Applying Hierarchy of Expert Performance (HEP) to investigative interview evaluation: strengths, challenges and future directions

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The purpose of this paper is to systematically examine the research literature on the decision of expert interviewers within the theoretical framework of the Hierarchy of Expert Performance (HEP). After providing an overview of the HEP framework, existing research in the investigative interviewing at each of the eight levels of the HEP framework is reviewed. The results identify areas of strength in *reliability between experts' observations* (Level 2) and of weakness in *reliability between experts' conclusions* (Level 6). Biases in investigative interview experts' decision making is also revealed at *biasability between expert conclusions* (Level 8). Moreover, no published data are available in *reliability within experts* at the level of *observations* (Level 1) or *conclusions* (Level 5), *biasability within or between expert observations* (Level 3 and 4) and *biasability within expert conclusions* (Level 7). The findings highlight areas where future research and practical endeavour are much needed for the investigative interview.

Key words: bias; decision making; forensic/investigative interview; HEP; Hierarchy of Expert Performance; professional judgements.

Introduction

An investigative interview, or forensic interview, is broadly defined as a structured conversation between an investigator (e.g. a police officer or qualified forensic interviewer) and an interviewee (typically a suspect, victim or witness of crime) to gather information for investigation. This is usually one of the first steps of information gathering in order to ascertain whether and how the alleged crimes happened. The quality as well as the quantity of the information gathered in an investigative interview plays a pivotal role in determining whether the case will move forward in the legal system. An investigative interview is different from a forensic clinical interview, as in

the latter the interview is conducted by clinicians (e.g. psychologists, psychiatrists or nurses) with already convicted individuals (Logan, 2018). This article focuses on the former, investigative interviews. In some cases, such as child sexual abuse (CSA), the statements of alleged victims often become the primary source of evidence that the investigators rely upon (Wright & Powell, 2007). The interviewee's mind, therefore, becomes the only way to access the crime scene. The interviewer must carefully navigate, collect and evaluate such 'psychological evidence' (i.e. interviewee's memory and accounts), using interviewing as the investigative tool.

The use of structured interview protocols (e.g. the National Institute of Child Health

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and Human Development, NICHD, interview protocol, Lamb, Orbach, Hershkowitz, Esplin, & Horowitz, 2007; Achieving the Best Evidence in Criminal Proceedings, Ministry of Justice, 2011) helps to obtain high-quality information from the interviewees. Some interviewers are trained experts¹ in optimizing the interviewee's memory recall accuracy, by maximizing free-recall information from the interviewees whilst minimizing information prompted by potentially (mis)leading or suggestive questions. However, even well-trained and experienced experts can be influenced by cognitive biases (consciously or unconsciously) and make erroneous decisions (Dror, 2016, 2018). To complicate the matter, in the investigative psychology domain, the 'ground truth' is often hard to establish (for example, what actually happened), which makes evaluating expert performance more difficult, as the accuracy cannot often be ascertained (Dror & Murre, 2018).

The field of forensic science (e.g. DNA and fingerprint examinations) has received attention in regard to cognitive bias (e.g. in the UK, guidance by the Forensic Science Regulator, 2015; in the US, the National Academy of Forensic Science, 2009, and the President's Council of Advisors on Science and Technology, 2016). This attention is now being applied to forensic psychology (e.g. competency and sanity evaluations, Dror & Murre, 2018; Zapf & Dror, 2017). However, research on investigative interviewing has yet to systematically pay attention

to how bias may influence experts' practice and decision-making (e.g. Everson & Sandoval, 2011).

The purpose of this paper is to make a first step towards a systematic and, within a single theoretical framework, examination of the potential bias and decision making in investigative interviewing. We use the Hierarchy of Expert Performance (HEP, Dror, 2016), established in the forensic science domain (and applied to forensic psychology, Dror & Murre, 2018), toward this aim and identify gaps in the literature as well as between knowledge and practice, while suggesting directions for future research and practical implications.

The Hierarchy of Expert Performance (HEP)

Dror (2016) suggested the following three distinct dimensions for conceptualizing, evaluating and quantifying expert performance: (a) reliability versus biasability; (b) within- versus between-expert performance; and (c) observations versus conclusions.

The first dimension, reliability versus biasability, are two fundamental and distinct properties of decision making (Dror, 2016; Dror & Rosenthal, 2008). *Reliability* concerns an expert's performance replicability regardless of bias, such as whether different child protection case evaluators would reach the same conclusions about a case being substantiated or not when they review the exact same investigative interviews. *Biasability* refers to the ability to make decisions based on relevant information without being biased by irrelevant contextual information (e.g. irrelevant case details that go beyond the referral question and beyond the evaluator's expertise) – for instance, whether an alleged rape victim's physical attractiveness would impact the evaluation of the interviewee's credibility. There may be disagreement about whether something is 'relevant' or 'irrelevant' when assessing

¹In countries where investigative interview protocols have been systematically implemented, such as the USA, the UK, Israel and Japan, the interviewers are trained experts in both conducting and evaluating the interviews. Sometimes, researchers specialized in this area of research may also be called to serve as expert witnesses in evaluating the interviews. In this paper, we use 'interviewers' to refer to the person conducting the interviews, and 'experts' to refer to the person evaluating the interviews, who can be either an experienced and well-trained interviewer or a researcher with relevant expertise serving as an expert witness.

interview credibility,² there needs to be transparency as to what factors were considered and contributed to the decision making, regardless of what is considered relevant or not. The field of investigative interviewing needs to arrive at agreement about what factors need to be considered when evaluating the credibility of an interviewee and/or of his/her account – that is, what is relevant and what is irrelevant to the task of determining credibility. Even if agreement could be reached about which factors to take into account under certain specific conditions (and whether it is really desirable to have a specific set of factors to take into account is another question), there would still likely be issues with between/within-expert reliability/biasability, as these factors could be understood or applied differently by different individuals or within different jurisdictions. Nevertheless, reaching evidence-based consensus is fundamental and a cornerstone underlying the profession.

