

Disguised Signatures: Random or Repetitious?

Marie E. Durina

Forensic Document Examiner, San Diego Sheriff's Crime Laboratory
5255 Mt. Etna Drive, San Diego, CA 92117

In an effort to determine if people use the same disguise repeatedly, 62 writers at the San Diego Sheriff's Crime Laboratory participated in a study and were asked to provide both a natural and a disguised signature on specimen checks. Approximately 1 month later, they were again asked to provide a disguised signature on another specimen check. In addition to documenting methods of disguise used, this study focused on determining whether people tend to disguise their signatures in the same manner each time. Results showed that approximately 89% of the participants disguised their signatures in the same way on each occasion. It is believed that information from this study will prove useful in cases where forensic document examiners encounter multiple cases involving repeated disguise of an individual's signature.

Introduction

The San Diego Sheriff's Crime Laboratory's Questioned Documents Section receives approximately 250 handwriting cases per year. Approximately 85% of these cases involve the examination of signatures. Many of these signatures are endorsements for payments on government warrants where the payee has denied that the endorsement signature is his or hers. In cases where the payee can be eliminated as the writer of the endorsement, a 2nd warrant is issued to the payee to replace the first; therefore, the motive for financial gain can be strong. The possibility of disguise in this type of case must always be considered. The purpose of this research was two-fold: to identify the strategies used by writers to disguise their signatures, and to determine whether writers use the same strategy to disguise their signatures each time.

Handwriting is disguised for the purpose of masking identity. Hilton (1993) defined disguised handwriting as "a deliberate attempt to remove or to modify all or some of his normal writing habits." Signatures represent only a small sample of handwriting, thus there is a stronger likelihood that disguise may go undetected. There are several strategies a writer may adopt for the purpose of disguising his or her handwriting. Some of the strategies employed may include: change in letter formation, change or variation in slant, use of

printed forms rather than cursive, embellishment of letters, abnormally wide or narrow spacing, change in size, change in speed, change in height ratios, writing with the unaccustomed hand, or any combination of these strategies.

Often, a large part of the signature will not be affected, with only the capital letters modified. Osborn (1929) contends there are 4 changes to writing that are popular as disguise strategies: a change in slant, a change in size, a change in style (usually from block to cursive), and the invention of unusual letter forms. He implies this is due to the difficulty people have in recognizing and changing the general habits of their natural writing.

Most studies dealing with the subject of disguised signature analysis were limited to reporting the percentage of methods for disguise used by writers (Alford, 1970; Michel, 1978; Herkt, 1986; Mohammed, 1993). Michel determined there were no relevant differences between a disguised signature written firsthand and a disguised signature written after practice. However, Michel did not directly address the issue of whether people who disguise their signatures were consistent in the manner they disguised them each time. Furthermore, it appears that scant research has been done to determine whether writers who disguise their signatures do so using the same method or strategy for disguise each time. Reporting on a single-writer case, Parker (1978) found

that one individual's chosen method of disguise tended to be consistent from 1 incident to the next. A more recent study (Vargas, 2003) sought to determine whether writers who disguised their writing resorted to the same mode of disguise at a later time. The results showed that the 7 participants in the study did tend to disguise their signatures in the same way on each separate occasion.

Disguise in handwriting is one of the most intriguing, and sometimes most frustrating, aspects of questioned document examination. Unfortunately, use of disguise by a writer can often result in an inconclusive opinion, especially when there is only a small sample to examine, as in a signature. In an attempt to shed further light on this subject, this paper will discuss the results of a study of signatures, both natural and disguised, that were collected from 62 writers.

Methods and Materials

Sixty-two individuals participated in this study, ranging from 21 to 76 years of age. Thirty-seven of the participants are female, and 25 are male. Educational levels ranged from "some high school" to "graduate level and above." The majority, 45 persons (74%) possessed at least a 4-year college degree; 29 (about 47%) possessed a bachelor's degree, while 16 (about 26%) had levels of education of graduate school or above. A total of 14 participants (23%) possessed "some college" education, 2 (about 3%) were high school graduates, and only 1 participant (less than 2%) listed "some high school" education (no high school diploma). All subjects were employed at the San Diego Sheriff's Crime Laboratory at the time the study was conducted. None of these individuals had any known physical conditions that would render him or her incapable of participating in the study. Specimens were written during normal working hours, and no participants were impaired by drugs or alcohol at the time the specimens were collected.

