

How can I reduce bias in my work?

Discussing debiasing strategies for forensic psychological assessments

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Abstract

Bias is an inherent phenomenon of information processing that can occur whenever human brains are involved. In forensic psychological assessments, bias threatens the reliability and validity of the conclusions about, for example, the credibility of witness' statements, the risk of reoffending, child custody, or the competency to stand trial. Given the far-reaching consequences of forensic psychological assessments for individuals and society, it is important to identify strategies to minimize the risk of bias. In this article, we apply a process-oriented understanding of bias to the context of forensic psychological assessments. In doing so, we bring together theoretical considerations and empirical findings on how to combat bias. We show how debiasing strategies can be implemented in the individual tasks of forensic psychological assessment and evaluate their challenges and limitations in this field of application. We provide five key messages for forensic psychological practitioners that include expert training, transparent documentation, using standardized procedures, masking irrelevant case information, and applying alternative hypotheses approaches, and we discuss the potential of generative artificial intelligence to help debiasing.

Keywords:

Bias, debiasing strategies, forensic psychological assessment, expert witness, information management

Public Significance Statement:

This article highlights how certain features of forensic psychological assessments can lead to bias. We recommend strategies for minimizing this bias, including methods for challenging one's own assumptions. These methods can help make assessments in the legal system more accurate and fair.

What is bias and does it affect me? If we were to collect our readers' answers to the first part of the question, we would probably get a colorful hodgepodge of different ideas, because bias can manifest itself in many different ways. As for the second part of the question, most lay people (e.g., Pronin et al., 2002) and professionals alike (e.g., Neal et al., 2022a) would likely underestimate the impact of bias on their everyday judgments and decisions. To understand what bias exactly is and why it affects each of us, we need to understand the common psychological processes that underlie this complex phenomenon. Bias is a “*conditio humana*” (Oeberst & Imhoff, 2023, p. 4), rooted in how humans process information. Therefore, even professional experts are not immune to bias (Neal et al., 2022a for an overview in forensic mental health assessments), making it crucial to combat bias where objective judgements and decisions with far-reaching consequences for individuals and society are required. This includes the context of forensic science, which encompasses various fields of work ranging from crime scene analysis, chemical and biological analysis, to forensic psychological assessment. The risk of bias in forensic science has been recognized and addressed in recent scientific literature (e.g., Davis et al., 2024; Kunkler & Roy, 2023) and by professional bodies in the USA (e.g., National Research Council, 2009; National Commission on Forensic Science, 2015). However, little work has been done on how to minimize bias in the specific area of forensic psychological assessment (e.g., credibility assessment, criminal risk or responsibility assessment, family law evaluations). Against this background, we outline how debiasing strategies that are often discussed in the broader context of forensic science could be implemented in the specific context of forensic psychological assessment. In doing so, we identify challenges and boundary conditions for the effectiveness of debiasing strategies and derive implications for practical work.

What Is Bias?

Bias refers to the (sometimes inaccurate) perception of information that is consistent with the subjective perspective of the perceiving individual and serves – consciously or unconsciously – cognitively economical information processing (Nickerson, 1998). The influence of bias on human judgment is an established finding in psychology. Numerous empirical studies provide consistent evidence for a variety of different forms of bias, including forensic contexts. The anchoring effect, for instance, describes how people base their judgments on specific anchors, such as judges who, aligned the level of sentencing with the prosecution's sentencing demand, even if this demand was explicitly randomly determined (Englich et al., 2006). Another prominent example shows that in the context of legal decisions, hindsight bias can occur when a court has to decide whether a defendant could have foreseen and hence avoided the consequences of their actions (Harley, 2007). The diversity of the bias phenomenon and its empirical operationalization is illustrated in the Cognitive Bias Codex (Manoogian & Benson, 2017; graphic available online at https://upload.wikimedia.org/wikipedia/commons/6/65/Cognitive_bias_codex_en.svg), identifying over 180 forms of bias in addition to the aforementioned effects.

The multitude of parallel research strands on different forms of bias complicates a uniform definition of the phenomenon. In view of this challenge, Oeberst and Imhoff (2023) developed a general framework model based on shared psychological processes. In this conceptualization, the authors describe different forms of bias using a common formula that encompasses two tendencies of human information processing: First, the tendency to form beliefs about the world, and second, the tendency to process information in light of those beliefs. The human tendency to form beliefs about the world is evident, for example, in schemas, stereotypes, or attitudes (Oeberst & Imhoff, 2023 for an overview). These concepts essentially describe how people regularly generalize across objects and situations, regardless of whether it is objective, reliable and valid, or even possible to do so. Consequently,

individuals as well as entire social groups can benefit from a strong sense of control or high self-efficacy. Additionally, empirical studies show that people tend to process information in the light of existing subjective beliefs. More specifically, people perceive, evaluate, or reconstruct information in ways that are consistent with prior assumptions. As such, beliefs can influence information processing in adaptive ways, leading to quick and correct decisions. However, if beliefs are invalid, they are likely to lead to incorrect judgements. With extensive reference to empirical evidence, Oeberst and Imhoff (2023) illustrate how the tendency to form beliefs about the world and the tendency to process information in light of those beliefs, form the basis of various forms of bias. For example, people tend to search their environment for features that are more likely to occur under the belief they hold than under the alternative hypothesis (*positive testing*; Zuckerman et al., 1995), or to discredit information that is inconsistent with prior beliefs (*disconfirmation bias*; Edwards & Smith, 1996).

