Journal of Applied Research in Memory and Cognition xxx (2017) xxx–xxx

Contents lists available at ScienceDirect

Journal of Applied Research in Memory and Cognition

journal homepage: www.elsevier.com/locate/jarmac

Cognitive Bias and Blindness: A Global Survey of Forensic Science Examiners

Jeff Kukucka[a,*], Saul M. Kassin[b], Patricia A. Zapf[b], Itiel E. Dror[c]

[a] Towson University, United States
[b] John Jay College of Criminal Justice, United States
[c] University College London (UCL), United Kingdom

Exposure to irrelevant contextual information prompts confirmation-biased judgments of forensic science evidence (Kassin, Dror, & Kukucka, 2013). Nevertheless, some forensic examiners appear to believe that blind testing is unnecessary. To assess forensic examiners' beliefs about the scope and nature of cognitive bias, we surveyed 403 experienced examiners from 21 countries. Overall, examiners regarded their judgments as nearly infallible and showed only a limited understanding and appreciation of cognitive bias. Most examiners believed they are immune to bias or can reduce bias through mere willpower, and fewer than half supported blind testing. Furthermore, many examiners showed a *bias blind spot* (Pronin, Lin, & Ross, 2002), acknowledging bias in other domains but not their own, and in other examiners but not themselves. These findings underscore the necessity of procedural reforms that blind forensic examiners to potentially biasing information, as is commonplace in other branches of science.

Keywords: Confirmation bias, Blind testing, Expert decision-making, Forensic science, Bias blind spot

General Audience Summary

Forensic science errors have been found in many cases where innocent people were wrongly convicted of crimes. Research suggests that some of these errors may be due to *confirmation bias*—the tendency to interpret new information in ways that confirm one's pre-existing beliefs. Some forensic labs have taken steps to protect against confirmation bias, while others have resisted doing so. To better understand forensic scientists' beliefs about bias, we surveyed over 400 professional forensic scientists from 21 countries. Although most agreed that bias is a problem in forensic science, few believed that bias affects them personally. Many also opposed procedures that are commonly used to prevent bias in other branches of science, and instead felt that willpower alone can prevent bias. We hope that our results can be used to encourage science-based reforms that will maximize the value of forensic science evidence.

Decades of psychological research have established that perception and decision-making are vulnerable to a host of confirmation biases—as seen in the tendency to seek out, select, and interpret information in ways that validate one's pre-existing beliefs or expectations (Nickerson, 1998). Recently, scholars have observed and documented these pernicious tendencies in the criminal justice system (Dror, 2016; Dror & Cole, 2010; Saks, Risinger, Rosenthal, & Thompson, 2003; Simon, 2012). In a target article published in the *Journal of Applied Research in Memory and Cognition*, Kassin, Dror, and Kukucka (2013) coined the term *forensic confirmation bias* to summarize the various ways in which one's beliefs, motives, and situational context have been shown to affect the collection and evaluation of evidence during the course of a criminal case.

The National Academy of Sciences (2009), the National Commission on Forensic Science (2015), and the President's

Author Note

* Correspondence concerning this article should be addressed to Jeff Kukucka, Towson University, Dept. of Psychology, 8000 York Road, Towson, MD 21252, United States. Contact: jkukucka@towson.edu

Please cite this article in press as: Kukucka, J., et al. Cognitive Bias and Blindness: A Global Survey of Forensic Science Examiners. *Journal of Applied Research in Memory and Cognition* (2017), http://dx.doi.org/10.1016/j.jarmac.2017.09.001

Council of Advisors on Science and Technology (2016) have each identified confirmation bias as a potential cause of forensic science error, noting that such errors are prevalent in DNA exoneration cases (i.e., 46% of wrongful convictions identified by the Innocence Project; www.innocenceproject.org). Indeed, studies of professional forensic examiners have shown that irrelevant contextual information can distort their judgment. In one of the earliest such studies, latent fingerprint experts changed 17% of their own prior judgments of the same fingerprints when given different contextual information (Dror & Charlton, 2006; see also Stevenage & Bennett, 2017). In another study, blood pattern analysts' error rates nearly doubled when irrelevant contextual information suggested the presence of a particular pattern (Taylor, Laber, Kish, Owens, & Osborne, 2016). Similar effects have been found among experts in other forensic domains as well, such as arson investigation (Bieber, 2012), crime scene investigation (van den Eeden, de Poot, & van Koppen, 2016), forensic anthropology (Nakhaeizadeh, Dror, & Morgan, 2014; Nakhaeizadeh, Morgan, Rando, & Dror, 2017), forensic pathology (Oliver, 2017), and analysis of complex DNA mixtures (Dror & Hampikian, 2011; see Kukucka, 2018, for a review; see Dror, 2016, for a theoretical model of how bias impacts observations and judgments made by forensic experts).