The study was conducted in 2 parts. In the 1st segment, the participants were provided with a 3-page document. The 1st page consisted of a brief questionnaire requesting information regarding gender, age group, and education level. Handedness (right or left) was subsequently determined via an e-mail question and response. A 2nd page of the initial questionnaire consisted of a specimen check "drawn on your account in the amount of \$100.00." The participant was instructed to,

"Sign your normal signature on the check using your own handwriting." A 3rd page consisted of another specimen check, identical in appearance to the 1st check. Each participant was instructed to, "Sign your name as if you plan to deny later that you were the one who signed it. You should try to disguise your writing."

Approximately 1 month later, a 4th page was distributed. This page consisted of another specimen check identical to the 2 checks distributed in the 1st segment of the study. Each participant was (once again) instructed to, "Sign your name as if you plan to deny later that you were the one who signed it. You should try to disguise your writing." The decision to use the signing of a check was made in the belief that it represented a more realistic and motivating scenario, rather than simply asking the participants to provide the author with disguised signatures.

A total of 75 questionnaire packets were distributed initially, and 62 persons responded to this initial call for completed questionnaire packets. Of these 62 persons, all of them responded to the secondary request for a disguised signature (on the 3rd specimen check). The participants were never given instructions as to which writing style (i.e., print or cursive) to use. Participation in the experiment was voluntary, and there was no compensation involved.

Specimens from the initial questionnaire packet were distributed and collected from the participants on February 6, 2004. The signatures on the 1st checks were filed as "natural known signatures," while the signatures on the 2nd checks were filed as "disguised known signatures." On March 8, 2004, a 3rd specimen check (which was the 2nd check to be signed with a "disguised signature") was distributed and then collected from the participants. These specimens were filed as "questioned signatures."

With the aid of 2 forensic document examiners in the San Diego Sheriff's Crime Laboratory, examination and comparison of the signatures commenced on March 12, 2004. The questioned signatures were first compared to the natural known signatures, then to the disguised known signatures. Techniques noted during observation and examination of the signatures included: slant, letter formation of capital and lower case letters, speed, size, height and length ratios, use of space, alignment, use of special characters, and writing with the unaccustomed hand (which, when suspected, was noted and later confirmed by the writers in post-study interviews). After observations

were noted, the disguised signatures were placed into 1 of the following 3 categories ranking effectiveness of disguise: **highly effective disguise** was defined as a disguise which could result in the opinion of either elimination, highly probably did not write, or probably did not write; **moderately effective disguise** was defined as a disguise that could result in the opinion of either indications did write, indications did not write, or inconclusive; and **ineffective disguise** was defined as a disguise that could result in the opinion of either identification, highly probable that they wrote it, or probably did write. After these preliminary examinations were performed, further observations were made concerning gender, handedness, and education levels based on information listed in each writer's questionnaire. Finally, each writer's disguised known signatures and the questioned signatures were compared to determine similarities or differences in methods of disguise used each time. The author and the laboratory's 2 forensic document examiners conducted their

examinations independently, compared their results, and came to a consensus on their findings as to the methods of disguise that were used. After the study was completed, methods of disguise used were confirmed verbally with the writers. All methods of disguise were found to have been classified accurately by the examiners.

Results

In this study, strategies chosen for methods of disguise were found to be: change in speed used by 64% of the writers (Figures 1a,b,c), change of letter formation or design used by 52% (Figures 2a,b,c), change of slant used by 41% (Figures 3a,b,c), use of the unaccustomed hand by 21% (Figures 4a,b,c), change of size used by 16% (Figures 5a,b,c), and change of style from cursive to printing used by 8% (Figures 6a,b,c). Some writers combined several of these methods, while others chose only 1 method to disguise their writing. Very few writers changed their disguise strategy each time (Figures 7a,b,c).

Natural Known Signature (1a)

A cursive signature, likely 'George R. Peña', written in dark ink on a light background. The signature is fluid and connected, with a horizontal line underneath.

Disguised Known Signature (1b)

A cursive signature, likely 'George R. Peña', written in dark ink on a light background. The signature is fluid and connected, with a horizontal line underneath.

Disguised Known Signature (1c)

A cursive signature, likely 'George R. Peña', written in dark ink on a light background. The signature is fluid and connected, with a horizontal line underneath.

