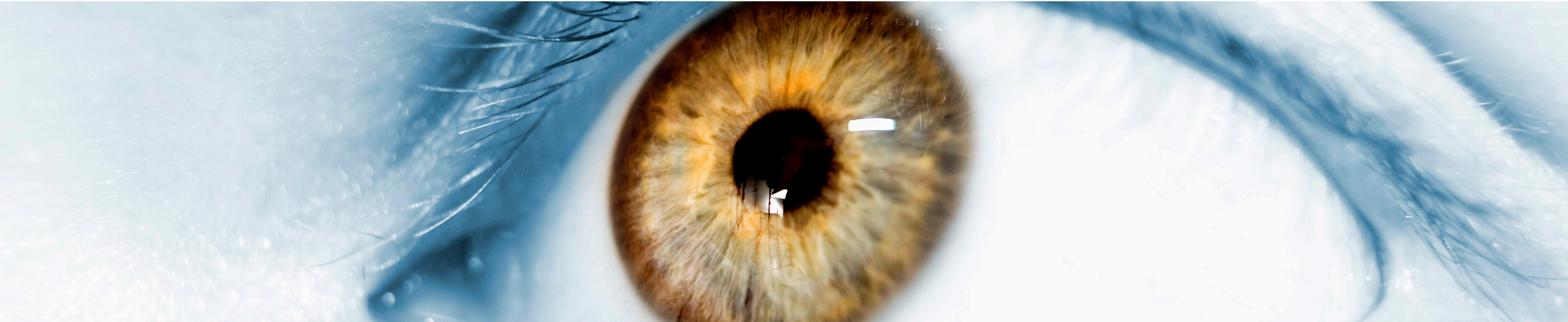


Enhancing performance in human decision making: The role of similarity in forensic identification

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Our Research

The use of Automated Fingerprint Identification Systems (AFIS) has fundamentally changed the way that latent fingerprint experts conduct comparisons. Typically, these systems require integration with human decision making. It is not viable to have fully automated decision making that affects lives and public safety. Conversely, it is not feasible to rely entirely on human judgement without the aid of technology. Of course, errors can happen, and they may be due to humans, technology, or the way we interact with technology (Thompson, Tangen, Treloar, & Ivson, 2010). The advantage of using technology is obvious, but its interaction with human forensic identification has been neglected.

The possibility of an AFIS search returning prints with identical similarities — i.e. highly similar prints from different sources — has not been explored and may increase the likelihood of making erroneous identifications (Dror & Mnookin, 2010). Australia’s NAFIS contains prints from 4.4 million people (Crimtrack, 2010), and the FBI’s AFIS contains prints from 60 million people. As these databases get larger, the chances of finding a highly similar print from a different donor increases. Here we investigate the role of similarity in fingerprint identification using highly similar distractors (non-matches from a NAFIS search) that originate from a different source.

