J13   Semantic Content and Signature Process Identification in Single Signature Specimens

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After attending this presentation, attendees will gain knowledge about the relationship between the extent of semantic content contained in signature specimens and the use of those contextual cues in reaching conclusions about the process (e.g., natural writing vs. simulation) by which signatures are created.

This presentation will impact the forensic science community by illustrating the relationships among the semantic content of signature specimens and the use of visually available information in Forensic Document Examiner (FDE) decision making, and the importance of engaging in theoretically-based, multidisciplinary research to an understanding of the nature of the methodology and expertise in forensic document examination.

The field of forensic document examination consists of a variety of specialized tasks related to the history and preparation of questioned documents. According to Lindblom, the wide array of tasks performed by FDEs includes the ability to identify the source of handwriting and hand printing, distinguish among genuine, forged, traced, or disguised writing, to analyze inks, papers, and other substances related to documents, and other scientific or technical analyses requiring highly specialized skills.[1]

These skills include the ability to sort information according to whether or not it is diagnostically relevant in identifying or eliminating an individual as the writer of a specimen. However, this determination may be impacted by cognitive factors, such as the semantic content of the signature specimen, which may influence the deployment of the examiner's attentional resources. In his review of dozens of studies that assessed the existence and impact of confirmation bias, Nickerson highlighted two paths by which confirmation bias occurs: (1) the preferential treatment of evidence that supports existing beliefs; and, (2) the overweighting of positive confirmatory instances.[2] The preferential treatment of evidence that conforms to what an individual believes does not necessarily entail completely ignoring contrary information, but it has been empirically demonstrated that selective attention and selective information-seeking do occur. This suggests that the negative information is not ignored, *per se,* but is cognitively countered by means of finding information that either explains the discrepancy or invalidates it. In much the same way, the overweighting of positive confirmatory evidence may occur as a complementary process to the underweighting of disconfirmatory evidence. These findings suggest that the type of signature (e.g., text-based, mixed, or stylized) may produce different levels of bias, such that signatures which are generally more legible and thus high in the semantic content, may influence the outcome of an assessment of whether the signature in question is genuine, simulated, or disguised. Signatures that are high in semantic content may be approached in a more top-down manner, while those that are more stylized may be approached in a bottom-up fashion.

This presentation will discuss the influence of top-down vs. bottom-up processing by comparing process decisions for text-based vs. stylized single signature specimens.

Specifically, this paper discusses findings from a national study of FDEs (supported by Award No. 2010-DN-BX-K271, awarded by the National Institute of Justice, Office of Justice Programs, U.S. Department of Justice) concerning the application of cognitive theory to understanding the nature of attention, feature extraction and weighting, and decision-making in forensic document examination.

References:

1. Lindblom, B.S. (2006). A forensic document examiner's training. In J.S. Kelly and B.S. Lindblom (Eds.), Scientific Examination of Questioned Documents (2ed.). (Ch. 3, pp. 15-17).
2. Nickerson, R.S. (1998). Confirmation bias: A ubiquitous phenomenon in many guises. Review of General Psychology, 2, 175-220

Feature Matching, Attention, Handwriting