New study reveals impact of face masks on person identification

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Credit: University of Stirling

Research by experts at the University of Stirling has revealed the impact that the increased wearing of face masks may be having on people's ability to recognize each other.

Led by Dr. Daniel Carragher and Professor Peter Hancock, of the Faculty of Natural Sciences, the study's findings—Surgical face masks impair human face matching performances for familiar and unfamiliar faces—have been published in the open-access journal Cognitive Research: Principles and Implications.

The wearing of face coverings, including surgical masks, has become widespread since the beginning of the COVID-19 pandemic. The Stirling team researched the extent to which their wearing is affecting the accuracy with which people can identify individuals.

They asked 138 participants to view pairs of photographs of either famous celebrities or unfamiliar models. The volunteers, placed in one of three groups, were shown two faces simultaneously, with: both wearing a mask; only one wearing a mask; or neither wearing a mask. Photo-editing software was used to fit the faces with blue surgical masks.

The study found that when asked whether the images showed the same person or different people, participants were less likely to correctly match faces wearing surgical masks—regardless of whether one or both faces were masked.

Dr. Carragher said: "Our study demonstrates that surgical face masks significantly impair our ability to identify both familiar and unfamiliar individuals, and that the impairment is similar whether one or both faces in each pair are masked.

"This study differs from previous work, because the participants could always see the two faces they were comparing—just like a cashier that asks to see your photo-ID in a shop. We think this may be because face masks might disrupt the ability of the observer to process the face as a whole. However, it is also possible that adding a mask to a face may also alter the perceived appearance of the top half of the face, which typically has a larger influence on face recognition than the lower features. Our findings suggest that future research could focus on designing transparent face coverings that still allow identification of the individual, while also reducing the spread of the virus."

The study also shows that face masks affect person identification for famous faces just as much as unfamiliar faces.

Professor Hancock said: "Typically, we are very good at recognizing and matching faces that we are familiar with, so to see the same decrease in performance for celebrity faces that were known by the participants was very surprising."

If shown two unfamiliar faces wearing masks, participants were more likely to report that they were different people, than if both faces were shown unmasked. However, participants were more likely to report that two faces were a match if they recognized at least one of the faces, and if either one or both faces were masked, compared to if both faces were unmasked.

Dr. Carragher added: "This suggests that the bias towards reporting a match for familiar faces may partly be explained by participants comparing the features of the familiar masked face to images of the celebrity previously stored in their memory."

The study also investigated whether surgical face masks would impair the performance of facial recognition systems that had not previously been trained to recognize masked faces. They found that the main system used in this study was able to extract enough information from the top half of two masked faces to outperform most human participants at accurate identification. However, the system was less accurate when only one face in each pair was masked.

The study also found that face masks cause significant impairment to the performance of several other commercially available face recognition systems. Extensive testing of all facial recognition systems that aim to accurately identify masked faces is recommended before they are used in the field.