The second dimension, *within* versus *between* experts, examines performance of experts compared with other experts (*between experts*), versus compared with themselves (*within experts*). For instance, a between-expert examination reviews whether different child protection case evaluators reach the same conclusions about the same interview, whereas a within-expert examination considers whether the *same* child protection case evaluator will reach the same conclusions about the same interview at different times. When an expert cannot be consistent with him/herself when making a decision based on the same exact

data, this kind of unreliability cannot be explained by individual differences, thus is a more basic and problematic variability than that of between-expert unreliability.

Finally, the third dimension distinguishes *observations* from *conclusions* – that is, between how information is observed, versus how it is evaluated and conclusions are reached based on those observations. Observations are the experts' perception of the data, whereas conclusions are made from evaluating and interpreting those observations. Bias as well as reliability issues can be introduced in observations and/or conclusions, therefore we should differentiate performance that derives from the interpretation and conclusions versus performance that actually derives from observations (Dror, 2016). One may misunderstand the decision if the observations are not teased apart from the conclusions. For example, forensic fingerprint examiners may reach different conclusions because they observe the same data differently in the fingerprint, not because they draw conclusions differently (Dror, Champod, Langenburg, Charlton, Hunt, & Rosenthal, 2011). Therefore, it is important to distinguish as much as possible between the observation stages and the conclusions based on those observations.

An eight-level Hierarchy of Expert Performance (HEP, see Figure 1) was formulated using these three dimensions (Dror, 2016). More details and examples can be found from the forensic science and the medical domain (Dror, 2016), as well as from the forensic psychology domain (Dror & Murrie, 2018). Structuring and distinguishing between different components in expert performance allows us to have a conceptual framework to systematically examine expert performance, which helps us to understand how these elements associate with one another. In so doing gaps in the literature can be identified to formulate future research, and policies tackling particular issues can be more effectively constructed.

²Although it is not always apparent if something is relevant or not, and there are instances where it is hard to determine what is irrelevant, there are nevertheless instances that information is clearly not relevant. For example, the race of the interviewee is irrelevant and should not contribute to determining their credibility. It is not within the aim or scope of this paper to determine what is relevant, or irrelevant, but to make the point that there is some information that is irrelevant, and if it impacts the decision making, it is biasing (see discussion of this matter by the National Commission on Forensic Science, 2015).

Figure 1. HEP: Hierarchy of Expert Performance (Dror, 2016).

Applying HEP to investigative interview practice and research

Similar to forensic science and forensic psychology professionals, investigative interviewers are, in some countries, well-trained experts. They share the goal of reaching correct conclusions. Forensic scientists examine physical evidence (e.g. fingerprints, trace materials, DNA) from the crime scenes, assess them, and write reports about them to assist investigators and court to make decisions. Investigative interviewers perform similar tasks to their forensic scientist colleagues, but they access what happened via the interviewees' minds. In many ways the nature of the information (recollections from memory, rather than physical evidence from the crime scene) makes the evaluation even more difficult, as memories are very vulnerable to many distortions, such as the effects of people's biases and 'psychological contamination' (e.g. post-event suggestions, leading and suggestive interview questions or coercive interview practices).

Although much work has been devoted to devise protocols for best practice to guide the interviewing (for reviews, see Bull, 2010; La Rooy et al., 2015), the actual practice of the investigative interview experts has rarely been systematically examined beyond its adherence to the best-practice protocols. Using the HEP framework, we first identify and discuss how

each of the three dimensions of HEP can apply to investigative interviewing. Then we examine what, if any, investigative interviewing research exists at each level of HEP.

Observations versus conclusions applied to investigative interviewing

Usually, it is reasonably straightforward to distinguish observations from conclusions in the forensic science domain. For instance, a fingerprint examiner will first carefully observe the minutia characteristics in the friction ridge of the fingerprints (observation) and then draw a conclusion as to whether they 'match' those on another print (Dror & Cole, 2010). In contrast, in investigative interviewing this distinction between observations and conclusions is not always well defined, and sometimes the observations and conclusions are points along a continuum.

A more clearly defined area of observation in interview practice is the types of questions posed by the interviewer. As demonstrated by numerous researchers (e.g. Bull, 2010; Fisher & Geiselman, 1992; Orbach & Pipe, 2011; Pipe, Lamb, Orbach, & Esplin, 2004; Vrij, Hope, & Fisher, 2014), different types of questions (such as open-ended questions, directive questions, option-posing questions or suggestive questions) used in the interview play a critical role in the accuracy of the information elicited from the interviewee. Therefore, the types of questions asked has been one of the most established areas of research and practical evaluation when examining investigative interviews. However, sometimes a question can be classified into more than one category, or difficult to categorize, thus requiring expert's judgement into the observation.

