Fake faces or original ones?

A new study shows how tricky the matching of faces is in a typical passport-check scenario. Experts on passport-checks are better than laymen – but: they are also very much susceptible to faked identities. A study just published in the scientific journal “Journal of Experimental Psychology: Applied” has tested 96 German federal police officers who are highly familiar with professional identity matching tasks and 48 laymen without any specific experience in such a task.

Everyday passport-checks, for instance routinely conducted at international airports, are mainly based on matching a person with a small photograph once taken in a specific situation in the past. Such tasks must be executed very fast to ensure the flow of people from and to the airplanes. “This is an enormously difficult and error-prone task, even challenging for face matching experts”, says Benedikt Wirth, psychologist at the Saarland University in Germany and first author of the study. Together with Claus-Christian Carbon, Professor of Cognitive Psychology at the University of Bamberg, he investigated three important questions: Which impact does professional experience with face matching have in a typical matching setting? How well will non-matching cases be recognized? At which rate will typical attempts at deception – attempts to imitate the outward appearance of the original passport holder – be spotted correctly?

The scientists developed an experimental task mimicking typical passport-checks at airports. Participants had to match a large-size portrait of a person with a small passport photo. Both depictions showed the very same or just similarly looking persons. Moreover, part of the photo pairs showed fluctuating features in the face area (e.g., glasses, moles, hairstyles) which were systematically manipulated to generate two conditions: a) the same person showed different features across the pictures (e.g., a different hairstyle), or b) different persons showed the same features (e.g., the same glasses).

Professional experience did not guarantee matching accuracy

The experiment was conducted with three different samples: 48 German federal police officers with long-term professional experience in face matching (at least 11 years), 48 police officers from the same department being shorter on experience in face matching (on average 6 years) and 48 students without any professional experience in face matching. The authors analyzed how accurate participants were on matching pairs of same or different faces. The best performing group was the one with police officers with shorter professional experience (89%), followed by the group of officers with longer professional experience (85%) and, finally, the group of students (83%). “Thus, the difference between laymen and experts is not solely based on professional experience”, says Benedikt Wirth. Possible reasons for the advantage of the professionals with shorter over those with longer experience might be the improvement of the recruiting process besides the inherently existing age difference between the groups.

Of utmost relevance was the distribution of errors made in the study: When a pair of photos showed the same person, matching was mostly executed correctly (95%), even if faces differed by some aspects (glasses, hairstyle, etc.). If, however, the two pictures showed different persons, matching performance dropped substantially to 76% – this means that nearly one in four potential frauds was not detected. This effect was amplified when specific properties in the face
were adjusted to each other. "Regarding non-matching pairs, the deception strategy to adjust one’s own facial features to another passport photo seems to be successful —especially when the hairstyle is imitated“ explains Benedikt Wirth.

Selection of Personnel – Police officers with high face recognition abilities

Claus-Christian Carbon evaluates the results of the study regarding practical recommendations. “Individual face recognition abilities could be a powerful selection criterion for police officers and personnel in other security-related areas. Well-engineered tests to identify persons with very good face recognition abilities, especially so called ‘super-recognizers’, should be used to select the optimally fit persons for such jobs. Conversely, it must be ensured that people with extreme low face recognizing abilities, especially people with prosopagnosia, are not assigned to any of such tasks. Specific tests for checking cognitive abilities are standard in other domains such as pilot and flight controller recruitment”.


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Experimental set-up as used in the dual monitor set-up
Photo: Wirth