Bias in Forensic Psychological Assessment

Given that bias can be traced back to basic principles of human information processing, we must expect bias to occur whenever a human brain is at work. Experts conducting forensic psychological assessments in the context of legal decisions are no exception. Forensic psychological reports are utilized in various legal contexts when experts are asked to assist the court in answering legal questions. For example, in credibility assessment, experts analyze the reliability or validity of a witness's statement. In criminal risk assessments, they examine the likelihood that a person will reoffend, or in family law cases, psychological expertise may be required in disputes over parental custody or whether child welfare may be at risk. Given the far-reaching consequences of forensic psychological assessments for individuals' liberty or social security (e.g., Brodsky & Pope, 2023), these tasks should ideally be carried out objectively and not based on invalid beliefs that threaten the reliability and validity of forensic

psychological assessments (Oeberst & Oberlader, 2024). Yet, empirical research suggests that bias is regularly present in this area of application.

Overview of Empirical Findings

In a review of research on bias in forensic mental health assessment, Neal et al. (2022a) identified 23 quantitative studies in which the majority of the samples were forensic experts. Although these studies differ in key methodological aspects (e.g., research method used, operationalization of bias), the overall results indicate that bias constitutes a serious problem in forensic mental health assessment. More than 80% of the included studies found evidence of bias. For instance, Chevalier and colleagues (2015) examined how experts conducting sexually violent predator evaluations reported and interpreted scores from a standardized risk assessment tool. They found that experts hired by the defense were more likely to report the lowest possible level of risk (e.g., using recidivism rates from a routine sample or 5-year recidivism rates), whereas experts hired by the prosecution were more likely to endorse practices that suggested the highest possible level of risk (e.g., using recidivism rates from a high-risk sample or 10-year recidivism rates). Outside of forensic mental health assessments, a study by Bogaard et al. (2014, Experiment 1) indicated that police officers' quality ratings of witness statements were influenced by the presentation of irrelevant positive or negative contextual information that increased or decreased the credibility of the witness. These findings illustrate how invalid beliefs can influence information processing in the context of forensic psychological assessment, thereby compromising and biasing the prognostic or diagnostic validity of the assessment.

Empirical data also show that expertise does not protect against bias, even if experts themselves systematically assume a protective effect (e.g., Kukucka et al., 2017; Zapf et al., 2018; Zappala et al., 2018). For example, while around 70% of the surveyed forensic experts stated that bias was a serious problem in forensic practice, only roughly 25% of these experts

also stated that this problem could affect their own work (Kukucka et al., 2017). Such a *bias blind spot* (e.g., Pronin et al., 2002; Walker et al., 2024) may be due in part to the fact that not all beliefs that a person holds, and that influence information processing are introspectively accessible (e.g., Greenwald & Banaji, 1995). In addition, beliefs can influence automatic information processing, which leads to unconscious bias (e.g., Neal et al., 2022a). Where experts do not have introspective access to their beliefs, or where beliefs influence automatic information processing, it is not possible for them to identify and correct the bias-inducing influence of these beliefs, despite their expertise. It should also be noted that bias does not require motivation to align information processing with certain beliefs. Conversely, bias can occur even when people are explicitly motivated to avoid biased judgments (for the role of motivation in the bias process, see Oeberst & Imhoff, 2023).

Bias-Promoting Features of Forensic Psychological Assessment

Specific features of forensic psychological assessment may increase the human tendency to be biased. In contrast to other fields of expertise where, for example, physical phenomena are assessed (e.g., weather forecasts), human experience and behavior (e.g., parenting skills, credibility of a statement, reoffending) are less bound by clear rules and are therefore more difficult to assess or predict (Shanteau, 1992). This aspect is also reflected in the low level of standardization of forensic psychological assessment procedures. Although overarching conceptual guidelines and assessment frameworks have been developed for certain legal areas (for a best practice guide for actuarial sexual offender risk assessment, see Craig & Beech, 2010; for a review of evidence-based interview protocols for children in child sexual abuse cases, see Fernandes et al., 2024; for an overview of guidelines for family law evaluations in Europe and North America, see Zumbach et al., 2022; for a general overview for the US context see Melton et al., 2017), specific and standardized principles or procedures for aggregating single case assessment data (i.e., multiple observations and conclusions) in