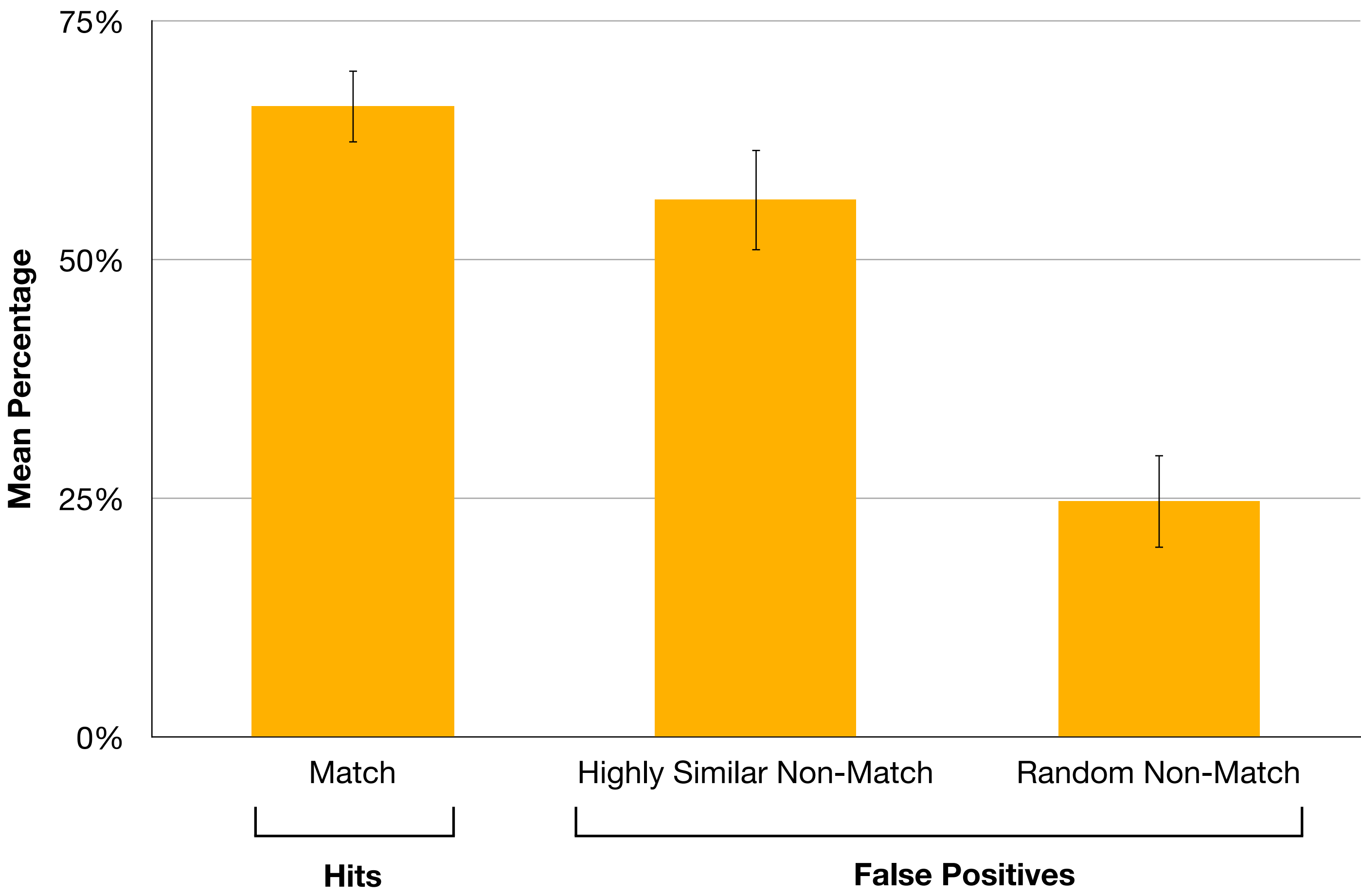
Method

Stimuli included 45 latent crime-scene fingerprints from actual casework, 45 patent matches previously identified by fingerprint experts, and 45 highly-similar non-matches. Highly-similar non-matches were obtained by conducting a NAFIS search on each latent print and retrieving the next available patent print in the candidate list that originated from a different source.

Participants were 34 undergraduate psychology students, with no previous fingerprint background. Two fingerprints were presented side-by-side on a computer screen. One was a latent print, and the other was either a matching patent (target), a non-matching patent selected randomly from the set (random distractor) or a non-matching patent from a NAFIS candidate search list (similar distractor). Participants completed a total of 15 comparisons in each condition resulting in 45 trials total. Participants were asked to judge whether the prints matched or not using a confidence rating scale ranging from 1 (sure different) to 12 (sure same).

Results

A one-way within-subjects ANOVA revealed a significant main effect across the three conditions ($p < .001$). Participants successfully discriminated the match trials ($M=66\%$) from the random non-match trials ($M=25\%$; $p < .001$). They can reliably discriminate match trials from non-match trials when the non-match trials are random. Similarly, they can also discriminate match trials ($M=66\%$) from non-match trials when the non-match trials are highly-similar ($M=56\%$; $p < .002$). Although participants could reliably distinguish between match trials and non-match trials, they made a large number of errors.



Conclusions

It appears that novice psychology undergraduates can reliably match casework latent crime-scene prints significantly better than chance (albeit producing a very large number of errors). Their performance is especially impressive when the distractor is a random non-match. Surprisingly, psychology undergraduates can also discriminate matches from highly-similar NAFIS non-matches.

Such demonstrations can establish the benefit of expertise by comparing the performance of forensic examiners with several years of experience to the performance of novices on exactly the same measures.

