

Metacognitive effects of initial question difficulty on subsequent eyewitness memory performance[☆]

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In this study, we examined the influence of initial question difficulty on the confidence in the answers to subsequent questions, affecting the tendency of eyewitnesses to report them. Target questions of intermediate difficulty about event details were preceded by either difficult or easy questions. In contrast to forced-report performance, free-report performance was affected by initial question difficulty: When preceded by difficult questions, more answers to the target questions were confidently held and hence were more likely to be reported, yielding a larger quantity of correct reported answers. These findings demonstrate how changes in subjective experience, as a result of initial question difficulty, can influence metacognitive monitoring and control, thereby affecting free-report eyewitness memory performance. From an applied perspective, our findings suggest that preceding questions about a witnessed event by relatively difficult as opposed to relatively easy questions can yield more event information from eyewitnesses, resulting in more complete eyewitness reports.

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When eyewitnesses are questioned, they typically have the freedom of deciding which questions to answer and which to refrain from answering. Under such free-report conditions, two measures of memory performance can be distinguished: *Memory quantity* and *memory accuracy* (see Koriat & Goldsmith, 1994, 1996). Memory quantity is *input-bound*, reflecting the likelihood that an event detail will be remembered correctly (or the completeness of an eyewitness account). In contrast, memory accuracy is *output-bound*, reflecting the likelihood that a reported event detail is correct (or the reliability of the reported information).

Previous studies have shown that certain aspects of eyewitness questioning can affect the quantity and/or the accuracy of the reported information (for a review, see Pansky, Koriat, & Goldsmith, 2005). For example, merely using a definite article when questioning about an object that was not part of the original event (e.g., “Did you see *the* broken headlight?”) rather than an indefinite article (“Did you see *a* broken headlight?”) has been shown to bias eyewitnesses into falsely remembering the specified object, thereby reducing memory accuracy (Loftus & Zanni, 1975). In contrast, questioning eyewitnesses using the Cognitive Interview—a technique that assists eyewitnesses in recollecting event details by utilizing psychological principles (e.g., tailoring questions so they are compatible with the witness’s unique mental representation of the crime rather than asking all witnesses questions in a standardized format)—was found to increase memory quantity without reducing memory accuracy

(see Fisher, Milne, & Bull, 2011). These examples demonstrate cognitively-mediated effects on eyewitness reports in the sense that they influence memory retrieval per se. Other studies have demonstrated metacognitively-mediated effects on eyewitness memory performance. For example, it was shown that inducing higher accuracy motivation using implicit or explicit payoffs leads rememberers to set a more strict criterion for reporting, resulting in more accurate memory reports (e.g., Koriat & Goldsmith, 1994, 1996). However, the increase in accuracy usually comes at a reduction in the quantity of correct reported information, in what is known as the *quantity-accuracy tradeoff*.

In the present study, we focused on another potential metacognitively-mediated effect of eyewitness questioning that may affect the quantity and/or accuracy of eyewitness reports: initial question difficulty. Specifically, we examined the effect of initial question difficulty on free-report eyewitness memory performance via the metacognitive processes of *monitoring* and *control*. With regard to monitoring, several studies have highlighted the importance of *retrieval fluency*—the ease with which information comes to mind when retrieving it—as a metacognitive cue that is used to evaluate the accuracy of the retrieved information by heuristically providing the rememberer with a sense of familiarity (e.g., Benjamin, Bjork, & Schwartz, 1998; for reviews, see Benjamin & Bjork, 1996; Kelley & Rhodes, 2002). For example, Shaw and McClure (1996) found higher confidence in the accuracy of items that were repeatedly questioned about than of those that were not (with no difference

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in accuracy). Similarly, [Bonham and González-Vallejo \(2009\)](#) found higher confidence in answers to postevent questions after reading a related (as opposed to a general) narrative, presumably as a result of the retrieval fluency emanating from this additional exposure.

In this study, we examined the role of relative rather than absolute retrieval fluency. Several studies that have manipulated fluency have shown that it is the discrepancy between experienced and expected levels of fluency (i.e., relative fluency), rather than its absolute level, that is critical in influencing memory judgments and other cognitive evaluations (e.g., [Whittlesea & Leboe, 2003](#); [Whittlesea & Williams, 1998](#); see also [Hansen & Wänke, 2008](#); [McCabe & Balota, 2007](#)). The significant impact of relative fluency was attributed to the high salience of such a deviation from what was expected, and to its role in signaling about environmental changes that call for a new appraisal of the situation and may require a change of strategy ([Wänke & Hansen, 2015](#)). The contribution of relative retrieval fluency to subjective confidence gains further importance when considering the potential influence of subjective confidence on one's controlled behavior (e.g., [Alter & Oppenheimer, 2009](#); [Nelson & Narens, 1990](#)). In eyewitness questioning, such influences may be observed because people heavily base their controlled volunteering decisions on their subjective confidence ([Goldsmith & Koriat, 2008](#)). Thus, when people are confident that they correctly know the answer to a question, they will generally provide it; otherwise, they will usually respond "don't know" (e.g., [Koriat & Goldsmith, 1996](#)).