To prevent bias-induced error, the President's Council of Advisors on Science and Technology (2016) noted "the importance of blinding [forensic science] practitioners to potentially biasing information" (p. 33). As standard practice, biomedical researchers demand the use of double-blind protocols in clinical drug trials (Kaptchuk, 1998) and psychological scientists strive to keep experimenters blind to conditions and/or hypotheses (Rosenthal, 1966). However, forensic examiners appear to disagree over the value of blind testing. While several laboratories have adopted procedures that shield examiners from irrelevant contextual information (e.g., Archer & Wallman, 2016; Found & Ganas, 2013), other examiners have argued that their training and expertise renders them immune to bias (e.g., Leadbetter, 2007) or that bias can be overcome by sheer willpower (Butt, 2013).

As it stands, it is not clear whether these latter opinions are normative or anomalous—nor whether opposition to blind testing is widespread among forensic experts. With this in mind, we aimed to measure the consensus and/or differences of opinion among forensic examiners on a range of bias-related issues. Specifically, we surveyed a global sample of forensic examiners as to their beliefs about the scope and nature of cognitive bias in the forensic sciences. As a secondary aim, we also sought to explore whether examiners differ in their beliefs about bias as a function of their experience or domain of specialization. We also compared the beliefs of bias-trained and -untrained examiners.

Method

Participants

Our sample included 403 professional forensic examiners (219 women, 183 men, and one who did not report gender) who were recruited via the electronic mailing lists of various professional forensic science organizations.[1] On average, examiners were 44.02 years old ($SD = 11.39$) and had 14.46 years of experience ($Mdn = 13$; $SD = 9.60$). Virtually all examiners held a college (42.43%), masters (38.71%), or doctoral (10.67%) degree.

Our sample included examiners from 21 different countries (*Mode* = United States; 82.38%) and a range of different forensic science domains, with the most common being biology and DNA (24.07%), latent fingerprint examination (14.64%), questioned document examination (e.g., handwriting identification; 8.68%), toxicology (6.20%), and firearm/toolmark examination (5.96%). Some examiners (17.62%) also reported having worked in multiple domains. Most (57.57%) currently worked in large laboratories (i.e., 21+ employees), while others worked alone (6.95%) or in very small laboratories (i.e., five or fewer employees; 8.44%). Most examiners reported having worked either exclusively (28.29%) or mostly (46.40%) for the prosecution; virtually none had worked either exclusively (0.25%) or mostly (0.74%) for the defense. The average (i.e., median) examiner estimated having worked on 1000 cases in their career (IQR = 487.75–4825) and having testified in court 25 times (IQR = 7–80.75).[2]

Procedure

Recruitment e-mails directed examiners to a password-protected survey website. After entering the password and giving electronic consent, they answered questions about their demographic (i.e., age, gender, location, education level) and professional background (i.e., current domain of specialization, years of experience, size of laboratory, number of cases worked, number of times testifying in court). They were also asked to estimate the accuracy rates of judgments in their domain and of their own judgments. On the next page, examiners read the following definition of cognitive bias:

> "In recent years, there has been some debate over whether forensic examiners are subconsciously influenced by prior beliefs and expectations formed on the basis of contextual information (e.g., a detective's opinion, evidence from other forensic domains, a suspect's criminal history, a confession, an eyewitness) that is irrelevant to the forensic samples they are evaluating. This phenomenon has been referred to as *cognitive bias*."

[1] Our goal was to obtain as many respondents as possible. Because we do not know how many examiners received our e-mails, the response rate is unknown. A total of 540 examiners began the survey (i.e., provided a password and consent). Of these, 137 were not included in our final sample—six (4.38%) who entered an incorrect password, 96 (70.07%) who exited the survey immediately after providing consent, and 35 (25.55%) who provided consent and demographic information but did not answer any of the 13 bias-related items.

[2] Examiners answered these items in an open-ended fashion. For those who gave a range (e.g., "50–100"), we recoded their response as the midpoint of that range. Inexact (e.g., "thousands") and/or non-numeric (e.g., "no idea") responses were excluded. Statistics for these two items are thus based on the responses of 370 and 396 examiners, respectively.

Please cite this article in press as: Kukucka, J., et al. Cognitive Bias and Blindness: A Global Survey of Forensic Science Examiners. *Journal of Applied Research in Memory and Cognition* (2017), http://dx.doi.org/10.1016/j.jarmac.2017.09.001