forensic psychological assessment are mostly lacking. Canonical assessment models in forensic psychology rely on rather informal aggregation of highly complex assessment data and unstructured linkage between data and evaluator opinions (Acklin & Velasquez, 2021), thus keeping the door open for biases in expert assessments. Whenever standardized guidelines for integrating diagnostic decisions are lacking, the scope for subjective beliefs biasing information processing increases (for the role of degrees of freedom regarding biases, see Oeberst & Oberlader, 2024; Boccaccini et al., 2024 for sexually violent predator evaluations). In addition, most forensic psychological experts do not receive regular and timely feedback on the quality of their forensic psychological assessment. For structural and contextual reasons, forensic psychological experts have limited opportunities to learn from failure (Shanteau, 1992). Feedback mechanisms implemented in certain jurisdictions, training curricula, or supervisory teams usually concern the methodological approach and the quality of the written reports, and feedback from commissioning parties is not the norm. Few countries (e.g., Australia, United Kingdom) and jurisdictions use concurrent expert testimony (“hot tubbing”) for certain cases, allowing experts to receive feedback from opposing experts. However, initial evidence from a case simulation (Perillo et al., 2021) suggests this approach may not reduce bias in criminal responsibility assessments, possibly due to its late implementation in the assessment process. Once experts have formed strong opinions, biases may be too entrenched for critical feedback to have an impact. Feedback on the validity of the expert recommendation is often not even possible because ground truth is unclear. For example, it is impossible to establish with certainty whether a statement is true, what someone's actual mental state was at the time of the offence, or whether a person still in prison would really have reoffended if they had been released early. Consequently, learning from misjudgments – which is necessary for correcting invalid beliefs – is severely hampered. A comparison of task indicators of good and poor expert performance (Shanteau, 1992)

underlines that even more aspects above and beyond those that have been mentioned here limit expert performance (see Table 1 for task-specific influences on expert performance).

Table 1

Task Characteristics Associated with Expert Performance (modified according to Shanteau, 1992, p. 259)

Good expert performance	Poor expert performance
Static stimuli	Dynamic, variable stimuli
Decisions about objects	Decisions about behavior
Expert consensus on relevant indicators	Expert disagreement on relevant indicators
Allowance for error	No allowance for error
Repetitive predictions	Predictions in unique case constellations
Failure feedback available	Failure feedback not available
Objective analyzability available	Only subjective analyzability possible
Problem can be broken down into smaller decisions	Problem cannot be broken down into smaller decisions
Inclusion of validated decision tools common	Inclusion of validated decision tools not common or possible

The summary of empirical evidence suggests that bias is a serious problem in forensic psychological assessment. Specific features of the subject matter and the assessment process may exacerbate general bias-promoting tendencies in human information processing. It should also be noted that the characteristics of different legal systems may further increase the risk of different biases. For example, the risk of allegiance effects and “my side” bias (e.g., Chevalier et al., 2015; Kunkler & Roy, 2023) is higher when experts are retained by one of the parties in adversarial legal systems compared to when they are employed by the court as neutral witnesses in inquisitorial legal systems. In the context of adversarial legal systems, allegiance bias refers to the tendency of experts to be influenced in their judgments or evaluations by the side they are supposed to support or represent. For instance, trained professionals and students have been found to rate criminal responsibility (Perillo et al., 2021) and the risk of reoffending (Murrie et al., 2013) higher when assigned to work for the prosecution than when assigned to work for the defense. In the study by Perillo and colleagues (2021), the expertise

of “court-appointed” participants appeared more balanced than the those of participants retained by a specific side. However, high variance suggested that these ratings might be due to a mixing of general pro-prosecution or pro-defense attitudes in the “court-appointed” condition. The more neutral external conditions in inquisitorial legal systems may thus hinder allegiance effects, but can facilitate personal biases due to pre-existing beliefs (Perillo et al., 2021). In any case, it is important to ask how the influence of bias can be effectively mitigated in this field. To this end, the process-oriented definition of bias (Oeberst & Imhoff, 2023) provides a useful approach for assessing the effectiveness and constraints of different debiasing strategies. If bias is generally based on beliefs that affect information processing, effective debiasing strategies must enable experts to control the formation of invalid beliefs and their biasing effects on information processing during the assessment.

Debiasing Strategies

The need for effective debiasing strategies in forensic psychological assessment has been addressed in the recent literature and recommendations have been derived (for overview, see Neal et al., 2022b; Neal & Brodsky, 2016; Neal & Grisso, 2014; Vredeveltdt et al., 2022; Zapf & Dror, 2017). At present, however, only a few empirical studies have examined the effectiveness of the proposed debiasing strategies in this context (e.g., Griffith, 2019; Oberlader & Verschuere, 2024; Perillo et al., 2021). Also, some strategies proposed for forensic science in general (e.g., Kunkler & Roy, 2023) are difficult to implement in forensic psychological assessment due to organizational or methodological constraints.

