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Viewers base estimates of face matching accuracy on their own familiarity: Explaining the photo-ID paradox

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ABSTRACT

Matching two different images of a face is a very easy task for familiar viewers, but much harder for unfamiliar viewers. Despite this, use of photo-ID is widespread, and people appear not to know how unreliable it is. We present a series of experiments investigating bias both when performing a matching task and when predicting other people's performance. Participants saw pairs of faces and were asked to make a same/different judgement, after which they were asked to predict how well other people, unfamiliar with these faces, would perform. In four experiments we show different groups of participants familiar and unfamiliar faces, manipulating this in different ways: celebrities in experiments 1–3 and personally familiar faces in experiment 4. The results consistently show that people match images of familiar faces more accurately than unfamiliar faces. However, people also reliably predict that the faces they themselves know will be more accurately matched by different viewers. This bias is discussed in the context of current theoretical debates about face recognition, and we suggest that it may underlie the continued use of photo-ID, despite the availability of evidence about its unreliability.

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1. Introduction

It is now well-established that matching two images of a face is very difficult for an unfamiliar viewer (Bruce et al., 1999; Burton & Jenkins, 2011; Johnston & Edmonds, 2009).

Across a variety of tasks (e.g. line-ups and pair-wise matching), viewers are highly error-prone, even when images are shown in high quality, and for an unlimited time (Clutterbuck & Johnston, 2002, 2004; Megreya & Burton, 2006, 2007). Furthermore, matching a live person to a photo is just as error-prone (Davis & Valentine, 2009; Kemp, Towell, & Pike, 1997; Megreya & Burton, 2008). This results in a paradox. If people are so poor at matching faces to photos, why do they continue to be used extensively in identification documents? One possibility is that the professional checkers of photo-ID are better able to make a match than the general population. Although there is rather little evidence about the performance of professional ID-checkers, what is available suggests that this is not true: Burton, Wilson, Cowan, and Bruce (1999) tested police officers, and White, Kemp, Jenkins, Matheson, and Burton (2014) tested passport officers. Both studies showed the same levels of performance in the professional groups and in untrained students. An alternative explanation for the continued use of photo-ID is that people do not know how unreliable it is, and that this results from their own experience of face recognition.

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In this paper we examine the possibility that people are subject to a systematic bias in face perception which arises from their excellent performance with familiar faces. It is a commonplace observation that we are able to recognise familiar people over a huge range of conditions, for example we can recognise our family members over large changes in photographic conditions, over pose, health and age. In an experimental setting, Burton et al. (1999) demonstrate how students familiar with their lecturers can recognise them even in very degraded CCTV images, while unfamiliar viewers are entirely unable to recognise these people. Here we suggest that our everyday experience with familiar face recognition – robust and accurate as it is – leads us falsely to believe that we are also good at *unfamiliar* face recognition.

There is growing evidence that the processes underlying familiar and unfamiliar face recognition are to some extent separate. It has been known for many years that unfamiliar faces are harder to remember in recognition memory tasks than familiar faces (Bruce, 1986; Ellis, 1981; Klatzky & Forrest, 1984), and this may simply reflect quantitative differences in difficulty. However, there are a growing number of reports that suggest some level of perceptual dissociation between familiar and unfamiliar face processing (Hancock, Bruce, & Burton, 2000; Megreya & Burton, 2006, 2007; Schweinberger, Pickering, Burton, & Kaufmann, 2002). The proposal is that perception of unfamiliar faces is more reliant on image-based properties, and so generalises to novel instances poorly. In contrast, familiar face recognition incorporates abstractive representations which can be recruited to recognise novel instances of the person (Burton & Jenkins, 2011; Hancock et al., 2000; Jenkins & Burton, 2011).

In daily life, there is little opportunity to calibrate one's unfamiliar face recognition. If we see someone on the street on two consecutive days, and imagine them the same or different people, there is rarely an opportunity for corrective feedback. On the other hand, we can have many familiar face recognition events in a single day, and these are self-evidently successful. For example, in the workplace we may encounter dozens of familiar faces, and recognise each with ease – with immediate correction of occasional errors. We hypothesise that this success with familiar faces can lead to a bias to believe that all face recognition is easy, when in fact the psychological literature demonstrates that it is not.

In fact, the existence of a bias to over-generalise one's performance with familiar faces would be consistent with findings in many other fields. For example, Nickerson, Baddeley, and Freeman (1987) demonstrated that people tend to over-estimate their own general knowledge in others: if they happened to know 'the island on which Napolean was born' then they tend to assume that others know this too. Similarly, if students know particular uncommon words, they tend to assume that others also know them (Hayes & Bajzek, 2008). An analogous effect in social psychology is referred to as the 'egocentric bias', or the 'perception of consensus' (Holmes, 1968; Krueger & Clement, 1994; Ross, Greene, & House, 1977). Researchers consistently find that if we are given a choice of two possible actions, we tend to predict that others will choose the same action as us. Similar effects exist for people skilled in particular cognitive tasks – people with expertise in particular tasks (like operating electronic equipment) tend to assume that others will be able to learn these easily (Hinds, 1999).

The fact that these egocentric biases crop up across different areas of psychology makes it plausible that they will also be seen in face processing. If so, this may go some way to explaining why the distinction between familiar and unfamiliar faces is not always clearly drawn in the literature, despite some compelling evidence that perceptual processing of these two classes of faces is to some extent different. On a day to day basis, we may not be aware of the fact that unfamiliar face recognition is poor, and so our excellent recognition of familiar faces is taken to be the default.

In these experiments we compare people's accuracy in matching pairs of familiar and unfamiliar faces. Following earlier work, we expect to see higher performance for familiar faces. However, we then ask participants to estimate how others might perform with these particular face pairs. If people over-generalise their good familiar face recognition, then we hypothesise that they will imagine that the faces they know will be better recognised by others – in other words they will fail to take into account their own familiarity with a face in judging the likely behaviour of others. If this prediction turns out to be true, then it offers a partial explanation for the continued use of photo-ID. In short, we know ourselves to be good at face recognition, and so this seems like a good way of identifying someone in a document. We present four experiments on this theme, using different participant groups, and different levels of familiarity.

2. Experiment 1. Matching celebrity faces

In the first experiment, we tested participants on a matching task using familiar and unfamiliar celebrity faces. In order to avoid any possible systematic differences between these sets of faces we ran the study bi-laterally in the UK and in Australia. Selecting photos of locally-familiar minor celebrities, we were therefore able to use each face as familiar (for participants in that person's country) and unfamiliar (for participants in the other country), across the experiment. On each trial, participants were asked to indicate whether a pair of faces was the same or a different person. Following previous research (Clutterbuck & Johnston, 2002, 2004), we expect an advantage for familiar faces here, despite the fact that the task requirements are independent of familiarity.

This study also incorporated a prediction component. Having made a match judgement (same/different person) we then asked participants on each trial to predict how other viewers would perform. This first experiment was somewhat exploratory, and so we also asked whether the character of the putative 'other viewers' might influence responses. To examine this we asked half the participants to predict how 'students in Germany' might perform. The intention here was to bring to mind viewers in many ways similar to our participants (who were mostly students), but

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