Research into contextual influences and forensic decision making: A Response

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The letter [1] regarding our paper 'Cascading bias of initial exposure to information at the crime scene to the subsequent evaluation of skeletal remains' [2] raises concerns that go beyond the specifics of the method employed in the research and the conclusions drawn. It touches upon some broader and basic issues about doing research that addresses forensic decision making. We start by briefly addressing the broader issues, before addressing the specific aim, method and conclusions presented in the study in question [2].

Research that addresses forensic decision making

Doing research that addresses expert decision making is always a challenge. This is not unique to forensic science, but it is an issue addressed in the vast literature on this topic in the fields of aviation, healthcare, finance, and other expert domains. Research should examine expert decision making in the most ecologically valid way possible. However, there are intrinsic trade-offs between different experimental factors, each offering unique insights along with inherent limitation. Therefore, it is important to have different research studies, each with their own strengths and weaknesses, so that together the findings can offer a better understanding of decision making in forensic reconstruction. Furthermore, it is important to evaluate each research study based on how the method fits its specific aims, scope and conclusions.

It can be observed that the issue of contextual influence on decision making is such a sensitive topic that rather than examining the possible contribution of each study (while acknowledging its weaknesses), some in the forensic community respond in a defensive manner whenever the potential of context influencing decision making is discussed (e.g., Butt [3] and Leadbetter [4]). Such a response has been attributed to the existence of the 'bias blind spot' [5,6], and it can be argued that it is this genre of response that undermines and "question[s] the professional capabilities of a forensic discipline" [1], not our study [2].

Any research in forensic decision making needs to balance various experimental factors. For each factor, there are advantages and limitations that need to be acknowledged. For example:

1. Who are the researchers? On the one hand, it is valuable to have forensic experts doing this type of research because they have insights into the specifics of their domain. However, on the other hand, there can be pressure to show there is no bias in the decision making (not only because they may have a 'bias blind spot' but also because they do not want the findings used to undermine their profession in general, as well as their specific testimony in court).
2. Do the participants know they are being tested? Data collection where participants do not know they are being tested is valuable because it better reflects what is actually done in casework. Conversely, it is often not possible to do many types of experiments without the participants knowing they are participating in a study.

There are of course many other factors in addition to these. The point is that every research study uses certain methods, participants, variables, etc., and these do not necessarily reflect "fundamental methodological flaws" [1], but rather they are research factors that frame the contribution and limitations of the research findings. Each research study needs to be examined based on the specific aims and contributions it offers (alongside its limitations, which all research has), and most importantly in its evaluation of the actual conclusions of the research.

The potential effects of initial exposure to context at a crime scene on decision making

The specific aim of our study, as we clearly stated, was to "further examine the extent to which contextual biases are present within forensic anthropological methods" [2; 404], and we were clear in our paper that the focus and scope of our study was on the potential effects of initial exposure to context at a crime scene on judgment and decision-making, and the subsequent evaluation of skeletal remains. The study therefore examined the impact of context on the process within which methods are routinely employed, rather than the expertise of the participants. We also very clearly stated the background of the participants who took part in the study (trained in the relevant methods but not currently working as experts), in order to show that they have the knowledge to conduct the methods, and throughout the paper we clearly state the findings were "..based upon a mock crime scene, with a limited sample size (due to participant availability), with nonworking experts within the field of forensic anthropology." [2; 408]. Thus, the aim of our study, as we stated in the paper [2], was not to examine if doing actual casework attenuates the impact of context. Indeed, "a recent empirical study with experts in crime scene investigation showed that prior information did effect experienced crime scene investigators [7]."[2; 409]. This is clearly an important topic for future research, but was not our research question, or within the aims of our study.

We also clearly outlined in our paper that there are findings in the previously published literature where experts have been shown to have a superior performance to novices. However, this literature also specifically states that there are "…cognitive vulnerabilities inherent in expertise due to the mechanisms of the brain for storing and processing information [8-10]" [2; 408]. Indeed, there is published research showing that experts "interpreted the crime scene differently dependent on the prior information that the examiners obtained [7]" [2; 409]. It is for this reason that we suggested in the paper that "a valuable comparable study would be to see whether similar effects [to those observed in our study] could be found amongst working professional anthropologists" [2; 409].