Building on the process-oriented definition of bias by Oeberst and Imhoff (2023), in the following we evaluate potential debiasing strategies with respect to whether and under which conditions they are suitable for minimizing the occurrence of invalid beliefs and their biasing effects on information processing. We derive concrete recommendations for practice, but also identify the challenges and limitations of each debiasing strategy in combating bias in forensic

psychological assessment. Table 2 illustrates how currently discussed debiasing strategies could be implemented in the different tasks of the generic process of any forensic psychological assessment including file analysis, data collection, as well as interpretation and integration of the data to provide support in answering the legal question at hand. We draw on specific examples from individual areas of forensic psychological assessment, but our recommendations are applicable to any legal issue that requires psychological expertise.

Table 2

Potential Debiasing Strategies in the Process of Forensic Psychological Assessment

At what stage in the forensic psychological assessment?	Which debiasing strategy?	How to implement?
Entire process	Expert training	Be aware that you are biased and keep up to date with research on bias. Participate in professional training and seek super- as well as intervision.
File review	Transparent documentation	Document sources and type of case information.
	Alternative hypotheses approach	Formulate case-specific alternative hypotheses based on scientific criteria.
Data collection	Transparent documentation	Document the order and circumstances of interviews, tests, and other examinations. Document preliminary conclusions in work notes. Document results in full and in a neutral manner, without interpretation. Clearly identify the source from which results originate.
		Supplement interview data with standardized assessment tools where available.
		Outsource standardized assessments to third parties who are not familiar with the case file.
	Masking of irrelevant information	
Data interpretation and integration to	Transparent documentation	Document on which results or empirical findings the conclusions are based. Explain why certain hypotheses or findings were rejected or not addressed in detail.

answer legal question	Standardization	Use guidelines and complement idiographic approaches / clinical judgement with formal rules for data integration where available.
	Alternative hypotheses approach	Challenge your hypotheses and interpretation of specific data as early as possible Consider and explicitly formulate alternative conclusions Use an “advocatus diaboli” who has not been involved in the assessment.

Expert Training

To reduce bias in forensic psychological assessment, experts could be trained to reduce (the impact of) invalid beliefs they hold. Debiasing strategies involving expert training can be distinguished according to whether they involve the transfer of meta-knowledge about biases or the transfer of expert knowledge about (in)valid indicators for answering legal questions.

Teaching Meta-Knowledge about Bias

Debiasing strategies that focus on providing meta-knowledge about bias are based on the idea that people can prevent or control the impact of bias if they are aware of it. However, empirical evidence suggests that the effectiveness of this debiasing strategy is limited. While some studies suggest that training can reduce bias in the short term (e.g., Morewedge et al., 2015) and even in the long term (e.g., Devine et al., 2012), these studies rarely address the question of the specific effect of meta-knowledge about bias. In a study by Devine et al. (2012), for example, the participants were not only provided with meta-knowledge about racial bias but were also trained in five specific strategies to reduce bias (e.g., perspective-taking). Consequently, it was not possible to test or evaluate the isolated effect of providing meta-knowledge about bias. At the same time, a large body of empirical research suggests that people are unable to inhibit or correct the influence of bias, even when they are aware of the problem, and even when they are explicitly motivated to avoid bias (e.g., Harley, 2007). For example, a meta-analysis ($k = 48$, $N = 8,474$) by Steblay and colleagues (2006) showed that

inadmissible evidence influenced judges in their decisions even when they were instructed to ignore it. Another meta-analysis ($k = 492$, $N = 87,418$) concludes that interventions to reduce implicit biases have negligible effects on actual behavior (Forscher et al., 2019; Lai & Lisnek, 2023).

The process-oriented bias conceptualization can help to understand why the effectiveness of meta-knowledge on bias is limited. Two conditions must be met to comprehensively inhibit or correct the biasing effects of beliefs on information processing: First, a person must be able to access their beliefs. Second, a person must be able to consciously perceive and control the impact of these beliefs on information processing. In view of extensive research findings on implicit attitudes, stereotypes, or schemata that are not introspectively accessible (e.g., Greenwald & Banaji, 1995) and on automatic information processing that cannot be consciously controlled (Strack & Deutsch, 2015), it can be supposed that these conditions may not be met. Nevertheless, providing meta-knowledge about bias may be useful, as increased awareness of the bias phenomenon reduces the likelihood of succumbing to a blind spot (e.g., Zapf et al., 2018). As a result, experts may be more willing to thoroughly implement more elaborate debiasing strategies.

