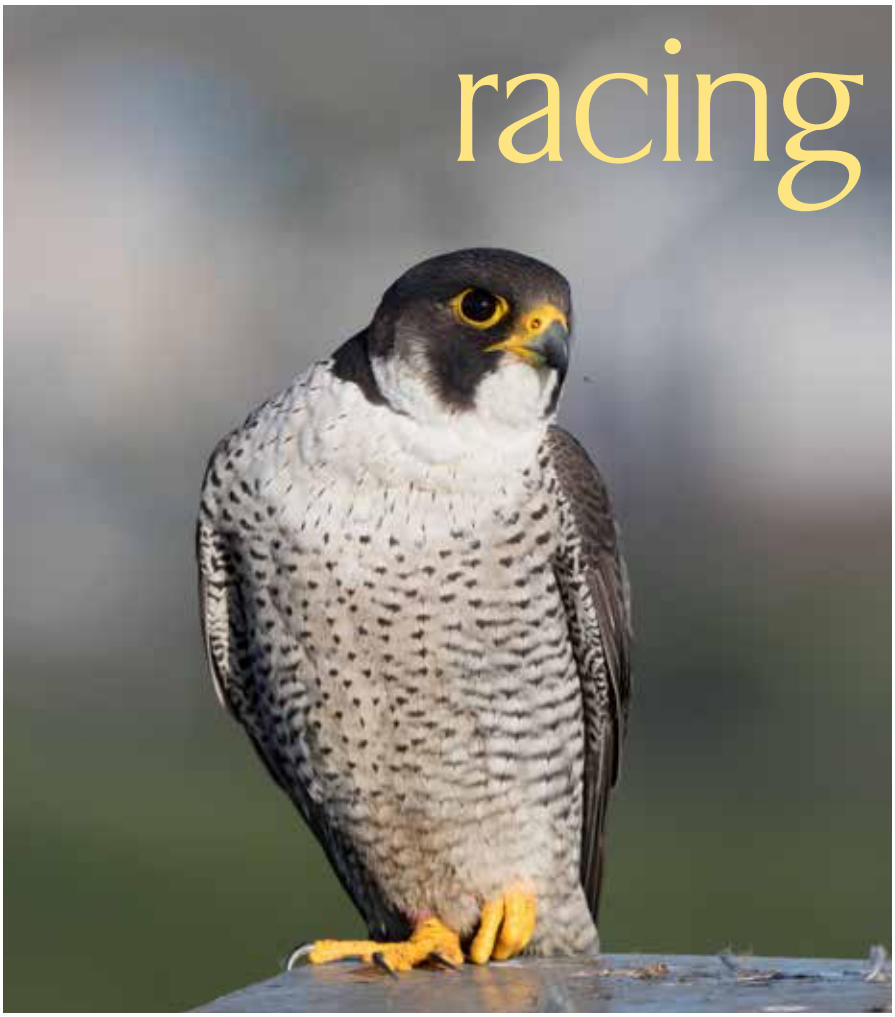
racing stripes



ANDREW JENKINS

The dark malar or moustachial stripes of falcons are among the most distinctive features of the group. A common claim in the popular literature is that these dark feathers reduce reflected glare into the falcon's eyes, helping the bird to see detail in bright conditions. In species such as Peregrine Falcons, which are diurnal, aerial hunters that prey mainly on birds, this may increase hunting efficiency on fast-moving, agile prey in bright conditions. However, this 'solar glare' hypothesis has not been explored rigorously.

New research from the FitzPatrick Institute published in *Biology Letters* has tested this hypothesis. If the malar stripe is an adaptation to reduce solar glare, we predicted that falcons living in sunny environments would have larger and darker stripes. To explore this, we investigated differences in the malar stripes of 2197 Peregrines from around the globe, using photographs obtained from online citizen science databases. We compared geographical trends in the size and prominence of malar stripes to local climatic conditions, including solar radiation, minimum daily temperature and rainfall.

Malar stripes in the falcons from regions of higher average solar radiation were both wider and darker than in those from regions of lower solar radiation. In sunnier regions, the falcons also exhibited darker facial plumage overall. By comparison, temperature and rainfall were not consistently associated with the size or prominence of malar stripes. This appears to rule out alternative environmental hypotheses for the function of malar stripes, including a thermoregulatory benefit or an anti-parasite function.

Although these results are purely correlative, they support previous experiments that have demonstrated that dark pigmentation under or around the eyes reduces the amount of solar glare experienced by the subject. For example, lightening the colour of the upper mandible in Willow Flycatchers and reducing the dark facial mask in Masked Shrikes reduced these birds' ability and willingness to forage in bright sunlight. Likewise, 'eye black' makeup has been shown to increase the ability of baseball players to see detail and target moving objects in bright conditions. It is thus plausible that the malar stripes of Peregrine Falcons function as natural analogues to such makeup.

We are currently extending the analysis to investigate whether the solar glare hypothesis provides a plausible functional explanation for malar stripes in other falcon species. We hope that this research will provide further insight into the evolutionary significance of malar stripes in falcons and help to explain how differences between species – such as differences in diet or hunting strategy – may affect the evolution of plumage features in this charismatic group of raptors.

MICHELLE VRETTOS & ARJUN AMAR

above *A Peregrine Falcon showing the distinctive dark malar stripe under its eye, which may function to reduce solar glare.*

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