[Koriat and Goldsmith \(1996\)](#) and [Goldsmith and Koriat \(2008\)](#) have developed a framework for studying the metacognitive processes that mediate between the retrieval of information and actual free-report performance: Upon the retrieval of a "best-candidate" answer, a monitoring process operates in order to subjectively assess its correctness (i.e., confidence). Based on the monitoring output, a control mechanism determines whether this answer should be reported or withheld by setting a *report criterion* to which the confidence in the answer is compared. The "best-candidate" answer is volunteered if the assessed probability correct passes the criterion; otherwise, it is withheld.

Consistent with [Koriat and Goldsmith's \(1996\)](#) framework, an effect on controlled behavior via an effect on monitoring was demonstrated by [Hanczakowski, Pasek, Zawadzka, and Mazzoni \(2013\)](#), who manipulated cue familiarity as a factor known to affect metacognitive monitoring at retrieval. They found that presenting primed rather than unprimed cues on a recognition test increased the participants' tendency to believe that they knew the correct answer, increased confidence for both correct and incorrect candidate responses, and consequently, increased the tendency to venture an answer instead of withholding it.

In the present study, we applied [Koriat and Goldsmith's \(1996\)](#) framework to an eyewitness situation, in which the rememberer is typically free to choose which information to report from memory ([Goldsmith, Pansky, & Koriat, 2014](#)). According to the framework, given that eyewitnesses try to provide as much accurate information as possible, they must subjectively evaluate the probability that the information that comes to mind is in fact correct—an evaluation which will

eventually affect their decision of whether or not to report it. This evaluation might be biased by the relative retrieval fluency heuristic described above, via a *metacognitive contrast effect* (cf. [Hansen & Wänke, 2008](#)), by which the experienced ease (or difficulty) of retrieving the answer to a current question is based on an implicit comparison to the ease of answering the preceding questions. Namely, if answering the current question is experienced as relatively difficult compared to the experienced ease of answering the preceding questions, relative retrieval fluency should be quite low, resulting in fairly low confidence in the answer, making it less likely to be volunteered under free-report conditions. Conversely, if answering the current question is experienced as relatively easy compared to the experienced difficulty of answering the preceding questions, relative retrieval fluency should be higher, resulting in higher confidence in the answer. As mentioned, higher subjective confidence is more likely to lead to volunteering an answer, ultimately affecting eyewitness free-report memory performance.

Findings obtained by [Bodner and Richardson-Champion \(2007\)](#) seem to be consistent with an interpretation of a metacognitive contrast effect. They found higher recognition rates and more "remember" (rather than "know") judgments for medium-difficulty details from a crime film following a block of difficult-to-retrieve details than following a block of easy-to-retrieve details. However, because the data they report are combined for both old and new items, they do not speak to the effect of initial difficulty on actual memory performance in terms of quantity and/or accuracy. Furthermore, as the authors correctly note (p. 725), it is not possible to determine on the basis of their data whether initial difficulty affected the participants' recollection of the subsequent items (i.e., memory discrimination) or their decision-making process (i.e., response bias).

In a recent study, [Pansky and Goldsmith \(2014\)](#) examined the effects of initial question difficulty on both subjective experience and actual free-report memory (quantity and accuracy) performance on a multiple-choice general-knowledge test. Using a variation of [Koriat and Goldsmith's \(1996\)](#) research methodology, they demonstrated effects of initial question difficulty on free-report performance via its effects on metacognitive monitoring and control, alongside comparable forced-report performance. Specifically, the participants in an initially-difficult group were more confident in their answers to the subsequent target questions than the participants in an initially-easy group. The effect of initial question difficulty on subjective confidence was translated into an overt effect on controlled behavior, with a higher tendency to volunteer an intermediate-difficulty answer after initially answering difficult questions than after initially answering easy questions. The effect of initial difficulty on confidence, and consequently, on volunteering rate, resulted in higher free-report memory quantity in the initially-difficult group, such that a larger quantity of correct answers was freely reported after answering initially-difficult questions than after answering initially-easy questions. Free-report memory accuracy, or the proportion of correct answers among those that were volunteered, was not affected by initial difficulty. Finally, Pansky and Goldsmith showed that the estimated report criterion was not affected by initial difficulty, supporting the interpretation

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