand simulations as well as cut and paste signatures.

Traced forgeries can be identified without exemplars if there are two or more forged signatures that were copied from the same model or evidence of tracing is present in the suspect signature. Evidence of tracing the signature would be a groove or guide along the signature line. Signatures may be traced with a stylus or carbon paper. The forger places a piece of paper under the model signature and goes over the signature line. He removes the model signature and follows the indentations or carbon residue in order to reproduce the signature.

![Figure 3 – Indentations from Tracing](image)

The forger will not follow the outline exactly so that there will be residue from the carbon or indentations in the paper as a result of tracing. Therefore, carbon residue or a groove along the signature line indicate traced forgeries.

Forgers are scanning genuine signatures into a computer and printing them on their colored ink jet printers in order to pass them as genuine signatures. A magnifying glass is sufficient to reveal their fraudulent nature.

A signature that is cut from one document and pasted onto another can sometimes be detected from the nature of the document. If the forger is sloppy, there may be shadows around the signature or pieces of the original document mingled with the new document. If the forger presents another document containing the same signature, the nature of the forgery is evident. Misalignment, trashmarks and shadows often can be found on cut and paste documents.

When a questioned signature matches the handwriting of another writer, an identification can be made that the writing was penned by that individual. In this case, no known signatures are needed for comparison.
Enough Exemplars

It is important to obtain sufficient knowledge about a writer that will enable a document examiner to draw conclusions. For example, a person who is too ill or infirm to write could not execute a highly-skilled signature. Knowing that the writer’s physical ability or lack thereof, is important information when one gives opinions about handwriting. A signature of a person who is on his deathbed will generally show deterioration. Signatures have been presented as authentic which were written after a person died. Knowing that a person is illiterate is also important information, especially if there are no known signatures and the questioned signature is obviously penned by a skilled writer.

There are many cases in which a document examiner would want to obtain numerous signatures for comparison with material in question. The average number of recommended signatures is 20 to 25 under normal circumstances and four to five pages of handwriting. Occasionally a document examiner will want more than 25 signatures especially when the signature is oversimplified. In these cases, 100 signatures may not be enough. This would hold true in many situations.

Ideally, the signatures used for comparison purposes should not be request writing taken after the fact. Documents should be gathered that are similar in nature to the questioned signatures dated around the same time as the questioned. A combination of requested and collected signatures should be used. Request writing may be necessary in some instances such as needing to see how a client writes.

The document examiner should request original exemplars for comparison purposes. Carbon copies are better than photocopies although it is difficult to assess pressure patterns from carbon copies and it is impossible to determine line direction. Photocopies of carbon copies are generally unacceptable for drawing conclusions about a writer.

Photocopies can be used when originals are not available but a conditional opinion should be given when working from photocopies. Your opinion is subject to review of the originals. If the photocopy is an accurate reproduction of the original, the document examiner’s opinion will be accurate.

There are several problems with photocopies. First a photocopy can be a cut and paste which may not be detectable. Second, photocopies are subject to dropout (small sections of the line disappears) and each succeeding generation shows more deterioration. It is not possible to distinguish between dropout and pen lifts in multi-generational photocopies. Faxed documents also have many problems when used for an identifying a writer. Faxing distorts signatures and creates a jagged line where there should be a smooth line. This is most obvious on diagonal lines. Faxed copies also suffer from dropout. Photocopies of faxed copies make poor exemplars.

The document examiner should make every effort to obtain documents that are suitable for comparison purposes. When possible, obtain originals for examinations. It is up to the document examiner to insist upon originals to support his findings. Always ask in writing for originals to document all requests for the record.
Unless the document examiner sees the writer execute all of his signatures, he needs to compare all of the signatures that have been identified as authentic for internal consistency. Sometimes signatures presented as genuine are not. This is more prevalent when the writer is elderly and/or infirm. Authorization is given to a caregiver or a spouse to sign the elderly person’s signature on normal course of business documents such as checks. These documents must be recognized as not representative of the writer.

If a known signature is inconsistent with other known signatures, document examiners should ask if this signature was written under unusual circumstances or executed by another person.

Many factors can influence a signature. These include factors relating to the writer or to the writing environment. The writer may be experiencing a health problem, be taking prescription medication that affects writing, be under the influence of drugs or alcohol or be under emotional stress.

Environmental factors include lightning, position of the writer (standing, sitting or prone), the type of writing instrument and the writing surface.