Other than the types of questions being asked, the sequence of the types of questions also plays an important role when evaluating the quality of such interviews. Several well-established guidelines (including the Achieving Best Evidence (ABE) in Criminal Proceedings, Ministry of Justice, 2011; Cognitive Interview, Fisher &

Geiselman, 1992; NICHD interview protocol, Lamb et al., 2007) underscore the importance of prioritizing the use of open-ended questions, followed by specific questions, and finally more closed questions if necessary (Bull, 2010; Newlin et al., 2015). The use of suggestive questions (questions containing information not previously mentioned by the interviewee) should be avoided, especially with child interviewees. Another related area of observation is whether the general sequence of the interview is in accordance with what is recommended in the guidelines for best practices.

Another observational factor is the information reported by the interviewees (for instance, the identity of the alleged perpetrator, the objects used for committing the alleged criminal act, the time of the alleged crime and the location, etc.). Information provided by witnesses, victims and suspects in interviews may be important leads in investigations; it may also elicit evidence for subsequent legal proceedings. Therefore, generally, the more information reported in the interview, the more potential leads and evidence we have to assist the investigation and legal process. However, what counts as ‘investigation-relevant details’ may require the experts’ subjective judgement and may vary across different kinds of investigations as well as different jurisdictions.

Interviewing is a highly dynamic interpersonal process, and the interviewer’s and interviewee’s verbal and non-verbal behaviours can have significant impact on the interview (e.g. Almerigogna, Ost, Bull, & Akehurst, 2007; Bull & Corran, 2002; Teoh & Lamb, 2013). Therefore, the verbal and non-verbal behaviours of both interviewer and interviewee constitute another area of observation. For example, the interviewer’s postures and supportiveness, whether the interviewer interrupts the interviewee’s response, the rapport between the interviewer and interviewee, the interviewee’s body language, reluctance or refusal in answering questions, and emotions

could all provide valuable information about the interview. However, this is another complicated area to tackle, as the sensitivity to correctly pick up and decode others’ emotional or behavioural cues in an interaction can vary according to the observers’ personal characteristics, experiences and training, cultural backgrounds and many other factors. Therefore, this is an observation that requires clear and careful definitions, and at times the observer’s subjective judgement may still be required.

The distinction that HEP seeks to draw between observations and conclusions is important in investigative interview evaluation because it allows us to identify when and how the accuracy in expert decision making may be compromised. Conclusions are more easily identified, such as the expert/professional’s judgement on the quality of the interview, the credibility of the interviewee (in countries that believe this can be determined), whether the case is substantiated and how the case should proceed following the interview. These conclusions are often made by relevant professionals (not limited to interviewers alone, as many other professionals may be involved in the decision-making process, such as social worker, police officer/investigator, prosecutor, judge, etc.) based on their observation of the interview. In order to assist them to make more objective judgements, structured tools for interview content analyses have been developed.

One such tool is criterion based content analysis (CBCA; Steller & Köhnken, 1989; for recent meta-analyses, see Amado, Arce, & Fariña, 2015; Amado, Arce, Fariña, & Vilariño, 2016). Assessments/judgements based on CBCA are accepted as evidence in some North American courts and in criminal courts in several Western European countries such as Germany, Holland, Spain and Sweden (Steller & Böhm, 2006; Vrij, 2008), but not in the UK and Canada (Novo & Seijo, 2010). Whether CBCA is accepted as evidence may arise from differences in the procedural law in the respective countries. CBCA experts read

written transcripts of interviews (some of which they themselves have conducted) with children in alleged sexual abuse cases and score for the presence (or absence) of 19 criteria in these transcripts. In this way, the final score is intended to help the experts to draw a more objective conclusion based on the observations (the presence of these 19 criteria). However, these criteria scores are not factual observation but require the expert raters' subjective judgement (Köhnken, 2004); therefore, we discuss the CBCA research within the conclusion levels in the HEP. Overall, as Dror and Murrie (2018) pointed out, the forensic and investigative psychology research literature provides far more evidence in *conclusions* than in *observations*.

Reliability versus biasability applied to investigative interviewing

Reliability can be examined by the experts' consistency in observing the interview dynamics (observation) and making judgements about the interview (conclusions). For example, would different experts categorize the interviewer question types in the same way if they are given the same interview recording to review (i.e. between-expert observation)? Would they make the same judgement on the credibility of the interviewee (i.e. between-expert conclusion)? Would the same expert make the same count of different question types if given the same interview recording to review at different times (i.e. within-expert observation)? And would she or he make the same judgement about the interview at these different times (i.e. within-expert conclusions)?

Biasability, the potential impact of irrelevant contextual information (Dror, 2016), has yet to be systematically examined in the investigative interview field. Interviewers and evaluators are likely to encounter a variety of contextual information that is irrelevant to their evaluation or beyond their expertise. However, the field has not yet identified what information is task relevant or task irrelevant

in any systematic way as other forensic sciences have (see, e.g. the US National Commission on Forensic Science, 2015).