Many of the visual methods used in forensic anthropology acknowledge their subjective nature, and general reliance upon observation and the specialised experience of the observer (e.g. Grivas and Komar [11]). It is important to note that contrary to the letter [1] that indicates that experience and practicing experts are immune to bias, a recent study by Hederstierna-Jonson et al. [12] shows that sex estimation of human remains appeared to be influenced by items associated with the remains ('warrior equipment') and prior understandings of the cultural traditions of that time period. The authors of that study go as far to conclude that their findings signal that "great caution against sweeping interpretations based on archaeological context and preconceptions" ([12]: 858) should be

taken. Hence, our study is consistent with, and complements, other studies that do use experts, to give a better understanding of the weaknesses and vulnerability to context in decision-making.

Furthermore, in addition to ignoring the published studies that show the impact of context on practicing experts with experience, the letter [1] misconstrues the aim of our study [2] and the conclusions it infers. Our study specifically addressed the effect of initial exposure to context at the crime scene to the subsequent evaluation of skeletal remains, and was not about the practitioners of those methods. Given the previously published findings presented in the literature concerning expert practitioners, we believe it was relevant and important to draw attention to the potential impact that extraneous information may have at a subsequent stage of the forensic reconstruction process.

The main conclusion in our paper [2] is that it is important to acknowledge, as the authors of the letter state, "the importance of bias and the necessity for ongoing research in this domain" [1;1]. We acknowledge that some practitioners within the profession will have an "awareness of the risk of cognitive bias" [1;1], but as many studies in the published literature have demonstrated, "human decision-making (particularly in the difficult and ambiguous cases) is vulnerable to unconscious context effects [and] the discipline of forensic anthropology is not an exception" [2;409]. Decision making is a universal and inherent part of the forensic reconstruction process across every forensic domain [14].

We believe that "embracing a constructive discussion about the role of human decision-making in the forensic sciences, and fostering a transparent and sustainable culture of context management based upon empirical findings will allow the forensic anthropology community (as well as other forensic disciplines) to openly explore decision-making within the forensic process, defining where issues exist, and finding ways in which decision-making processes can be enhanced to ensure the delivery of robust transparent forensic reconstruction approaches" [2; 409].

The Letter [1], unfortunately, moves the discussion about the impact of context on decision making in the reconstruction process to where it was a decade ago, when responses were often a denial of the influence of context (e.g., Leadbetter [4], Wells [15]). It is encouraging that, for the most part, the forensic community has moved forward significantly in this time, and that steps are being taken to deal with and minimize the impact of context on decision-making in forensic reconstruction (e.g., UK Forensic Science Regulator 2015 Guidance on "Cognitive Bias"[16]; the US National Commission on Forensic Science 2015 document "Ensuring that forensic analysis is based upon task-relevant information" [17]).

In summary, we clearly stated the aims of our study and the background of the participants [2]. We set those findings within the context of the previously published studies that focussed on practicing experts in the forensic domain. The issues of unconscious influences on decision-making, especially under conditions of uncertainty, need to be acknowledged and require continued discussion. This will enable the development of approaches that ensure that potential context effects are acknowledged and the way findings are presented to investigators or the courts incorporate this clearly and transparently.

We do not accept that these results question the "professional capabilities of a forensic discipline" [1;2]. Our results indicate that, as with many other fields, there is a risk that context can influence the decision-making process at an 'unconscious' level, and it is important that this is recognized and addressed. One way of doing this will be by undertaking further empirical studies that can increase our understanding of how (and to what extent) context affects the human role at the different stages of the forensic science process.

We do not accept that unconscious context effects can be removed entirely from the decision-making process, nor that experts are immune to it [18], or that awareness by itself (without taking actual measures) is a solution to the problem. There is a broad range of published literature that spans many domains, from expert practicing judges [19,20] to expert practicing medical doctors [21] (including scientific research itself e.g., [22]) that indicates the power of bias and contextual influences, regardless of the level of experience or expertise of the decision-maker. The use of double blind procedures in scientific research and placebo in the medical domain further reflects the potential power and impact of bias and that measures are needed. The results of our research [2] are important for illustrating the types of context that can influence the decision-making process. The results are also important for fuelling the development of approaches that can acknowledge "the existence of cognitive and contextual effects and identifying situations in which it may occur'" [2;409]. These results are important for driving the progress that is needed to ensure that the way findings are presented in every domain in forensic science incorporates the potential for unconscious influences on the decision-making process. This needs to be achieved in a way that enables the investigator, the jury or the judge to reach conclusions based on a clear, transparent and reproducible understanding of the findings presented by the forensic scientist [5, 23-25].

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