The document examiner must also consider accidentals. Did someone jostle the writer while he was signing his name? Did the writer sign on the steering wheel of his car or place the document on a wall to write? It is the responsibility of the document examiner to discover any extenuating circumstances that will affect the writing.

A document examiner may be asked to identify the known writing. The document examiner must observe the writing act in order to be able to identify the exemplars as being written by his client or another subject writer.

It is usually easier to make an identification of a writer than to eliminate him. An identification requires significant similarities between the known and questioned documents. An elimination requires that the document examiner know all of the ways in which a writer can write. Document examiners rarely have access to all of the various ways in which a writer can write. Of course, when obvious signs of forgery are present, the document examiner can give an opinion of spuriousness.

The number of exemplars needed in each case that a document examiner studies will have to be determined from various factors affecting the case and their availability.

**Katherine M. Koppenhaver** is a Certified Forensic Document Examiner who is one of the founders of the International Association of Document Examiners. She maintains an office in Joppa, Maryland. Her website is [www.forensicdocumentexaminers.com](http://www.forensicdocumentexaminers.com).
Characteristics of Authentic Writing  
Katherine M. Koppenhaver, CFDE

Abstract

Characteristics of genuine writing make it easier to identify writing that is genuine. We will cover the basic characteristics of genuine writing.

Key Words

Genuine writing, complexity, graphic maturity, line quality, signs of deterioration

Genuine writing is generally easier to recognize and identify than non-genuine writing, especially when the writing shows graphic maturity. Graphic maturity occurs when all movement is made from the habituated neuromuscular patterns. Most adults have reached graphic maturity.

There are many writers who do not reach graphic maturity or whose writing has declined due to illness and/or age. Their genuine writing can frequently be identified by their writing habits even though the writing shows signs of deterioration.

Figure 1 – Graphic Maturity

Genuine writing that shows a low skill level can be mistaken for forgery. The tremulous writing of the aged or infirm can be mistaken for the criminal tremor. Tremulous writing is erratic and irregular. Some unskilled writers may also have false starts and overwrites.

Figure 2 – Elderly Writer
Complexity

Dr. Bryan Found describes complexity as the number of changes of direction and the number of intersections in a signature. An oversimplified signature consisting of a line or a squiggle can too easily be duplicated and is therefore not identifiable.

Figure 3 – Moderately-Complex Signature

All signatures that contain numerous changes of direction and intersections are not complex.

Figure 4 – Signature with Numerous Changes of Direction

Complex signatures must contain additional characteristics to qualify as complex. Highly-stylized letter forms aid in complexity. To qualify for complexity, the signature must be written rapidly as well with good line quality.
Line Quality

Genuine writing of a graphically mature writer contains smooth lines without tremor. Even writers of moderate speed have smooth lines. Other signs of speed include tapered initial and terminal strokes, letters that are not carefully formed or easily identified, stylized writing, smooth unbroken strokes, slurred writing and lack of attention to details.

![Rapidly Written Signature](image)

**Figure 5 – Rapidly Written Signature**

![Moderate Written Signature](image)

**Figure 6 – Moderate Written Signature**

![Slow Illiterate Writer](image)

**Figure 7 – Slow Illiterate Writer**

Pressure Patterns

Most writers have lighter pressure on the upstrokes and heavier pressure on the down strokes. Occasionally a writer will have displaced pressure with heavier upstrokes and lighter down strokes but this is rare. Some writing instruments mask the pressure patterns, especially gel pens and felt tip pens.
Pressure patterns can be observed on photocopies. Thinner or lighter lines reveal lighter pressure and wider or darker lines indicate heavier pressure.

Figure 8 – Pressure Patterns

Rhythm

Rhythm is the alternating pattern of lighter and heavier pressure patterns. Good rhythm has parallel lines and an even return to the baseline. Letter sizes are even in similar letter forms. Slant is uniform.

Pattern Recognition

One of the most important skills a document examiner needs to develop is pattern recognition which comes from eye training. People write in patterns. These patterns are imprinted on the writer's brain so that a writer uses these patterns subconsciously even when he tries to disguise his handwriting.

A document examiner needs to become aware of the various patterns that identify a writer. These patterns will be found in line direction, pressure patterns, spacing, letter forms and connecting strokes. Writers repeat shapes of letters. Even though each letter of the alphabet has distinguishing characteristics, there are many shared characteristics. There are upper loops (b, d, h, k, l) and lower loops (g, p, y, z), circle letters (a, d, g, o) and humped letters (h, m, n).
The shape and size of a loop will be consistent on “a,” “b” and “h” or “g” and “y.” Circle letters will have similar shapes. Humped letters are consistently rounded or pointed.