Figures 1a,b,c. Jorge chose to write more slowly and changed his letter formation. His 2 disguises are very similar in appearance.

Natural Known Signature (2a)

A handwritten signature in cursive script that reads "Henry D Berry". The letters are fluid and connected, with a prominent "black J" or "black W" style for the uppercase "H".

Disguised Known Signature (2b)

A handwritten signature in cursive script that reads "Henry D Berry". The slant of the letters is different from the natural signature, and the uppercase "H" is written with a different formation.

Disguised Known Signature (2c)

A handwritten signature in cursive script that reads "Henry D Berry". The slant of the letters is different from the natural signature, and the uppercase "H" is written with a different formation.

Figures 2a,b,c. Henry changed the formation of some letters. Note the use of a version of the "black J" or "black W," used here with the uppercase "H."

Natural Known Signature (3a)

A handwritten signature in cursive script that reads "Celia L Lukomski". The letters are fluid and connected, with a prominent "black J" or "black W" style for the uppercase "C".

Disguised Known Signature (3b)

A handwritten signature in cursive script that reads "Celia L Lukomski". The slant of the letters is different from the natural signature, and the uppercase "C" is written with a different formation.

Disguised Known Signature (3c)

A handwritten signature in cursive script that reads "Celia L Lukomski". The slant of the letters is different from the natural signature, and the uppercase "C" is written with a different formation.

Figures 3a,b,c. Celia chose to change the slant in her writing. The disguises are similar to one another.

Natural Known Signature (4a)

A cursive signature "Heather L. Debevec" written in black ink on a light blue background.

Disguised Known Signature (4b)

A cursive signature "Heather L. Debevec" written in black ink on a light blue background, written with the left hand.

Disguised Known Signature (4c)

A cursive signature "Heather L. Debevec" written in black ink on a light blue background, written with the right hand.

Figures 4a,b,c. Heather is a sinistral writer, and wrote the 1st disguised signature with her left hand. Despite a change in strategy by writing the 2nd disguise with her right (unaccustomed) hand, the 2 disguised signatures are remarkably similar.

Natural Known Signature (5a)

A cursive signature "Richard Legler" written in black ink on a light blue background.

Disguised Known Signature (5b)

A cursive signature "Richard Legler" written in black ink on a light blue background, written smaller than the natural signature.

Disguised Known Signature (5c)

A cursive signature "Richard Legler" written in black ink on a light blue background, written smaller than the natural signature.

Figures 5a,b,c. Richard changed the size of his natural signature, choosing to write smaller. Both times, the end result is the same.

Natural Known Signature (6a)

A handwritten signature in a cursive style, appearing to read 'Melinda Marks', written on a horizontal line.

Disguised Known Signature (6b)

A handwritten signature in a cursive style, appearing to read 'Melinda Marks', written on a horizontal line.

Disguised Known Signature (6c)

A handwritten signature in a cursive style, appearing to read 'Melinda Marks', written on a horizontal line.

Figure 6a,b,c. Melinda's natural style is a printed signature. To disguise her writing, she changed to a cursive style on both occasions.

Natural Known Signature (7a)

A handwritten signature in a cursive style, appearing to read 'Alicia Carloger', written on a horizontal line.

Disguised Known Signature (7b)

A handwritten signature in a cursive style, appearing to read 'Alicia Carloger', written on a horizontal line.

Disguised Known Signature (7c)

A handwritten signature in a cursive style, appearing to read 'Alicia Carloger', written on a horizontal line.

Figure 7a,b,c. Alicia is left-handed, and 1 of the few writers in the study who submitted 2 disguises that differed in appearance. The 1st disguise was written rapidly with her right (unaccustomed) hand, and the 2nd disguise was written more slowly with her left hand, while changing slant and letter formation.

With regard to gender, a noteworthy observation was that 13 of the 25 male writers (or 52%) chose only a single method of disguise in their writing each time, while 15 of the 37 females (or 40%) chose only a single method of disguise. It did not appear that gender influenced the mode of disguise used or the overall effectiveness of the disguise.

Eight of the writers in the study are sinistral (left-handed), which equates to 13% of the total number of participants in the study. It is interesting to note that the national average for sinistrality has been reported to be 11% (Huber, 1999). Handedness, however, does not appear to affect either the choice of method for disguise or the effectiveness of the disguise. One observation, although unrelated to the purpose of the study, was that 4 of the 8 sinistral writers, when asked to provide the 2nd disguised signature (the questioned), responded to the author with an inquiry as to whether they "did something wrong." This comment was made only by left-handed writers.