Take confirmation bias, for example: the beliefs an interviewer holds about the case prior to her/his interview may, consciously or unconsciously, lead the interviewer to seek information in a certain direction (e.g. asking suggestive questions to the interviewee), and thus the interview progresses in the direction that is confirming the interviewer's prior beliefs. The biases the interviewers have can be a result of (or cause) '*bias cascade*' or '*bias snowball*' effects (Dror, 2018). With the growing knowledge and understanding in memory suggestibility, the field of investigative interviewing has identified a number of inappropriate (biased) interview practices, which can lead to inaccurate reports from the interviewees, especially in children and vulnerable witnesses (for a review, see Hritz, Royer, Helm, Burd, Ojeda, & Ceci, 2015). Consequently, considerable efforts have been made to develop practical means of minimizing the possible effects of suggestibility and interviewer biases by having standard interview protocols and recommended best practices.

Although many advances have been made to address the issue of suggestibility within interview practice, much is left unexplored about how different sources of biases (e.g. see Dror, 2017) may or may not affect experts' observations as well as conclusions. In highly sensitive contexts, such as child sexual abuse cases, often with limited corroborative evidence, understanding the potential effect of biases is important, so the mitigating measures can be developed and used. Moreover, the impact of biases can go well beyond the interview outcome and can also impact on how the case information is processed, evaluated and finally presented at court. However, there are no standardized procedures (like linear sequential unmasking, LSU, in forensic science) on deciding what information is relevant and irrelevant to present to the interviewer before conducting the interview, how the

information from the interview should be presented, including what content, at which time point, and how much of it should be presented, and to whom.

Between- versus within-expert performance

This dimension examines experts' performance relative to other (*between*) experts versus their performance relative to themselves (*within*). For instance, examining the inter-rater reliability of assessments of the interview content is important (e.g. Lamb et al., 2007), and this addresses the level of reliability between experts' observations (Level 2 in HEP). However, examination for within-expert performance is a more fundamental and insightful measure, but it can be practically difficult to conduct, because an interviewer is more likely to recognize that she or he is reviewing the same interview. Nevertheless, research on within-expert performance is critical, as this is the foundation of professional practices and expertise. The unreliability within experts can severely compromise the validity of their work.

Existing research at each level of the HEP

Level 1. Reliability within expert observations

Level 1 examines the most basic of expert performance: whether the same expert, looking at the same evidence, will observe the same data. Dror et al. (2011) investigated this amongst forensic fingerprint experts and found that not only were their observations not consistent with one another (Level 2), but even the same forensic fingerprint expert looking at the same print is not always consistent with his or her own observations (Dror et al., 2011). In investigative interview research, we know of no comparable published research. However, in Walsh's (2010) unpublished doctoral dissertation he examined real-life investigative interviews with fraud suspects ($n = 142$, of which 115 were audio-taped and 27 verbatim transcripts). He evaluated each of these for over

30 interviewer skills, then some time later, he again evaluated every interview, but this time in a different interview order. He found that his intra-rater correlations for 25 of the 30 skills exceeded .90, and the lowest correlation was .73. These types of studies are critical for the investigative interviewing community to explore and understand potential lack of reliability within experts in observations, and take appropriate measures, when needed, to minimize them.

Level 2. Reliability between expert observations

Level 2 pertains to the reliability between experts' observations of the data. In investigative interview research, this level of examination can be demonstrated in the inter-rater reliability of the coding of interviewer question types and forensically relevant details from interviewees. In other words, will different experts make the same observation about the types of questions posed by interviewer, and identify the same amount of relevant details in the interviewee's response? For instance, in Brown et al.'s (2017) work examining the interviewers' questions posed to vulnerable child witnesses, the trained researchers 'blind' to the research question and the researchers from the research team coded the interviewer question types (open prompts, cued invitations, direct prompts, option-posing prompts or suggestive prompts) independently. They reached an inter-rater reliability of .91 (Cohen's kappa), showing a high level of reliability between their observations.

Similarly, Gagnon and Cyr (2017) reported high intra-class correlations for the number of forensically relevant details (correlation $r = .98$) and for types of questions ($r = .99$) observed by researchers when coding the interview. When the interview question types were coded by experienced investigation professionals, the inter-rater agreement ranged from .57 to 1.00 (Cohen's kappa, see Walsh & Bull, 2015), and percentage of rater agreement between police officers was 79% (Clarke &

Figure 2. Seven different sources of biasing information (Dror, 2017; Zapf & Dror, 2017).

Milne, 2001; Clarke, Milne & Bull, 2011). These results indicate a high level of reliability between experts' observations.

Level 3. Biasability within expert observations

Level 3 in HEP examines whether the same expert will observe the evidence differently if it is presented within irrelevant contextual information. In investigative interview research, we know of no research examining this aspect of expert performance. Investigative interview experts rarely examine exactly the same case data in the way a forensic scientist might re-examine the same evidence without recognizing they were looking at a case that they had previously examined. Moreover, as discussed in previous sections on biasability and reliability, the field has not considered or identified what information is task irrelevant or task relevant systematically as other forensic sciences have. To minimize the possibility of experts recognizing that the interview case is one that they had examined before, researchers could use partial interview files (e.g. only one section of the interview instead of the whole interview transcript, or viewing only the interviewer questions at one occasion and viewing only the interviewee's responses at another occasion) and give different contextual information at different times.

