# Predicting and postdicting eyewitness accuracy and confidence☆,☆☆

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## ABSTRACT

A primary consideration regarding the admissibility of expert testimony in criminal trials is whether particular evidentiary issues are intuitively understood by jurors. Experiment 1 assessed the eyewitness identification accuracy and confidence of 287 retail store clerks, half of whom knew, while interacting with the target, that they would later be tested on their ability to identify that person. Two weeks later, each clerk/witness was tested on both a target absent and a target present lineup. In Experiment 2, 32 undergraduate students were given a detailed description of Experiment 1 and asked to postdict the clerks' accuracy and confidence. Although individual students often erred in their absolute estimates, their postdictions were sensitive to the effects of the warning and lineup manipulations; on average their estimates largely approximated the direction and magnitude of the effects observed in the clerks' data.

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Psychologists sometimes serve as expert witnesses testifying as to variables that affect eyewitness identification accuracy and confidence when there are evidentiary issues that are considered to be "beyond the ken" of jurors. The rationale for such expert testimony hinges on the idea that experts' knowledge differs substantially from jurors'. But what do we know about jurors' knowledge and beliefs regarding eyewitness identification, and how do we know it?

Psychologists have used a variety of methods to assess laypersons' knowledge and beliefs regarding eyewitness identification. Several surveys of laypersons' explicit beliefs suggested that jurors have generally poor knowledge regarding the factors that influence eyewitness identification accuracy and confidence (e.g., Benton, Ross, Bradshaw, Thomas, & Bradshaw, 2006; Schmechel, O'Toole, Easterly, & Loftus, 2006). Surveys of experts indicate that many of them believe that laypersons do not intuitively possess an accurate understanding of eyewitness phenomena (e.g., Kassin, Tubb,

Hosch, & Memon, 2001). However, in a recent set of Canadian surveys, laypersons' accuracy was greater than anticipated (Read & Desmarais, 2009a, 2009b). Additionally, meta-analysis of extant survey research showed that (a) respondents agreed with experts two-thirds of the time; (b) accuracy has increased over the last 30 years of research; and (c) divergences between expert and lay opinions often involved issues about which there is substantial disagreement among experts (Desmarais & Read, 2011).

In experimental research, inferences about lay beliefs have sometimes been based on participants' reactions to eyewitness identification evidence, either in the form of mock trials (e.g., Cutler, Dexter, & Penrod, 1990; Leippe, Eisenstadt, Rauch, & Seib, 2004; Neal, Christiansen, Bornstein, & Robicheaux, 2012) or videotapes of interviews and eyewitness identifications (e.g., Reardon & Fisher, 2011; Wells, Lindsay, & Ferguson, 1979). Participant/jurors often fail to distinguish accurate from inaccurate eyewitnesses and generally believe witness identifications are accurate (e.g., Boyce, Beaudry, & Lindsay, 2007; Kassin, Rigby, & Castillo, 1991; Lindsay, Wells, & Rumpel, 1981).

Researchers have pointed to the influence of eyewitnesses' apparent confidence to explain observers' generally poor performance assessing the accuracy of identifications (e.g., Boyce et al., 2007; Semmler, Brewer, & Douglass, 2012). Indeed, when asked directly, participants typically indicate that confidence is a good predictor of eyewitness accuracy (e.g., Read & Desmarais, 2009b). Participants' reliance on witnesses' confidence has also been borne out in studies using experimental paradigms (e.g., Cutler et al., 1990; Wells et al., 1979). Such reliance on confidence runs counter to the prevailing view of expert psychologists that confidence is

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not a reliable indicator of accuracy (Kassin et al., 2001). But a number of findings published since the mid-1990s suggest that under some conditions confidence is at least moderately related to accuracy, particularly among "choosers" and when conditions promote wide variability across subjects in ability to identify the culprit (e.g., Brewer, Weber, Wootton, & Lindsay, 2012; Brewer & Wells, 2006; Leippe & Eisenstadt, 2007; Lindsay, Nilsen, & Read, 2000; Lindsay, Read, & Sharma, 1998; Read, Lindsay, & Nicholls, 1998; Sauer, Brewer, Zweck, & Weber, 2010; Sporer, Penrod, Read, & Cutler, 1995; see also Roediger, Wixted, & DeSoto, 2012).

Only a few published studies have asked participant/witnesses to predict their own performance on an upcoming identification task (e.g., Hourihan, Benjamin, & Liu, 2012; Read, 1995, Experiment 3). Participant/witnesses in these studies often overestimated their accuracy on photo identification tasks. Cutler and Penrod's (1989) meta-analysis showed trivial correlations between pre-identification confidence and identification accuracy. More recently, a large naturalistic study by Sauerland and Sporer (2009) found that, for choosers and non-choosers, the correlation between pre-decision confidence and later accuracy was statistically significant, but small in magnitude. Similar results were found by Valentine and Mesout (2009). Overconfidence is also found when participants are asked to predict their performance on other types of memory tasks, such as memory for words (e.g., Bjork, Dunlosky, & Kornell, 2013; Zimmerman & Kelley, 2010).