Transferring Expert Knowledge

Transferring expert knowledge on how to proceed in forensic psychological assessment in training or supervision and interview contexts is not a specific debiasing strategy – but can it still help to reduce the formation and the biasing effects of invalid beliefs? As outlined above, study results suggest that expertise alone does not fully protect against bias, as bias is also regularly found among experts (e.g. Neal et al., 2022a). Again, the process-oriented bias conceptualization can help to understand the limited effectiveness of expert knowledge in combating bias: Expert knowledge can only fully protect against bias if all of a person's invalid beliefs are replaced with valid beliefs based on empirical research about how to

proceed with forensic psychological assessment. However, as outlined above, there is a significant lack of empirical research on forensic psychological assessment. Consequently, invalid beliefs cannot be completely replaced by valid ones. Nevertheless, the transfer of expertise is a key component in dealing with bias. Expertise can ultimately be understood as valid assumptions that should replace invalid beliefs wherever they exist.

Transparent Documentation

When reviewing the quality of forensic psychological reports, it is hardly possible to separate significant deficiencies such as bias from inaccurate or incomplete descriptions in the written presentation. Many of the common criticisms of expert evidence in forensic psychology relate to the lack of transparency in documentation (e.g., Brodsky & Pope, 2023; Grisso, 2010; Quinten et al., 2024), which illustrates the importance of presenting the entire assessment process in a comprehensible manner.

Specifically, transparency in assessment includes accurately documenting all sources of information during the file review. With regard to data collection, not only the order but also all the circumstances of the individual examinations should be made transparent. The results should be documented objectively, neutrally, and strictly separated from interpretations. In doing so, it should be made clear on which data source individual results are based. When drawing conclusions, it should be made clear which results and empirical evidence are being used. In many cases, it is also advisable to include a rationale for diagnostic decisions, e.g. explaining why certain hypotheses or findings were rejected or not addressed in detail. This will make the report easier to understand for the reader and will decrease the likelihood of bias leading to unwarranted diagnostic decisions. Transparent documentation in the sense of a debiasing strategy also applies to work notes that may not be part of the written final report (e.g., documenting what was assumed or learned and when, what impact it may have had on the analysis, how analytical decisions were justified, etc.; Kunkler & Roy, 2023). Overall,

transparent documentation cannot completely prevent invalid beliefs from finding their way into the assessment process. However, transparent documentation makes it possible to identify shortcomings and gaps that may be traced back to invalid beliefs.

Masking Irrelevant Case Information

Any forensic psychological assessment begins with a review of the case file. This process involves reviewing and structuring the documents, extracting relevant information and identifying discrepancies and open questions. File analysis is a fertile ground for the formation of invalid beliefs that may favor bias. Besides relevant case information, case files contain many data that are irrelevant to the questions at hand and have no diagnostic or prognostic value. This risk persists throughout the assessment process when new data are collected and analyzed, as experts are inevitably confronted with irrelevant information (e.g., a person's appearance or clothing style). Indeed, according to feedback by the American Board of Forensic Psychology, 31% out of 62 forensic psychology reports included data and/or opinions that were not relevant for the forensic or clinical question at hand (Grisso, 2010). In a German convenience sample of 73 reports of methodological criticism of psychological assessments in family law, the inclusion of irrelevant information was criticized in 22% of cases (Quinten et al., 2024). Irrelevant case information can lead to invalid beliefs that bias the process of forensic psychological assessment. This risk applies not only to cases in which experts misclassify irrelevant information as relevant, but also to cases in which experts correctly identify irrelevant information and intend to ignore it. As a meta-analysis involving judges (Stebly et al., 2006) indicates, people have difficulty ignoring information once it has been processed and they can hardly suppress its (invalid) effects on further information processing.

To minimize the impact of invalid beliefs based on irrelevant information, various approaches have been discussed in the literature to mask irrelevant data or to ensure that

experts only receive relevant data (e.g., Kunkler & Roy, 2023; Vredevelde et al., 2022).

Recent information management protocols such as the *Linear Sequential Unmasking-Expanded* approach (LSU-E; Dror & Kukucka, 2021) recommend that case information is managed by a case manager and gradually passed on to the expert. The decision as to what information should be passed to the expert at what point in the assessment should be based on considerations of its relevance to a particular step in the assessment.

Empirical evidence on the effectiveness of approaches for masking irrelevant case information mainly stems from comparative forensic analysis, such as DNA analysis (Krane et al., 2008). In these studies, masking irrelevant case information is recognized as one of the most effective debiasing strategies (for an overview, see Robertson & Kesselheim, 2016). At present, due to a lack of research, we do not know whether masking irrelevant case information is also an effective debiasing strategy in forensic psychological assessment which involves a contextually much richer information base than, for example, DNA analysis. Considerations regarding implementation suggest that masking irrelevant case information can only be realized to a limited extent in this area of application. To successfully implement this debiasing strategy, it must be possible to determine *a priori* whether each piece of case information contained in a file is relevant or not. However, there is no empirical knowledge in forensic psychological assessment that would allow *all* file information to be classified as relevant or irrelevant based on objective criteria. In many cases, a case manager would thus have to decide based on subjective beliefs whether information from the file is relevant and should be considered, or whether it should be masked as irrelevant. Clearly, such a strategy is not likely to reduce bias, but merely shifts the potential for bias in the file analysis to another person.