Some writers have consistent patterns between specific letter forms such as "of" and "th" or the letter 't' connected to any other letter by the t-bar. Some writers connect letter combinations in a distinct pattern that is unique to the writer. Breaks can occur between specific letter forms as well. More or less spacing can occur between words as a habit of the writer. Some writers mix cursive and printscript or interchange letterforms.

In pattern recognition you are looking at repeated configurations of letter forms, not just individual letters. Where does the pattern start? What does it encompass? Writing is a habit. Starting points of individual letters tend to be consistent. Shapes are repeated. Connecting strokes are standardized.

Patterns can be found in the way letters intersect with other letters. Baselines often contain patterns. There are patterns in many of the handwriting characteristics.
Identifying Genuine Writing

Genuine writing compares favorably to the known exemplars. All of the basic handwriting characteristics are present in the exemplars.

Fewer samples of known writing are needed to identify genuine writing than are needed to eliminate a writer. One must know all the ways a writer can write to eliminate a writer.

While 20 to 25 exemplars are recommended, cases have been solved using only one known signature when all of the characteristics of handwriting appear in the questioned and known.

Genuine writing of the elderly or infirm individual is more difficult to identify. Their writing has lost some of its spontaneity. Line quality has deteriorated. Rhythm is erratic. The writing no longer adheres to the baseline. The writing is slowly executed, making it difficult to distinguish from imitated writing. The writing may contain false starts, hesitation or overwrites also indicative of forgery.

As the writer declines, so does the handwriting until the writing no longer resembles the known writing of the individual. Eventually writing will deteriorate into a series of squiggles or lines. See Figures 12, 13, and 14.

The Writing of Anlee Reid

![Figure 12 - Normal Writing](image)

![Figure 13 - Writing Deteriorating Due to Brain Cancer](image)

![Figure 14 - Last Known Writing Shortly before Death](image)
Photocopies Versus Originals

By Katherine M. Koppenhaver, CFDE

Document examiners prefer to work with original documents but originals are not always available. Since courts accept best evidence, photocopies are often the only documents available for our examination.

There is a lack of empirical evidence regarding document examiners’ ability to give opinions on photocopied documents compared to original documents. Bryan Found, PhD, Doug Rogers, PhD and Allan Herkt conducted a study to determine if document examiners performed any better on originals than on photocopies.

The test consisted of 260 signatures for comparison with 21 genuine specimen signatures. There were three sets of document examiners who gave opinions on the 260 signatures, first on photocopies of the signatures and ten months later on the original signatures. 780 opinions were given by the three sets of examiners. All of the original genuine signatures were correctly identified by all three groups. 98% of the photocopied genuine signatures were identified. Three of the genuine signatures were given an inconclusive.

59 disguised photocopied signatures were correctly identified and 61 disguised original signatures were also identified correctly. All of the rest of the opinions were inconclusive. That included 3 genuine photocopies, 504 forged photocopies and 504 forged original signatures, 63 auto-forged photocopies and 63 auto-forged originals, 4 disguised photocopies and 2 disguised originals. See chart below.

<table>
<thead>
<tr>
<th>Signature Type</th>
<th># Correct</th>
<th># Inconclusive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Photocopies</td>
<td>Originals</td>
</tr>
<tr>
<td>Genuine</td>
<td>147</td>
<td>150</td>
</tr>
<tr>
<td>Simulated</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Auto-simulated</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Disguised</td>
<td>59</td>
<td>61</td>
</tr>
</tbody>
</table>

Figure 1

No opinions were reversed between opinions on photocopies versus originals. However, all forged signatures were marked inconclusive. This is not an ideal study because it didn’t go deep enough. Additional studies need to be conducted with document examiners giving conclusions on more documents instead of inconclusives.

Another study was conducted by G. A. Dawson and B. S. Lindblom, BS to assess the impact on document examiners’ ability to assess a variety of line quality features from copies versus originals. Document examiners from various countries participated. They examined a total of 72 genuine and forged signatures, each examiner comparing one questioned signature with ten known signatures. The line quality features were correctly assessed in 69 of the 72
tests. They discovered that although not all line quality features were correctly identified this did not result in significant inaccuracies in the overall assessment, as evidenced by the accuracy rate of 95.8%.

