

## A43 A Hierarchy of Expert Performance as Applied to Forensic Anthropology

Stephanie Hartley, BA\*, Lafayette, LA 70508; Allysha P. Winburn, PhD, University of West Florida, Pensacola, FL 32514

**Learning Overview:** After attending this presentation, attendees will understand how a newly developed model organizes and frames research on forensic anthropology decision-making.

**Impact on the Forensic Science Community:** This presentation will impact the forensic science community by showcasing trends and gaps in anthropological research regarding the reliability (i.e., consistency and repeatability of decisions) and biasability (i.e., effects of irrelevant information) of analyses.

Forensic scientists historically pride themselves on their objectivity, focusing primarily on objects of research while deprioritizing human observer effects on the decision-making process. In forensic anthropology, reliability is often seen as a methodological rather than an observer characteristic, and error studies usually focus on the reliability of a particular method, rather than investigating how reliable forensic anthropologists are at using a particular method. To better understand the latter, one must first understand human cognition. The human brain relies on shortcutting techniques (e.g., categorical perception) in order to process large amounts of information. These shortcuts, while enabling effective information gathering and organization, can also introduce cognitive biases—systematic distortions of the world observed.

To organize knowledge of observer effects in a particular discipline, researchers can utilize the Hierarchy of Expert Performance (HEP), an eight-level model examining intra- and inter-observer reliability and biasability.<sup>1</sup> The first four levels of the HEP focus on the observations made by experts and the last four focus on the interpreted conclusions based on those observations. As the HEP has not yet been applied to forensic anthropology, an extensive review of the anthropological literature was conducted with the goal of creating the first forensic anthropology-specific HEP. Papers from the *American Journal of Physical Anthropology*, *Forensic Anthropology*, *Forensic Science International*, and *Journal of Forensic Sciences* ( $n=3,000$ ) and Anthropology Section abstracts published in the *Proceedings* of the annual meetings of the AAFS ( $n=1,985$ ) that matched the keywords “forensic anthropology,” “bias,” “reliability,” “cognition,” “cognitive,” or “error” were reviewed for their relevancy to the HEP. The systematic literature review was further augmented by reviewing other relevant manuscripts, academic journal articles, and edited-volume chapters (e.g., articles dealing with cognition, bias, and reliability).

The resulting forensic anthropology HEP showcases areas of strength and weakness within the landscape of anthropology research. The literature review identified many forensic anthropological publications (some matching multiple levels and therefore counted multiple times) that aimed to understand the reliability of observations and conclusions ( $n=461$ ). For example, many anthropologists conducted intra- and inter-observer error studies as a part of their overall research design ( $n=290$ ) or analyzed the reliability of observer conclusions ( $n=171$ ). In contrast, the comprehensive literature review revealed few studies that dealt specifically with the biasability of forensic anthropological observations or conclusions ( $n=20$ ). Notably, while several studies demonstrated the effect of extraneous information on anthropological morphological assessments, there was no research into these effects on anthropological metric assessments.<sup>2-4</sup> Also, the majority of research regarding biasability dealt with extraneous contextual information rather than extraneous personal information (e.g., mood, stress, and motivation).<sup>4</sup>

These results indicate areas for future forensic anthropology research—into the bias-related HEP levels in general and the biasability of metric analyses in particular. Together with the ample data on the reliability of forensic anthropology methods, these results showcase the strengths and highlight the shortcomings in current forensic anthropological research on reliability and biasability. As it continues to be populated with data, the discipline-specific HEP will influence the field’s approaches to recognizing and mitigating cognitive biases in our observations and conclusions.

### Reference(s):

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2. Nakhaeizadeh S., I. Hanson, and N. Dozzi. The Power of Contextual Effects in Forensic Anthropology: A Study of Biasability in the Visual Interpretations of Trauma Analysis on Skeletal Remains. *Journal of Forensic Sciences* 59, no. 5 (2014): 1177-1183.
3. Nakhaeizadeh S., I.E. Dror, and R.M. Morgan. Cognitive Bias in Forensic Anthropology: Visual Assessment of Skeletal Remains is Susceptible to Confirmation Bias. *Science and Justice* 54 (2014): 208-214.
4. Sauerwein, K., X. Zhu, and D. Steadman. Perceptions and Cognitive Bias in Decomposition Scoring Methods in Forensic Anthropology. *Proceedings of the American Academy of Forensic Sciences, 71<sup>st</sup> Annual Scientific Meeting, Baltimore, MD. 2019. A84, p. 131.*

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### Biasability, Reliability, Forensic Anthropology