To still minimize the impact of irrelevant information on the assessment process, it would be plausible to outsource individual standardized assessment steps to third parties who are not

familiar with the case file. Such a procedure reverses the idea of the LSU-E approach: Instead of a case manager passing on selected information to the expert, the expert passes on standardized tasks (e.g., standardized risk assessment tools, psychological tests with parents or children) to another expert. Ideally, this second expert is given only the case-specific data necessary for their particular assessment task. Their results are then combined by the first expert with results from other data sources (e.g., interviews) to draw conclusions. As such, the risk of cascading bias could be reduced by making only minor organizational changes (Dror et al., 2017; Kunkler & Roy, 2023).

Alternative Hypotheses Approach

After analyzing the case file, forensic psychologists often derive psychological hypotheses from the legal questions posed by the court, to plan their assessment steps and methods. Hypotheses are formulated considering case-specific information and possible outcomes of the assessment. When biased by invalid (pre-existing) beliefs, experts run the risk of neglecting relevant alternative hypotheses or outcomes. Indeed, a recurring criticism of psychological reports is the lack of explanation as to why certain alternative interpretations were excluded (30% of 62 forensic psychology reports, Grisso, 2010), or why certain hypotheses, criteria or alternative recommendations were not addressed, or not adequately addressed (80% of 73 reports of methodological criticism of psychological assessments in family law, Quinten et al., 2024). To reduce the risk of bias in hypotheses and, most importantly, outcomes of forensic psychological assessments, several strategies have been proposed in relation to considering the opposite or alternative hypotheses (e.g., *differential diagnosis approach*, Davis, 2024; *alternative competing hypothesis*, Heuer, 2005; *considering objections from alternative points of view*, Kukor et al., 2024; *alternative hypotheses*, Liden et al., 2023; *alternative scenarios*; Otgaar et al., 2017). In general, all these strategies require experts to consider and evaluate the possibility of alternative or opposite outcomes at various stages of their analyses (Kunkler & Roy, 2023). For example, it has been recommended to

actively look for hypotheses and case information that contradicts initial hypotheses or supports alternative hypotheses throughout the assessment, for example when interpreting the data collected or drawing final conclusions (Otgaar et al., 2017; Vredeveldt et al., 2022). Kukor and colleagues (2024) propose a framework for relevancy-focused reports that includes a section entitled 'Data that may not be consistent with the opinions', in which examiners identify data that could be used to support interpretations or conclusions that are contrary to those they have reached.

Several empirical studies support the idea that alternative hypotheses approaches can reduce bias in forensic psychological assessment (Griffith, 2019; O'Brien, 2009; Rassin, 2018) or non-forensic contexts (e.g., Mussweiler et al., 2000; Roese & Vohs, 2012). For example, Griffith (2019) found evidence that an instruction to consider the opposite could reduce bias in assessments of legal criteria for culpability, competency to stand trial, and work ability. Participants instructed to find evidence to support an alternative hypothesis rated information consistent with their initial hypothesis as less important when asked again, compared to participants in the control group. In a study by O'Brien (2009), participants reviewing a mock police file showed less bias when they were instructed to consider why their initial hypothesis about who committed a crime might have been wrong (Study 2).

While some studies (e.g., Arbiyah et al., 2023; Maegherman et al., 2021) failed to induce bias in the first place, others found no reduction in bias using the alternative hypothesis approach. For example, participants in O'Brien's (2009) mock police file study did not show less bias when they were asked to consider three other suspects and find evidence for and against each (Study 2). Also, in a study by Sauerland et al. (2020), participants' allegiance bias was not reduced by a consider the opposite-instruction. In two experiments, students rated a witness statement as more credible when they received a letter from the prosecution that emphasized aspects supporting credibility, compared to students who received a letter

from the defense that emphasized aspects challenging credibility. This bias was not reduced when participants received a two-sided instruction to look for aspects that supported or challenged the credibility of the statement. Both of these findings may be due to an unintended 'backfiring' effect, where the effort of thinking about alternatives may have reinforced the original view as the only solution. Thinking through different hypotheses may have increased confidence that one has considered everything thoroughly and can now stick to the initial hypothesis (O'Brien, 2009; Sauerland et al., 2020).

In sum, empirical data on the effectiveness of alternative hypotheses approaches are mixed. With regard to the process-oriented conceptualization of bias, alternative hypotheses approaches provide an opportunity to challenge invalid beliefs and thus minimize the risk of bias. However, the boundary conditions under which this strategy works need to be explored in more detail. For example, testing alternative hypotheses should not lead to even greater reliance on one's initial hypothesis. To avoid such backfiring effects, we suppose that alternative hypotheses should be generated and thoroughly tested throughout the assessment process. Ideally, similar to the scientific principle of preregistration, alternative hypotheses should be generated before the expert is confronted with the case material (Otgaar et al., 2017). Otherwise, invalid beliefs based on file information may cause biased information processing before the debiasing strategy can take effect (as specifically pointed out by Otgaar et al., 2017; see also Perillo et al., 2021). In general, alternative hypotheses should be tailored to the individual case and be based on scientific criteria. When interpreting the data, all possible interpretations should be considered consistently and thoroughly, and finally, all possible conclusions should be assessed in terms of their likelihood (e.g., Acklin & Velasquez, 2021; Davis et al., 2024; Kunkler & Roy, 2023). This also includes experts documenting and explaining why certain hypotheses or findings were rejected or not addressed in detail (see *transparent documentation*).

