F30 Reliability, Validity, Accuracy, and Bias in Forensic Document Examination: Results From an Interdisciplinary Study of Questioned/Known Signature-Comparison Tasks

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After attending this presentation, attendees will understand some of the theoretical principles of cognitive psychology and how the application of psychological principles and research methods to the question of how Forensic Document Examiners (FDEs) reach conclusions provided important information about some of the cognitive and physiological aspects of the evaluation of signatures. This presentation discusses some of the relationships among signature type, signature complexity, and the deployment of attention in signature comparison tasks as they relate to process and authorship decisions in a sample of handwriting comparisons.

This presentation will impact the forensic science community by demonstrating the importance of engaging in theoretically based, multidisciplinary research to reach an understanding of the nature of the methodology and expertise in forensic document examination.

This presentation reports findings from a national study of forensic document examiners concerning the deployment of visual attention as it relates to signature type and complexity.

A substantial portion of FDE training is devoted to signature comparisons, handwriting, and hand printing. FDEs seek those features and characteristics which may represent the document's identifying attributes. Examiners first determine the presence or absence of features, and then qualitatively assign these features some degree of evidentiary weight to reach their decisions. Examiners are trained to look for both substantial similarities and differences among writing samples and for repeated small characteristics which may sufficiently establish that writings are clearly the work of two individuals even though they may contain many general similarities. The number and quality of these features allow FDEs to make assertions about the authorship of the specimen and the extent of their confidence in their decisions.[1]

Many current theories of attention propose that attention is based on the relationship between a bottom-up, saliency-based attentional system and a top-down, feature-specific selection mechanism. Attention is guided by relational information about the target or by information about how the irrelevant information of a non-target differs from the features of the target. Relational models of visual search demonstrate that visual attention can be guided by attending to specific feature values such as color, size, or intensity, by inhibiting attention to irrelevant features, or by directing attention to how stimuli differ. Relational models place the target in relation to its context, offering more specific (e.g., directional) information about differences.[2]

The features available for forensic evaluation are determined in part by the nature of the writing specimens. For example, compared to stylized or mixed signatures, text-based signatures may offer a greater variety of features for evaluation. Additionally, signatures vary in terms of their complexity (e.g., the number of turning points and crossing lines), their semantic content, and any number of additional features commonly recognized within the profession as indicators of the authenticity of the writing. Findings will be discussed in the context of Amos Tversky's "contrast model," which posits that most stimuli seem to be effectively described by the presence or absence of qualitative features. He and others argued that an object is represented by a set of features or attributes, and that judgments of similarity are achieved through a process of feature matching. The contrast model systematizes this "feature" approach and proposes that similarity depends on the proportion of features common to the two objects and also on their unique features.[3]

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References:

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Signature Comparison, Interdisciplinary Research, Reliability and Validity