This writer has found that most opinions given on photocopies have not changed when viewing the original documents. The one exception occurred in a case in which the photocopy was not an accurate reproduction of the original document. The photocopy showed breaks in the writing that were not present in the original document.

In some cases it is essential to view the original document. One example involved four promissory notes containing questioned signatures. The examiners went to opposing attorney’s office to examine and photograph the original documents. Three of the promissory notes had been cut across the bottom with scissors leaving a curved edge on the bottom of the notes. There was an artifact on one of the notes in the lower right hand corner. A trip to the stationery store enabled the examiners to compare the promissory note forms with the ones that had been cut. There was a revision date on the bottom of the forms and that date was after the date of the questioned promissory notes proving that the questioned signatures were not genuine. This could not have been discovered from the copies.

The biggest problem with working with copies is that it is not always possible to see alterations on the documents. Cut and paste documents can be created with no evidence of manipulation of the documents.

Documents that are altered by hand usually can be identified as such. When a signature is cut and pasted by hand, it is very difficult to align the signature block properly and careful measurements will show misalignment horizontally and/or vertically. In addition, there may be shadow marks along the signature block. If the perpetrator whites out the shadow line and recopies the document, there may be a cluster of trash marks along the signature block. Trash marks are marks left on a photocopy because the glass on the copier may be dirty or the drum is damaged. There may also be different generations of copies between the signature block and the rest of the document. This also can be observed on electronic cut and pasted documents.
Figure 2 is a Last Will and Testament submitted for probate. The signatures of the testator and the witnesses are a different generation than the rest of the document. The witness signatures contained jagged edges were of different generations.

Handle original documents carefully. They should be kept in a secure environment such as a fireproof safe or file cabinet. Scan originals into the computer and work from the computer so that original documents are not damaged. Just handling documents damages them. Photograph the signatures or other handwriting on the document so that the handwriting can be enlarged on the computer without pixilating. Keep a record of all the documents that you examine.

It is not a good idea to write anything on the original documents. In the past, document examiners would mark documents with their initials and the date they examined the documents. This practice should be discouraged. Make notes that will enable you to recognize original documents that you have examined.

Whenever working with photocopies, always asked in writing to see the original documents. Add a sentence to your letter of opinion that says. “I would like to review the original questioned documents. However, based upon the quality of the documents that you have provided, the lack of originals does not materially affect my analysis.” You may need to prove your request in cross-examination.

Bibliography
By Bryan Found, PhD. and Doug Rogers, PhD and Allan Herkt.

The Death of Cursive Writing

A Research Project by Dr. Raymond K. Berweger

Objective: To determine the handwriting characteristics of today's high school students.

Introduction

Cursive handwriting has been declining in not only student use but also in formalized instruction. In New York City, public schools have not taught penmanship for many years.

Methodology

A total of 122 high school students were asked to write the following sentence: "The quick brown fox jumped over the lazy dog". They were also told to write their numbers 0 - 9; on the face of an index card. They were not told to use cursive or print. It was their choice. On the back of the index card they were also asked the following: their age, if they went to public or private elementary school, and finally if they were taught penmanship at that school.

The following chart summarizes the results:

<table>
<thead>
<tr>
<th></th>
<th>PUBLIC</th>
<th>PRIVATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Students</td>
<td>16</td>
<td>106</td>
</tr>
<tr>
<td>Taught Penmanship</td>
<td>7</td>
<td>104</td>
</tr>
<tr>
<td>Not Taught Penmanship</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Preferred Print</td>
<td>12</td>
<td>54</td>
</tr>
<tr>
<td>Preferred Cursive</td>
<td>4</td>
<td>52</td>
</tr>
</tbody>
</table>

Results

All of the students were able to use cursive as their method of handwriting. This study did not determine how those who weren't taught penmanship learned to write.

Of interest is that only about half of the public school students (47%) were given penmanship lessons, almost all of the private school students (98%) were instructed. As to their individual choice of writing style, the public school students preferred printing 3:1 compared to the private school students that were split almost evenly 51%: 49%.