Level 4. Biasability between expert observations

The Level 4 of HEP looks at whether the observations of the data among different experts are biased by irrelevant information. Dror (2017; see also Zapf & Dror, 2017) identified seven different sources of biasing information (see Figure 2), one of which is the reference material (a 'target') that evidence is matched to. For example, when the evidence from the crime scene is observed within the context of the 'target suspect', will this bias how the actual evidence is observed? Although the investigative interview field has yet to systematically distinguish what information is task irrelevant or relevant, some information (e.g. the attractiveness of an alleged rape victim) is clearly irrelevant and should not impact experts' observations (e.g. the number of case-relevant details reported in the alleged victim's interview or the types of questions asked). The authors have not found any comparable research examining biasability between experts' observation in the investigative interview literature, underscoring the need for future research.

Level 5. Reliability within expert conclusions

Level 5 is the first level in the HEP regarding experts' conclusions, and it examines the

reliability of conclusions *within* experts. This is a more basic measure of reliability, in that we would expect an expert to reach the same conclusion if considering the same data on different occasions. Findings from forensic fingerprint examiners demonstrated that they will not reach the same conclusions 10% of the time, even when the same experts examine the same pair of prints in the absence of biasing information (Ulery, Hicklin, Buscaglia, & Roberts, 2012). In investigative interview research, we know of no comparable research that examines this aspect. As discussed above in Levels 1 and 3 of the HEP, *within*-expert studies are much more difficult to conduct in general, and even more so for interviewing. However, within-expert reliability regarding conclusions is critical for establishing the scientific rigor of the expertise, which should be prioritized in future research.

Level 6. Reliability between expert conclusions

Will different experts evaluating the same data reach the same conclusions in the absence of biasing information? Unfortunately, research evidence from the forensic science field showed that, even in the absence of irrelevant biasing information, fingerprint and DNA examiners will reach a range of different and conflicting conclusions when they examine the very same evidence (e.g. Dror & Hampikian, 2011; Dror & Rosenthal, 2008). Such findings are alarming as unreliable expert judgements compromise the goal of equitable justice. In investigative interview research, several studies provide information about the reliability between experts' conclusions. These can be in the form of different professionals' judgement on credibility (e.g. is the interviewee's statement believable?), quality of interviewers' practice (e.g. is this a good interview?), whether the case is substantiated and how the case should proceed.

The majority of the research evidence at this level has come from one of the most contested topics – the credibility of child sexual

abuse (CSA) testimony. Due to the difficulty of obtaining corroborative evidence in CSA cases (Herman, 2010; Lamb, Hershkowitz, Orbach, & Esplin, 2008), these investigations are often largely based on children's accounts, and the discrepant opinions about the validity and credibility of CSA cases had invoked a large amount of research since the 1990s (see Herman 2009 for reviews). However, there is still no method that can validly distinguish between truthful and false statements (Vrij, Granhag, & Porter, 2010; although several components of the CBCA have been validated, e.g. Roma, Martini, Sabatello, Tatarelli, & Ferracuti, 2011). Also, increasingly research brings professionals' ability to accurately assess a child's testimony into question (Herman, 2009; Zajac, Garry, London, Goodyear-Smith, & Hayne, 2013).

A substantial body of research has demonstrated subjectivity in CSA case assessments, jeopardizing the reliability of professionals' performance. Subjectivity is inferred to the degree that case ratings or determinations are unreliable, or are systematically related to characteristics of the professional, such as professional discipline (Horner et al., 1993a, 1993b; Jackson & Nuttall, 1997), years of experience (Jackson & Nuttall, 1997), the professional's gender (Finlayson & Koocher, 1991; Horner et al., 1993a, 1993b; Jackson & Nuttall, 1997), and personal history of childhood sexual abuse (Jackson & Nuttall, 1997).

Several analogue studies have focused on professionals' credibility ratings using a variety of methodologies, including observations of behavioural cues during the interview (Ceci & Huffman, 1997; Westcott, Davies, & Clifford, 2007), comparisons of the performance of professionals to that of laypersons (Chahal & Cassidy, 1994; Leach, Talwar, Lee, Bala, & Lindsay, 2004; Tye, Henderson, & Honts, 1995), using verbal tools such as the CBCA (Akehurst, Kohnken, & Hoefer, 2001; Steller, Wellerhaus, & Wolf, 1988; Yuille, 1988). Across these studies and the different methods used, on average, a third of the

judgements were 'incorrect' (Melkman, Hershkowitz, & Zur, 2017). Overall, experts do not seem to substantially outperform laypersons in successfully identifying those telling the truth from those telling lies (Bond & DePaulo, 2006; Crossman & Lewis, 2006; Edelstein, Luten, Ekman, & Goodman, 2006; Strömwall, Granhag, & Landstrom, 2007; Vrij, Akehurst, Brown, & Mann, 2006). However, Mann, Vrij, and Bull (2004) found police performance to be noticeably above chance when observing video-recorded police interviews with real suspects; and Dando and Bull (2011) found experienced police interviewers to achieve noticeably higher accuracy when gradually disclosing information to suspects.

If we leave out the issue of actual validity of the judgement (whether the professional's judgement is accurate) and just focus on examining the inter-rater reliability of professionals' judgement of the perceived credibility of interview contents, inter-rater reliability is still alarmingly poor, regardless of whether the statements were obtained in analogue studies (Ceci et al., 1994; Horner et al., 1993a, 1993b) or using transcripts from real investigative interviews (Finlayson & Koocher, 1991; Jackson & Nuttall, 1993). Credibility ratings of any given statement are usually distributed across the full available range in analogue studies (e.g. range from .10 to .90 in Horner et al.'s, 1993a, 1993b, studies; and 0–25% to 75–100% in Finlayson & Koocher's, 1991, study) as well as field studies (ranging from 'certainty that the abuse had occurred' to 'certainty that it had not occurred', Finlayson & Koocher, 1991; Jackson & Nuttall, 1993).

