Categorical & Probabilistic Fingerprint Evidence and Proficiency Information: Two Recent Studies

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Project Rationale & Goals

Project U: Research on Lawyers, Jurors, and the Evaluation of Forensic Evidence

The broad goal of the project is to better understand how to convey forensic information in the courtroom in a way that is accurate and comprehensible to jurors, but also lawyers and judges. We focused initially on proficiency and error rate information, as our initial studies suggested such information is highly salient to laypeople. We hope that this research will be of academic interest and of real practical use for latent fingerprint examiners.

Materials & Methods

In each of these two studies, we commissioned Qualtrics to recruit a nationally representative sample with respect to gender, race/ethnicity, age, and geographic region in the United States. A total of 1,450 adults for the work in progress, and 858 adults for the recently published work, received approximately $3 each for participation in the study, which took less than 15 minutes.

The description of the case was kept simple in both studies, to keep the Participants focused on the fingerprint evidence itself.

In the first study, the survey software assigned participants to one of 14 conditions with five proficiency levels and three error types, as well as a control in which the examiner received a perfect score on proficiency (with no errors) and a control condition with no proficiency information provided.
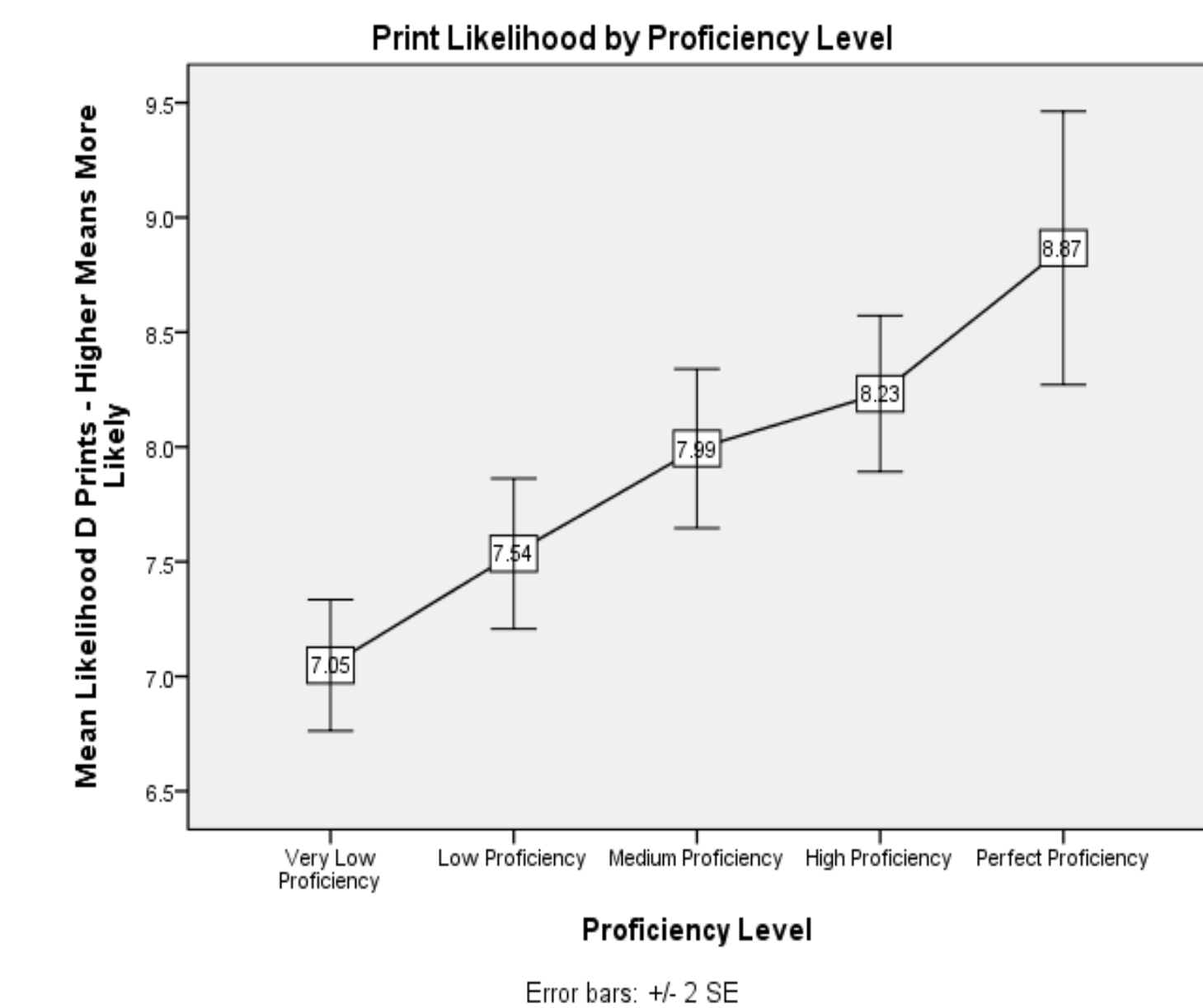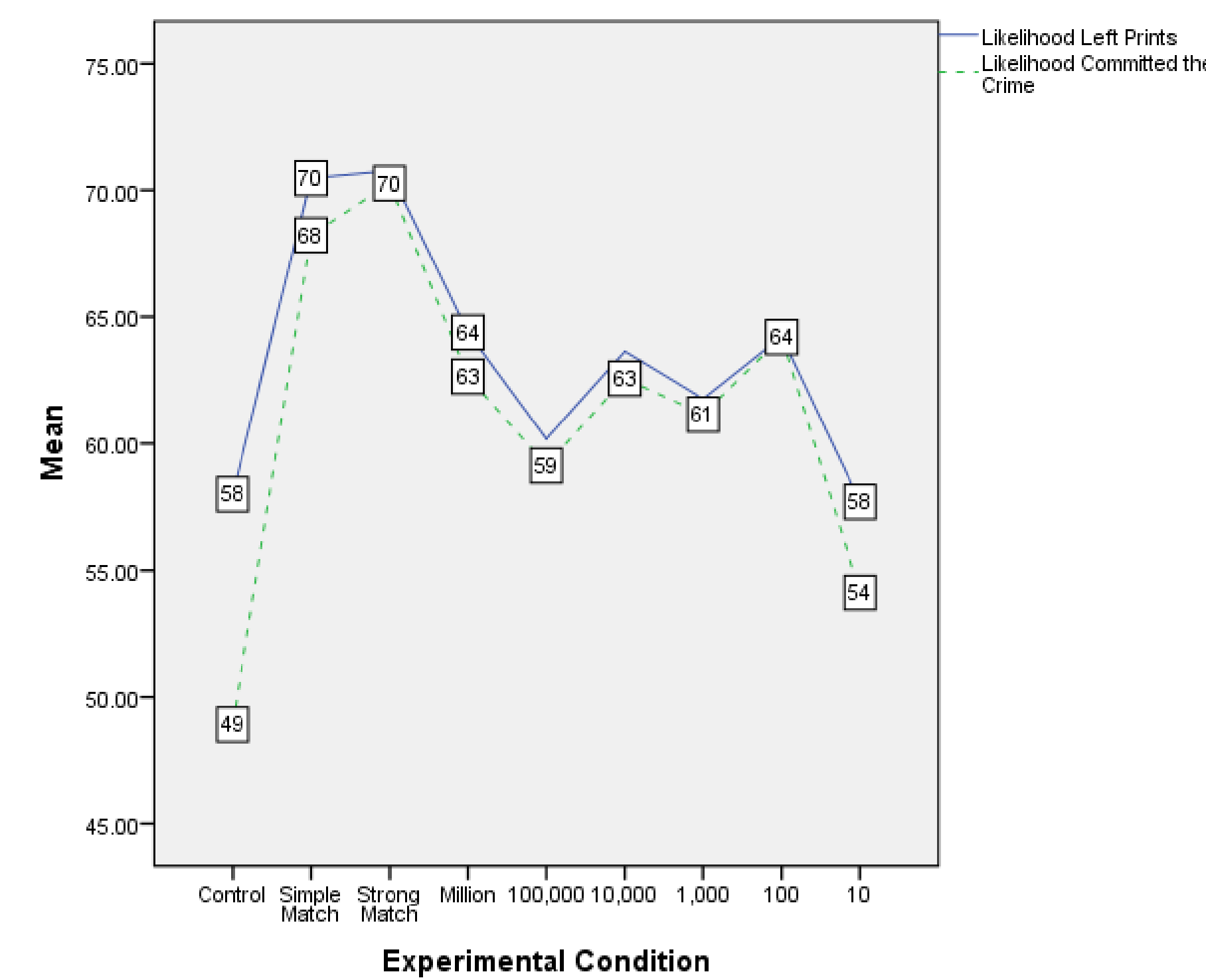
In the recently published piece, participants were randomly assigned to one of nine conditions. One was a control, in which there was no information about fingerprint evidence. In two of the fingerprint evidence conditions, the fingerprint examiner used categorical language to describe the fingerprint match: In the "simple match" condition, the examiner concluded that "the fingerprint was individualized as the right thumb of the defendant"; in the "strong match" condition, the examiner added to the simple match language that it was a "practical impossibility that the prints came from a different source." The remaining six scenarios presented the fingerprint examiner's testimony in probabilistic terms based on the DFSC's model language:

The probability of observing this amount of correspondence is approximately [1,000,000; 100,000; 10,000; 1,000, 100; 10] times greater when impressions are made by the same source rather than by different sources. This conclusion was reached using software that measures the degree of similarity between fingerprint impressions.

Results & Discussion

Fingerprint examiners often participate in tests designed to assess examiner's proficiency at identifying the sources of fingerprint impressions. The results of these proficiency tests provide information on the examiner's level of expertise and, accordingly, on the degree of confidence that factfinders should place in a fingerprint examiner's identification opinions at trial. Using a nationally representative sample, we examined the impact of proficiency testing information on the weight given by potential jurors to a fingerprint examiner's opinion that a defendant's fingerprints matched latent prints recovered from a crime scene.

The examiner's level of performance on a proficiency test (high, medium, low, or very low) but not the type of errors committed on the test (false positive identifications, false negative identifications, or a mix of both types of errors), affected the weight given to the examiner's identification opinion, which in turn affected judgments of the defendant's guilt. Those with stronger aversions to false acquittals than false convictions, older participants, White participants, and those who were objectively less numerate gave greater weight to the fingerprint evidence and were less sensitive to the proficiency level information.

Comparing Categorical and Probabilistic Fingerprint Evidence

Garrett, Mitchell & Scurich, recently published: J Forensic Sci, 2018, doi: 10.1111/1556-4029.137 97

The most probative FRSTAT conclusions were weighted as stronger than a traditional identification conclusion.

The less probative FRSTAT conclusions were weighted less, but without discrimination among the higher and lower probability evidence. Additional language describing the procedure did not impact results.

Conclusions

Expertise ratings, perceptions of likelihood the defendant left prints on a gun, as well as ultimate guilt determination, varied according to proficiency test results.

These results suggest that jurors do weight fingerprint evidence based on information concerning proficiency of an individual examiner. They are not sensitive to False negatives versus false positives. Alternative analyses have been conducted using Normal Scores.

Finally, our results suggest jurors assume fingerprint examiners are highly proficient but not perfect. Evidence of proficiency levels below 90% can meaningfully inform how jurors evaluate such evidence.

Acknowledgements

Many thanks to CSAFE, NIST, Duke, UVA, and UCI for supporting this research