With regard to education, it did not appear that the level of education had an effect on the choice of method(s) used for disguise or the effectiveness of disguise. In fact, the writer with the lowest level of education was able to produce a disguised signature that fell into the category of highly effective disguise.

With regard to ranking the effectiveness of the disguise used, the following results were obtained: 22 writers (35%) accomplished **highly effective disguise**; 15 writers (24%) accomplished **moderately effective disguise**; and 25 writers (40%) used disguises that were classified as **ineffective**.

Only 5 participants (8%) in this study produced a disguised signature different in appearance the 2nd time around. Of these 5, one of the more successfully disguised pairs of signatures was written by a sinistral writer. Additionally, for 2 other writers in the study (3%), the method of disguise chosen differed for the 2nd disguised signature (use of the unaccustomed hand combined with slant for one and change of style from cursive to printing combined with use of the unaccustomed hand for the other). For these 2 writers, the resulting disguised signatures were remarkably similar in appearance to the 1st disguised signature (in which only style was changed in one and only size and slant were changed in the other).

As for the remaining 89% of participants who chose the same method of disguise each time, all submitted a 2nd disguised signature bearing great similarity to the 1st disguised signature.

Discussion

This research was performed in the belief that knowledge gained from it could prove useful in cases where there are repeated instances of disguised signatures from the same payee on checks or warrants. In an attempt to have replacement checks issued to him or her, the payee repeatedly makes claims that the checks have been stolen and cashed by another person. It is recommended that signatures (both questioned and known) from prior cases be kept on file. If disguise can be determined in 1 case, that disguised signature could later be compared to others made by the same person in subsequent or related cases. This also raises a possibility of creating the additional category of "deliberately disguised handwriting" when obtaining requested specimens. Investigators are trained to monitor a subject from whom they are obtaining requested specimens, with a view toward deterring disguise in those specimens. According to Parker (1989), it is plausible to request "deliberately disguised writings" from a subject.

Conclusions

Disguise strategies for signatures still appear to be limited to a small number of methods—the most prevalent found in this study to be *change in writing speed*, followed by *change in letter design*, then *change in slant*, *use of the unaccustomed hand*, *change in size*, and finally *change in style (usually from cursive to printing)*. Gender, handedness, and education levels were found to have little impact on the methods chosen or on the effectiveness of disguise. Perhaps the most important finding of this study is the answer to the question, "Do people always disguise their signatures the same?" In this study, an overwhelming majority (89%) did disguise their signatures in the same way each time using the same strategy/strategies.

Acknowledgments

The author wishes to thank San Diego Sheriff's Department Crime Laboratory forensic document examiners Linton Mohammed and Max Stayrook for their guidance in the preparation of this paper, and the employees of the San Diego Sheriff's Department Crime Laboratory who donated their handwriting to make this study possible.

References

- Alford, E. (1970). Disguised Handwriting — A Statistical Survey of How Handwriting is Most Frequently Disguised. *Journal of the Forensic Sciences*, Vol. 15, pp. 476-488.
- Herkt, A. (1986). Signature Disguise or Signature Forgery? *Journal of the Forensic Science Society*, Vol. 26, pp. 257-266.
- Hilton, O. (1993). *Scientific Examination of Questioned Documents*. Revised edition, New York: Elsevier, pp. 168-169.
- Huber, R. A. and Headrick, A. M. (1999). *Handwriting Identification: Facts and Fundamentals*. New York: CAC Press, pp. 307.
- Michel, L. (1978). Disguised Signatures. *Journal of the Forensic Science Society*, Vol. 18, pp. 25-29.
- Mohammed, L. (1993). Signature Disguise in Trinidad and Tobago. *Journal of the Forensic Science Society*. Vol. 33, pp. 21-24.
- Osborn, A. S. (1929). *Questioned Documents*. Albany: Boyd Printing Co., pp. 407-408
- Parker, J. L. (1989). Repeated Disguise Beats the Clone Defense. Presented at the American Society of Questioned Document Examiners Annual Meeting, Crystal City, VA.
- Vargas, R. (2003). Do People Always Disguise Their Writing the Same? Presented at the American Society of Questioned Document Examiners Annual Meeting, Baltimore, MD.