Using structured tools, such as CBCA, to assist with analyses of the interview content seemed to improve the validity of experts' judgement on interviewee credibility (Amado et al., 2015; Roma et al., 2011). Nevertheless, the inter-rater reliability of the CBCA studies from field data (using child sexual abuse case interview transcripts, e.g. Roma et al., 2011; Welle, Berclaz, Lacasa, & Niveau, 2016)

demonstrated a range of reliability coefficients for the various criteria (e.g. Maxwell's Random Error (RE) coefficient ranged from .52 to .94 in Roma et al., 2011; Krippendorff α coefficient ranged from $-.13$ to .75 in Welle et al., 2016), demonstrating the need for improvement on its diagnostic accuracy, hence the unreliability of between-experts' conclusions.

In field interview data, Hershkowitz and her colleagues (Hershkowitz, Fisher, Lamb, & Horowitz, 2007) have shown that using the NICHD investigative protocol significantly improved the levels of accuracy in judgements of credibility as well as inter-rater reliability. When rating non-protocol interviews, the distribution of investigators' judgements about credibility was wider and inter-rater reliability lower ($\alpha = .764$) than when rating protocol interviews ($\alpha = .874$). The advantage of the protocolled interviews in increasing reliability ratings was especially evident when rating cases involving implausible allegations ($\alpha = .642$ for protocol and $\alpha = .338$ for non-protocol interviews), but not when rating plausible allegations ($\alpha = .811$ for protocol and $\alpha = .890$ for non-protocol interviews). However, rates of erroneous judgements still exceeded 40%, and an additional 16.7% (excluded from accuracy calculation) were deemed as 'no judgement possible' (Hershkowitz et al., 2007).

As for judgement on quality of the interview, when there are clear guidelines on the criteria of good practice, such as having a list of appropriate interviewer questioning skills and behavioural items (e.g. MacDonald, Snook, & Milne, 2017; Read, Powell, Kebbell, Milne, & Steinberg, 2014), the inter-rater reliabilities tend to be higher. For example, in MacDonald, Snook, and Milne's (2017) field evaluation of witness interview training, their inter-rater reliability (kappa) ranged from .60 to 1.00 for individual items, and the overall value was .75. In Read et al.'s (2014) study, the agreement percentage of the behavioural categories ranged from 50% to 100%,

whereas in Walsh, King, and Griffiths (2017) the inter-rater correlations between two expert evaluators ranged from .77 to 1.0. Walsh et al. (2017) also compared the interview quality evaluation between the interviewers (who conducted the interview) and the two expert evaluators' judgements, and they found that the interviewers' self-evaluations tended to be higher than those of the experts.

Overall, similar to what Dror and Murrie (2018) found within the field of forensic psychology, most of the research literature regarding investigative interviewing is within Level 6 in the HEP *reliability between expert conclusions*. But even within this level, the data are mainly in the area of judgement of interviewee credibility and some in evaluating interview quality. Important questions, such as whether different experts will make the same decision about how to process the case after viewing the same interview, were unknown.

Moreover, there is a lack of reliability data for civil evaluations, and to the authors' knowledge, civil cases such as custody evaluation interviews (both of parents and children) even lack a structured protocol for their conducting (although in England civil courts require adherence to the ABE guidance). In such situations, the courts in many countries may restrict rights (or tolerate risk of great harm) based on the opinion of an evaluator. Therefore, the evaluator's ability to make reliable conclusions is critical. Data about reliability may help inform policies requiring multiple evaluations or multidisciplinary team (MDT) work, or to have a checklist to help measure and assess experts' judgement regarding interviews. Further understanding of the factors that affect reliability in experts' conclusions can facilitate development of specific measures and policies to improve practice, like how the Fingerprint Analyses Consistency Tester (FACT; Dror et al. 2011) was developed in the forensic sciences. However, without data, we cannot ascertain the quality of the performance of the investigative interviewers, let alone characterize it, so as to develop tools to help improve it.

Level 7. Biasability within expert conclusions

Will the *same* evaluator arrive at the same conclusions when she or he reviews an identical interview within a different (irrelevant) biasing context? Evidence from forensic fingerprint experts demonstrates that, when the same fingerprints were presented to them on different occasions within different irrelevant contexts, they did not always reach the same conclusions (Dror & Rosenthal, 2008). Their conclusions varied depending on several factors, such as the difficulty of the decision, the strength of the biasing-irrelevant contextual information and the direction of the bias (for more information, see Dror, 2016).

We know of no comparable research in the investigative interview field. As discussed above (in Levels 1, 3 and 5), *within*-expert studies are much more challenging to conduct. Moreover, as discussed in the section on biasability and reliability, the field of investigative interviewing has not even systematically identified what information is task irrelevant or task relevant. Questions such as would an interviewer make the same judgement about the same suspect interview given two different pieces of contextual irrelevant information (e.g. in the first context the suspect had criminal history, and in the second context the suspect has no criminal record) are important to have research data on. Such studies and underlying questions, albeit more difficult to execute in the investigative interview field, are important to investigate.

