A84 Perceptions and Cognitive Bias in Decomposition Scoring Methods in Forensic Anthropology

Kelly Sauerwein, PhD, University of Tennessee, Knoxville, TN 37996; Xiaojuan Zhu, University of Tennessee, Knoxville, Knoxville, TN 37996; Dawnie W. Steadman, PhD, University of Tennessee, Knoxville, TN 37996*

Learning Overview: After attending this presentation, attendees will better understand how cognitive biases may impact the interpretation of human remains and the decision-making process involved when using the Total Body Score (TBS) method.[1]

Impact on the Forensic Science Community: This presentation will impact the forensic science community by illustrating the gaps in our understanding of bias in an oft-utilized method that is underrepresented in previous studies of bias in forensic anthropology.

Since *Daubert* and the 2009 National Academy of Sciences (NAS) Report, there has been increasing recognition within the forensic science community that human examiners are prone to biases that may affect the accuracy and precision of conclusions.[2] The analysis of decomposition to estimate the Postmortem Interval (PMI) is one of the important functions of forensic anthropologists; yet, analytical methods that rely on the judgment of human observers, such as assessing PMI from decomposition, may be vulnerable to cognitive bias, leading to inaccurate results. To date, there is a lack of research examining the effects of cognitive bias on decomposition scoring methods and on what specific cognitive factors are most predictive of the decision-making process. Therefore, the goal of this project is to understand how bias might impact TBS values and the role played by cognitive factors, such as the examiners' mood and motivations, on the analysis of decomposition characteristics in the field.

Two experimental trials were conducted whereby the TBSs of four experts with extensive knowledge and experience with the human decomposition process were compared with those of 50 inexperienced undergraduate observers. Each group scored ten donated individuals daily between October 2016 and April 2017 at the University of Tennessee, Knoxville's Anthropology Research Facility. Observers also completed two psychological measures designed to assess their motivations (Intrinsic Motivation Inventory) and mood (Positive and Negative Affect Schedule) after each scoring session.[3,4] Hierarchical random intercept multiple regression models were conducted to assess the relationship between experts' and observers' TBS values as well as the cognitive measures and observers' TBS scores. These models revealed significant differences in TBS values between observers and experts in both trials ($p<0.05$ in both trials). However, the directionality of the difference depended on the unique contextual information present in each trial. These hierarchical models were also utilized to assess which cognitive factors, if any, might be predictive of observers' TBS values. Overall, observers' scores were predicted by different factors in each trial. In Trial 1, how nervous observers felt while scoring ($p<0.0001$), how much they enjoyed scoring ($p<0.05$), and negative mood ($p<0.05$) were all predictive of TBS. However, in Trial 2, only observers' perceived scoring ability (i.e., competence; $p<0.001$) was a significant predictor, due to observers' previous experiences in Trial 1.

Overall, results indicated that bias does exist within the TBS method, with scores depending on the specific contextual information available at the scene as well as the experience and motivations of the observer. This study builds upon previous research examining bias within biological profile methods in forensic anthropology, and it has the potential to impact standard protocols when utilizing the TBS method during longitudinal decomposition research conducted at outdoor decomposition facilities.

Reference(s):

1. Megyesi M.S., Haskell N.H., Nawrocki S.P. Using Accumulated Degree Days to Estimate the Postmortem Interval From Decomposed Human Remains. *J Forensic Sci.* 2005;50(3):1-9.
2. National Academy of Science. *Strengthening Forensic Science in the United States: A Path Forward.* Washington DC: National Academies Press 2009.
3. Ryan R.M., Mims V., Koestner R. Relation of Reward Contingency and Interpersonal Context to Intrinsic Motivation: A Review and Test Using Cognitive Evaluation Theory. *J Pers Soc Psychol.* 1983;45:736-750.
4. Watson D., Clark L.A., Tellegen A. Development and Validation of Brief Measures of Positive and Negative Affect: The PANAS Scales. *J Pers Soc Psychol.* 1988;54:1063-1070.

Bias, Human Decomposition, Total Body Score