Challenging invalid beliefs through alternative hypotheses can also be carried out by third parties. Here, the use of an external *advocatus diaboli* could be considered, who is also an expert in the assessment in question but is blind to the actual case material. The expert's task is to critically examine whether the conclusions of the first expert have been drawn in accordance with the state of the art in the field and are indeed based on the available case information as well as an appropriate weighting of the evidence for and against the relevant hypotheses (Otgaar et al., 2017). Thus, this external review can be seen as a specific case of simplified peer review.

Standardization

As outlined above, the biasing influence of invalid beliefs depends on the degree of standardization of the whole diagnostic task. If there are precise specifications for the implementation, evaluation, integration, and interpretation of all observations and conclusions relevant for a given psycho-legal diagnostic task, invalid beliefs are likely to have less of an impact than if there are no such specifications and there are ample degrees of freedom for the forensic expert (Oeberst & Oberlader, 2024)¹. Simply adding more aspects to be considered in procedural frameworks and conceptual guidelines without specifying their integration into a final recommendation, however, has been less successful in the context of forensic mental health assessments (Lander & Heilbrun, 2009).

Furthermore, it should be noted that even a high degree of standardization does not fully protect against bias. For example, a study by Murrie et al. (2013) showed that trained practitioners rated the likelihood of recidivism of a person who had committed a sexual offence as higher if they thought that they had been instructed by the prosecution rather than

¹ This should not be misunderstood as an argument for making forensic psychological assessment an exclusively actuarial task. Forensic psychological assessment can never be completely standardized, as case-specific information must be taken into account (for the context of criminal risk assessment, see Helmus, 2021). However, research on risk assessment clearly shows that increased standardization (structured professional judgement, actuarial risk assessment) outperforms unstructured risk assessment (e.g., Wertz et al., 2023).

by the defense. This allegiance bias also occurred when the participants used a highly standardized risk assessment tool to estimate the likelihood of reoffending (Static-99R; Helmus et al., 2012). At the same time, the study also supports that bias can be reduced by using standardized procedures: When the Static-99R was used, allegiance bias occurred in only one out of four cases and had a wide confidence interval close to zero (95% CI [0.01,0.82]). However, when participants used an only partially standardized procedure to assess the likelihood of reoffending (PCL-R; Hare, 2003), allegiance bias occurred in three out of four cases and showed larger effect sizes. Consequently, supplementing other sources of information such as interviews with standardized tools is an effective way of reducing bias and improving the reliability and validity of the results and conclusions. However, apart from criminal risk assessment, there are hardly any standardized tools or procedures that directly relate to the legal question at hand. For example, there are no standardized tests to determine whether someone is a suitable care person for a specific child. Nevertheless, in many such cases, standardized tools can be added that shed more light on at least some aspects of the matter in question (e.g., dimensions of the parent-child relationship, caring competencies).

Standardization is important not only for the collection, but also for the interpretation of data, as invalid beliefs in the course of data integration can promote bias even in the case of unbiased results (for explanations regarding criminal risk assessment, see e.g., Oberlader & Verschuere, 2024). As outlined above, however, standardized guidelines on how data should be integrated to answer the legal questions in forensic psychological assessment are still very rare (for practical proposals for data integration in the area of criminal risk assessment, see e.g., Helmus, 2021; for criminal responsibility assessments see Acklin & Velasquez, 2021). More detailed recommendations for the selection of standardized procedures depend heavily on the respective legal question and the corresponding subject matter of the assessment and can be derived from the relevant literature.

Recommendations for Expert Practice and Further Developments

A large body of empirical research results shows that the impact of bias on judgement and decision-making is indeed part of the human condition of processing information (Oeberst & Imhoff, 2023). Since experts are only human, it follows that bias necessarily will occur in the context of forensic psychological assessment. As outlined above, specific characteristics of this area of application may even increase the likelihood of bias. Against this background, experts need to use effective debiasing strategies to minimize the risk of bias as a threat to the reliability and validity of forensic psychological assessments. Based on theoretical considerations and empirical findings, we have derived suggestions on how to reduce bias for each stage of forensic psychological assessment. We assessed the conditions under which these strategies can be effective in terms of process-oriented understanding of bias. Five key messages for practitioners can be derived:

First, be aware that you are biased. Although being aware of bias, or even motivated to avoid it, will not protect you from being biased, it will help you to realize that you need to continually educate yourself. Keep up to date with ways to combat bias and replace invalid beliefs with empirically based knowledge where available. Second, since invalid beliefs cannot be completely avoided, document all steps transparently. It is important to know the sequence of what information was obtained from what source. Moreover, document the results or empirical findings on which the conclusions are based, and explain why certain hypotheses or findings were rejected or not explored further. Third, combine different sources of information such as interviews with standardized procedures, and use standardized tools for data integration where available. This is an effective way to reduce the biasing influence of invalid beliefs on information processing. Fourth, to further reduce the biasing impact of invalid beliefs, practice appropriate information hygiene. In particular, base your judgements on diagnostically or prognostically relevant case information and avoid dealing with

diagnostically or prognostically irrelevant case information (Verschuere et al., 2023; Weiss & Shanteau, 2003). However, as outlined above, this is easier said than done, as in forensic psychological assessment, it is difficult to impossible to a priori determine which information is relevant and which is irrelevant in individual case decisions. We recommend outsourcing standardized tasks to third parties not informed about the case to limit the scope for biasing effects of invalid beliefs. If you have already outsourced individual tasks mainly for practical reasons, you can optimize the workflow to use this procedure also as a debiasing strategy. Make sure that the other person knows as little as possible about case-specific information. Fifth, challenge your hypotheses and conclusions as early as possible and at each step of the assessment process, using alternative hypotheses approaches. You can search for contradictory information and assess all possible outcomes yourself, or you can mandate a third party (e.g., *advocatus diaboli*).

In view of the lack of empirical studies, the assessment of the effectiveness of the debiasing strategies presented should be regarded as preliminary and needs to be updated by future empirical studies in the context of forensic psychological assessment. This is particularly important as debiasing strategies are highly domain-specific and results cannot be easily transferred from one domain to another. In addition to limiting constraints (e.g., paradoxical effects of increased cognitive load due to the use of debiasing strategies, which could increase the likelihood of bias in information processing as a side effect), practical implementation issues also need to be considered (e.g., limited control over the order in which evidence is entered in a forensic psychological assessment; for conceptual, practical, and logistical challenges, see Thompson, 2018). In general, it can be assumed that a cascade of bias in the assessment process (Dror et al., 2017) can only be prevented by combining debiasing strategies that address the individual stages of the assessment process. Overall, however, expectations of a comprehensive bias reduction in single case evaluations should not

be too optimistic - even professionally qualified experts are human beings whose information processing is fundamentally based on bias-promoting cognitive mechanisms.

Artificial Intelligence as a Potential Debiasing Aid

If it is not possible for humans to completely eliminate bias, to what extent can artificial intelligence (AI) help? Due to the rapid developments in the field of generative AI, there are currently high expectations regarding its use in various fields of application. For forensic psychological assessments, AI tools hold the potential, for example, to augment data sets to train better predictive models for assessment tools or, more directly, to be used as decision-making support tools (e.g., Tortora, 2024). At the same time, the use of AI is particularly problematic with regard to bias. For example, discriminative algorithms that have already been established within criminal justice systems exhibit racial and gender bias (e.g., Angwin et al., 2016). Large generative AI models have also been found to reproduce biases contained in training data (e.g., Birhane et al., 2023). With the increased use of such tools, discrimination against marginalized groups may increase to the extent that the training data produced by humans contains such biases. This is all the more problematic as many people who undergo forensic psychological assessments belong to stigmatized groups, for example with regard to sexual deviance or mental health problems (Tortora, 2024). Moreover, AI tools lack transparency, i.e., the paths between input variables and output are unknown, and the lack of a basic theory for various applications discussed in forensic psychological diagnostics reinforces concerns about data quality and validity (for deception detection, see Suchotzki & Gamer, 2024). For these and other yet unresolved issues (e.g., regarding data security, copyright, and environmental impact; for overview, see, Tortora, 2024), the use of AI in forensic psychological assessment currently calls for great caution, in particular as it involves decisions of far-reaching consequences for the lives of those affected.

Instead, AI could be useful as a complement to the alternative hypotheses approach due to its strong hypothesis-generating abilities (Banker et al., 2024). Generative AI could be used to support the discussion of the expert recommendation by being prompted to find data in the report that supports or opposes the discussed or other AI-generated alternative hypotheses. However, this application requires future research to systematically test the quality of collaborative human-AI evidence discussions (Toniolo et al., 2023) specifically in the field of forensic psychological assessments. Moreover, data protection/privacy concerns have to be raised if publicly accessible AI tools are fed with real case material. Nevertheless, this is a promising venue that future research should explore.

Conclusion

Although some structural factors limit the use of debiasing techniques that have been proposed for forensic sciences in general (including possible uses of AI), there are several approaches that can be used in forensic psychological assessments with relatively little effort. Adherence to current scientific standards to minimize bias is crucial, as forensic psychological assessments are an indispensable decision-making tool in a wide range of legal matters.

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