Level 8. Biasability between expert conclusions

Will different experts be biased by irrelevant contextual information when examining identical materials? Several biasing effects of contextually irrelevant information have been identified in forensic science, such as whether a suspect confessed to a crime and whether other evidence suggests the suspect is the culprit. For example, research with forensic DNA experts' conclusions demonstrated that, when

the examiners were exposed to the biasing information (that the suspect was involved in a gang rape), they concluded that the suspect could not be excluded from being a contributor to the DNA mixture. In contrast, most (16 out of 17) examiners not exposed to the biasing information did not reach this conclusion (Dror & Hampikian, 2011).

In investigative interview practice, interviewers are likely to encounter a number of irrelevant contextual information before, during and after the interview. One such piece of irrelevant contextual information is the party requesting the expert's opinion. Ideally, experts should provide impartial evidence-based opinion about the interview/case to the party who requested their services. However, research from the forensic psychology field suggests that *adversarial allegiance* (a bias towards reaching conclusions that favour the party retaining their services) may influence forensic psychology expert evaluations (Murrie & Boccaccini, 2015; Murrie, Boccaccini, Johnson, & Janke, 2008; Murrie, Boccaccini, Turner, Meeks, Woods, & Tussey, 2009).

Adversarial allegiance also exists among witness suggestibility experts. McAuliff and Arter (2016) examined 100 witness suggestibility experts' responses after they reviewed the same police interview of a female child victim, while manipulating the experts' beliefs about their retaining party (prosecution or defence) and about the interview suggestibility (low, high). They found that experts who believed they were working for the prosecution were more willing to testify than those who believed they were working for the defence when perceived interview suggestibility was low. In contrast, when perceived interview suggestibility was high, experts who believed they were working for the defence were more willing to testify. Moreover, these experts' anticipated testimony focused more on pro-defence aspects of the police interview and child's memory overall (negativity bias), but favoured the retaining party only when the perceived interview suggestibility was low.

Additionally, the prosecution-retained experts focused more on the pro-defence aspects of the case in the high suggestibility interview condition, but focused more on the prosecution aspects in the low suggestibility interview condition, but the defence experts did not show such differences.

Another piece of information that affected the experts' judgement in the McAuliff and Arter's (2016) study was the experts' beliefs about how the interview was conducted. The experts' judgement about the child victim accuracy and interview quality were negatively affected if they believed the interview was highly suggestive, despite the actual interview content remaining identical. However, such information (suggestibility of interview practice) is actually relevant to the quality of the interview, because it can impact the quality of information obtained from the interviewee; and these experts' judgements did rightly reflect their knowledge about it. More research is necessary in the field to identify *how* these experts make such judgements, and whether this affects their judgement at both observation and conclusion levels. However, the 'bottom line' is that research within the investigative interviewing domain currently does show existence of bias at the Level 8 of the HEP: different experts examining the same data can reach different conclusions due to biasing impact of irrelevant contextual information.

Information about the interviewee could also be a source of bias in experts' judgement. For instance, negative perceptions of the reliability and suggestibility of witnesses with intellectual disabilities (ID) appear to have been widespread amongst some police officers (Aarons & Powell, 2003) and legal professionals (Nathanson & Platt, 2005). In a study by Stobbs and Kebbell (2003) mock jurors judged adults as witnesses described as having ID as having less credible and less accurate testimonies and being less competent witnesses than a typically developing (TD) counterpart, and therefore gave fewer guilty ratings of the perpetrator, meaning that cases may be less likely

to be investigated because successful outcomes (i.e. guilty verdicts) are deemed unlikely (Aarons, Powell, & Browne, 2004). However, some countries' recent (e.g. government) policies may be increasing the likelihood of such cases being investigated.

Peled, Iarocci, and Connolly (2004) used video and written transcripts of a child testimony to examine mock jurors' judgement of witness ability and credibility. They found that jurors believing the child had ID rated the child witness as less credible than those who believed the child was TD when the video testimony was presented, whereas such differences were not found when the testimony was presented as written transcripts. This suggested that a general (negative) bias regarding the competency of witnesses with ID may be ameliorated when jurors are presented with actual testimony (Peled et al., 2004). Similarly, Brown and Lewis (2013) found that mock jurors judged a child witness as less accurate in responding to suggestive questions and less cognitively competent when the child witness was presented as having an ID. Such bias in perception about children with ID was also present in attorneys (Nathanson & Platt, 2005). Information about the interviewee (such as age, cultural background, disability, etc.) is indeed important for the interviewer to prepare and plan the interview in order to obtain the best evidence. However, given the possible biasing effect of interviewee characteristics on evaluators' judgement, it may be advisable to have another professional 'blind' to the interviewee characteristics to independently evaluate the credibility of the interviewee and the quality of the interview.

The field of investigative interviewing has little data on other types of task-irrelevant contextual information that may bias experts. Many questions about contextual bias are important for interviewing practice as well as policy. For example, an interviewer's workplace is technically irrelevant to an interviewee's statement credibility. But might a police interviewer from one jurisdiction reach

different conclusions about the same case interview than another police interviewer from another jurisdiction (especially where actual training differs across jurisdictions), even if they both received the same national standardized interview protocol?

Discussion

The forensic science field had undergone a major shift in the last decade, from its previously solely object-focused inquiries (DNA, fingerprints, firearms, handwriting, etc.) to some countries now integrating the critical role that the human experts play in forensic decision making into safeguarding best practice. Nowadays the forensic sciences are beginning to acknowledge, research and develop regulations as well as policies, and take actions to reduce unreliability and bias in their decision making (Forensic Science Regulator, 2015; National Academy of Science, 2009; National Commission on Forensic Science, 2015; President's Council of Advisors on Science and Technology, 2016).

