J2   An Empirical Exploration of Handwriting Theory With Regard to Natural Variation

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Learning Overview: After attending this presentation, attendees will have a better understanding of natural variation in signatures and the methods used to define a writer's range of variation.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by providing information and new methods to quantify a writer's range of variation. The results of this study also provide statistical validation for the premise of natural variation.

Forensic handwriting identification is based on two universally accepted premises: no two people share the same combination of class and individual characteristics and no one person writes in the exact same way twice, which is referred to as natural variation. Statistical research has been conducted to validate the premise of individuality, but there is little published research to validate the premise of natural variation.

Slight differences or deviations found among repeated specimens of an individual's handwriting are referred to as natural variation and are expected in every person's writing. Variation is evaluated and determined by the Forensic Document Examiner (FDE) based upon training and experience and is used to decide if a new feature falls within a writer's range of variation. Some writers have a very small range of variation, seldom deviating from their habitual letter formations, spacing, relative heights, and speed. Conversely, others may possess a much wider range of variation incorporating numerous letter formations and features within their writing. Proper evaluation of variation is critical in an examination, as misinterpretation of a writer's range of variation may result in an erroneous conclusion. When little to no variation is present between two or more signatures, the genuineness or authenticity of the signatures is called into question.

The current study focused on 765 bank check signatures produced by a single writer over the course of 40 years. An American Board of Forensic Document Examiners (ABFDE) -certified forensic document examiner assessed the writer as possessing high skill and consistency. Manual comparison of the signatures to detect variation in handwriting features would be significantly time consuming, requiring more than 292,230 comparisons. Instead, a computational program was designed to conduct automated comparisons through pixel-by-pixel matching to quantify the percentage of overlap between each possible pairing of the 765 signatures. The signature comparison results provide preliminary data to support the premise that no one person writes the exact same way twice and strengthens the scientific basis for the validity of forensic handwriting examination. This study also demonstrates how a writer's range of variation can be measured and quantified.

Forensic Handwriting, Signatures, Variation

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