Review of Literature

Kuhl and Dewitz in their study: "The Effect of Handwriting Style on Alphabet Recognition", argue that handwriting style has a significant effect on letter recognition. They found a possible problem with use of the D'Nealian alphabet in that it causes more confusion than traditional manuscript and interferes with the ability to read traditional print. Compare these findings with Christensens' "The Critical Role Handwriting Plays in Ability to Produce High Quality Written
The Death of Cursive Writing

Text", where she states that the de-emphasis on basic skills and that "spelling, grammar, and handwriting has been replaced by an emphasis on personal communication”. This point was expanded upon with the statement "in regard to word-processing had led some educators to argue that there is no longer any need to teach low-level skills such as handwriting". Michael Hairston, president of the Fairfax Education Association, the largest teachers union in the country, called cursive "a dying art". "Cursive writing is a traditional skill that has been replaced with technology". "Common Core State Standards allow communities and teachers to make decisions at the local level about how to teach reading and writing, so they can teach cursive if they think it's what their students need”, said Kate Dando, a spokeswoman for the Council of Chief State School Officers.

So, the handwriting argument is becoming moot. Slowly our countries high school graduates will not be able to write nor read cursive. Everything will be word processed, both the writing and reading.

Conclusion

The dire predictions of modern educators seem to be at odds with the realities of current students. Even though some were not taught penmanship all 122 of the subject students learned cursive. All were able to copy the sentence illustrated and they wrote in cursive. But, the preferred method of handwriting was printing.

Special thanks to Ms. Andria Lombardi, history teacher at St. Jean the Baptist High School, New York City, for asking her students to cooperate in this study.

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The Washington Post (November 12, 2014); “Cursive handwriting is disappearing from public schools.” T. Rees Shapiro, education reporter

Dr. Raymond K. Berweger is a recent graduate of the Forensic Document Examination Interactive Training Program. His teacher was Debra Dunlap, CFDE. He is a member of the International Association of Document Examiners. His email address is rberweger@gmail.com.
Accidentals

By Marcela Word, CFDE

There are occurrences in writing that may have little or no reasonable explanation. These mishaps can occur in any writing, including genuine writings. Definition: Accidentals are isolated, brief, or temporary digressions from normal writing practices.

According to Roy Huber and A. M. Headrick, these accidentals are rarely noted or observed in writing standards. Some examiners have been known to refer to accidental occurrences as accidental characteristics. This is, of course a self-contradiction, for their occurrence is not likely to be repeated in a similar fashion, therefore, it is not representative or characteristic of any aspect of the writing. They may be unusual forms or movements, breaks in the writing line, even the doubling of some letters or parts of letters. They are more often minor in nature, infrequent, and of insufficient concern to the writer to warrant attention or correction. They are, frequently, completely erratic movements and may reflect a momentary interruption in neuromuscular coordination. Thus, accidental occurrences are best described as brief, temporary digressions from normal writing practices.

The answer may rest in the opportunities the questioned writing provides for the occurrence to repeat itself. If opportunities are present and the occurrence is not repeated, the occurrence may be considered to be an accidental. If opportunities are present and the occurrence is repeated, it must be considered to be behaving as a writing habit, and thus, constitutes a dissimilarity. Obviously, the resolution of the question, will hinge largely on the nature and extent of the questioned writing, in which the discrepancy occurs\(^1\).

Accidentals also occur in handwriting as the result of an unusual situation. The writer’s arm may have been bumped while signing his or her name. The writer may have hit a rough spot on the writing surface. Startling the writer could cause the occurrence of an atypical stroke of writing. Because of the transitory nature of an accidental, it will not be repeated in the handwriting.\(^2\)

Accidentals occur when there is a physical jarring or movement that displaces the directional movement of the pen, when a writer changes intent during the forming of a letter and alters the letter form, when the pen outpaces the thinking, and when attention is momentarily diverted from the writing, causing the writer to omit a letter or word or unwittingly add extra letters or words. When the writer notices the mistake, the error may be corrected by overwriting or insertion of omitted letters or words or crossing out extra words. The complex qualities discussed above can be discovered and evaluated only if the continuous writing and the movement of the writing are examined (Figure 1).\(^3\)

Some document examiners attribute differences to accidentals when they are trying to prove that a signature is genuine. According to Ordway Hilton, “An accidental or rare variation…. occurs like once in 100 to 200 specimens.”\(^4\)
Accidentals

Figure 1: The distorted “p” in the first signature is an accidental because it is a single occurrence and such cannot be classed as a basic structure or habit of the writer.

Figure 1: The upward stroke of the letter “z” extending upward is an accidental because it is a single occurrence and such cannot be classed as a basic structure or habit of the writer.\(^5\)
End Notes
5. Word, Marcela, CFDE.

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