Another few studies have assessed participant/witnesses' feeling-of-knowing judgments for details of an eyewitness scenario (e.g., Perfect & Hollins, 1996, 1999). The paucity of research on witnesses' beliefs about their ability to identify culprits is odd because criminal investigators sometimes query real-world eyewitnesses as to whether they believe they could identify the perpetrator. For example, Jennifer Thompson was asked first by the police whether she believed she could identify her rapist, in part because she described trying to memorize the perpetrator's face during the assault (see Hourihan et al., 2012, for case discussion). A useful perspective in this regard is the "cue belief" model developed by Leippe, Eisenstadt, and Rauch (2009), in which a participant/witness's preparedness for and willingness to choose someone from a lineup is theorized to depend upon a summation of cues from three sources: intrinsic (adequacy of encoding), self-credibility (judgments of one's own memory), and extrinsic cues (information about the viewing situation, such as viewing time or distance). We suspect that laypersons' judgments regarding the likely accuracy of a witness' identification may similarly incorporate inferences about the availability of these kinds of cues to eyewitnesses.

Our Experiment 1 included measures of participant/witnesses' prediction of their own performance on target absent (TA) and target present (TP) lineups. Experiment 2 added a second method, a postdiction approach, in which naïve participants are given detailed descriptions of the conditions employed in an empirical investigation of eyewitnesses' accuracy and confidence and are asked to postdict the participant/witnesses' performance. As in surveys, this postdiction paradigm speaks to participants' knowledge of the influence of particular variables on legal outcomes (e.g., eyewitness accuracy and confidence). The postdiction paradigm also addresses some critiques of survey methodologies by allowing researchers to ask questions that are specific and to provide participants with a context in which to make their judgments (e.g., Boyce et al., 2007). Postdiction studies permit researchers to examine participants' perceptions of both the presence and magnitude of the effects of particular variables on eyewitness accuracy. Although some opinion surveys have also attempted to quantify respondents' impressions of the strength and relative importance of particular phenomena (e.g., Lindsay, 1994; for review, see Boyce et al., 2007), the majority have not. The survey approach has also

been criticized for drawing inappropriate comparisons between the responses of laypersons and eyewitness experts on survey items that were specifically designed for experts, rather than laypersons (see Read & Desmarais, 2009b). Postdiction studies allow comparisons between layperson opinion and objective reality, without relying on expert opinion as a proxy for the latter. Two important qualifications must be made, however: The eyewitness experiment that provides the index of "objective reality" against which layperson's postdictions are compared must be both methodologically sound and have high external validity. If these conditions are not met, the results of postdiction research would be of little value.

Despite the advantages of postdiction methods, their use in the experimental literature has been limited. The first study of which we are aware was conducted by Kassin in 1979 (reported in Wells, 1984). Kassin (1979) asked participants to postdict the results of an eyewitness study by Leippe, Wells, and Ostrom (1978) in which a theft was staged. Participants overestimated eyewitness accuracy rates. Brigham and Bothwell (1983) reported similar evidence of overbelief in eyewitnesses. They used descriptions of one of Leippe et al.'s (1978) conditions and of Brigham, Maass, Snyder, and Spaulding's (1982) field study of Caucasian convenience store clerks' ability to identify Caucasian and African American customers. Results showed some sensitivity to the cross-race effect in Brigham et al.'s study, with participants predicting 68.9% accuracy for the Caucasian customer and 51.1% accuracy for the African American customer on a 6-person lineup. Interestingly, in the field study with store clerks the cross-race effect was not observed, with accuracy for Caucasian (31.3%) and African American (32.3%) customers being virtually identical. Wells (1984) provided participants with a modified description of the study by Leippe et al. (1978) that included a manipulation of the eyewitness's self-reported confidence. Some participants were told that the witness had been "completely certain" in his/her identification, whereas others were told that the witness had been "somewhat uncertain." No relationship was found between confidence and accuracy in Leippe et al.'s (1978) study, but participants predicted a probability of .83 that the confident eyewitness' identification was accurate and only a probability of .28 that the uncertain witness' identification was correct. Finally, Yarmey (2004) found that students overestimated accuracy in TP lineups and underestimated accuracy in TA lineups for a naturalistic eyewitness study he had conducted.

There are noteworthy limitations in the extant postdiction studies. Most significantly, all studies except Yarmey (2004) employed only TP lineups and so shed no light on participants' perceptions of the probability of correct rejection of a TA lineup. Second, the actual witness data have not always been consistent with expectations based on laboratory research. For example, the lack of a cross-race effect in Brigham et al.'s (1982) study is troubling, given the robustness of that effect (e.g., Brigham, Bennett, Meissner, & Mitchell, 2007), although a floor effect for accuracy may have been present. Third, the Leippe et al. (1978) study, used as "ground truth" in two of the published postdiction studies, had a rather small sample size.

Experiment 1 assessed the eyewitness identification accuracy and confidence of 287 retail store clerks. Approximately half of the sample knew, while interacting with the target, that they would later be tested on their ability to identify that person. Each clerk/witness was tested on both a TA and a TP lineup, and predicted his/her performance on both types of lineups. In Experiment 2, 32 undergraduate students were given a detailed description of Experiment 1 and asked to postdict the clerk/witnesses' accuracy and confidence. Rather than emphasizing the absolute accuracy of students' postdictions, we focused on the extent to which their intuitions about the effects—or lack of effects—of particular variables on eyewitness accuracy and/or confidence conformed to the empirical patterns.