The investigative interview field has recognized the pivotal role that interview experts have regarding the accuracy of interviewees' statements since the 1980s, after a few day-care sex abuse scandals (such as Little Rascals, Bruck, 1998, and Wee Care, Rosenthal, 1995). Fortunately, such cases fostered the development of evidence-based interview protocols (such as the NICHD protocol) and the introduction in England of typically video-recording investigative interviews with children and the associated 'Memorandum of Good Practice' published by the government (Home Office, 1992) to optimize interview practice and outcome.

However, the attention of the investigative interviewing field is still largely focused on the interview protocols, techniques and outcomes, with far less attention paid to the critical role that the interviewer (and other legal professionals) themselves, as human experts, play while conducting and evaluating

interviews. Some fundamental issues of reliability and validity had indeed received attention, particularly in the context of interview tool assessment. Nevertheless, much less attention has been paid to the factors affecting decision making process and the role that human experts play in investigative interview assessment.

The recent shift in forensic science has generated inspection of the factors affecting forensic science experts' performance and decision making (Dror, 2018). Research evidence in the forensic science field has yielded the Hierarchy of Expert Performance (HEP in short, Dror, 2016) model for examining expert decision making, providing a framework for systematically examining and organizing existing research to assist in identifying problematic or under-researched areas. Applying HEP to investigative interviews has unveiled a few areas of strength and weakness, as well as several areas in which basic research is severely lacking. For areas of strength, investigative interview research has provided evidence on *reliability between experts' observations* (Level 2). These studies demonstrated reliability in the coding of interview transcripts, revealing inter-rater reliabilities among field professionals (e.g. Walsh & Bull, 2015) as well as academic researchers (e.g. Brown et al., 2017). However, research about *reliability between experts' conclusions* (Level 6) revealed weakness in the experts' performance reliability, even with verbal analytic tools intending to objectify and assist experts' judgement, such as CBCA. The data revealed the unreliability of between-experts' conclusions (e.g. Welle et al., 2016). However, having protocol interviews did help increase reliability (Hershkowitz et al., 2007).

As for areas lacking in research evidence, the field offers no published data on *reliability within experts* at the level of observations (Level 1) or conclusions (Level 5). This fundamental form of reliability must be examined and quantified, in order to establish the robust scientific basis for investigative interview

practice. However, we acknowledge that such research can be particularly challenging to conduct, but it is imperative to establish a scientific foundation.

There is also some research at the *biasability between experts' conclusions* (Level 8) level, demonstrating the biasing effects of task-irrelevant information on experts' judgement (e.g. McAuliff & Arter, 2016), though such a study requires replication. The limited available research on bias has addressed *adversarial allegiance* (McAuliff & Arter, 2016), which may contribute to injustice in the adversarial justice system. Interviewee disability (e.g. Brown & Lewis, 2013) could also contribute to experts' biases in judgements. Biases related to gender, race, sexual orientation, attractiveness, profession and religion, or other potential topics related to crime details or criminal stereotypes, or basic base-rate expectation biases (see Figure 2), to our knowledge, still remain under-studied among interview experts' decision-making. More research on biases and factors affecting investigative interview experts' decision making is clearly needed, and the field needs to thoroughly identify what information is task relevant or task irrelevant, and at which point of the case progression such information is actually needed. If evidence-based consensus could be reached about which factors are relevant/irrelevant under specific conditions, then further research could be conducted to identify which factors have the lowest or highest levels of reliability/biasability, which then could be used for professional training purposes.

Conclusion

Based on research in forensic science, different context management protocols could be developed to minimize such impacts of bias and irrelevant contextual information. For example, linear sequential unmasking (LSU) controls the sequence and timing for providing information (Dror et al., 2015). LSU, and the need to minimize bias in forensic science, has

been adopted by the UK Forensic Science Regulator (2015) as well as the US National Commission on Forensic Science (2015). However, no such research and actions appear to have been undertaken within the investigative interview field.

Countless decisions are made about any given interview, both formally and informally, at each stage of the investigative process, which may influence whether a case that relies on the testimony of a witness, a victim or a suspect will proceed. For example, parents (if the interviewee is a child), social workers, police, investigative interviewers, lawyers, expert witness, prosecutors and judges all make judgments of the capacity of a witness and the possible contribution of their evidence to a case outcome, even if the case never reaches court. The investigative interview field should develop such context management protocols based on research evidence to minimize bias in decision-making process. After all, this 'psychological crime scene' (i.e. the interviewee's memory) is highly vulnerable to contamination, resulting in consequences that can jeopardize justice. If such issues are not isolated within the judicial process, they can easily cause bias cascade or bias snowball that stand in the way of the fair administration of justice.

Author statement

We are grateful to the anonymous reviewers who provided their invaluable suggestions to improve this manuscript. This research did not receive any specific grant from funding agencies in the public, commercial or not-for-profit sectors.

Ethical standards

Declaration of conflicts of interest

Ching-Yu Huang has declared no conflicts of interest

Ray Bull has declared no conflicts of interest

Ethical approval

This article does not contain any studies with human participants or animals performed by any of the authors.

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