Cognitive Neuroscience
Current Debates, Research & Reports

ISSN: 1758-8928 (Print) 1758-8936 (Online) Journal homepage: www.tandfonline.com/journals/pcns20

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To cite this article: Antônio Mello & Brad Duchaine (16 Nov 2025): Facial distortions as a critical test for models of the organization of visual function, Cognitive Neuroscience, DOI: 10.1080/17588928.2025.2590662

To link to this article: https://doi.org/10.1080/17588928.2025.2590662

Published online: 16 Nov 2025.

COGNITIVE NEUROSCIENCE
https://doi.org/10.1080/17588928.2025.2590662

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COMMENTARY

Facial distortions as a critical test for models of the organization of visual function

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ABSTRACT

Ritchie et al. propose a novel framework for understanding the organization of visual function in the occipitotemporal cortex (OTC). We argue that neuropsychological evidence from individuals with prosopometamorphopsia (PMO), a condition in which faces appear distorted, offers a unique opportunity to test models of OTC. Drawing on findings from a large-scale experiment that used naturalistic stimuli with five individuals with PMO, we show that distortions in two cases appear to be face-specific. These results highlight the value of integrating neuropsychological, computational, and behavioral approaches to constrain and refine models of the organization of visual function.

KEYWORDS

Prosopometamorphopsia; face perception; object recognition; category selectivity; neuropsychological evidence

We thank Ritchie et al. for describing their stimulating new perspective on the organization of visual function in the occipitotemporal cortex (OTC). Their target article focused almost solely on evidence from functional magnetic resonance imaging (fMRI), but here we make the case that neuropsychological studies of individuals experiencing high-level visual impairments are more likely to effectively carve visual recognition at its joints than fMRI studies. Nevertheless, despite our advocacy for neuropsychology, we are confident that converging evidence from a wide variety of approaches will be crucial to making progress on these challenging questions.

One striking example of such an impairment is prosopometamorphopsia (PMO), a visual perceptual condition in which individuals see faces as distorted (Blom et al., 2021; Herald et al., 2023). These distortions can alter the shape, color, texture, and position of facial features and may affect both sides of the face (bilateral PMO) or only one side (hemi-PMO) (Figure 1; Mello et al., 2024). PMO is rare and can emerge following brain damage or result from atypical development (Blom et al., 2021). More relevant to this discussion, however, is that while distortions extend to other visual categories in some cases of PMO, in others they appear to be face-specific (Herald et al., 2023).

As Ritchie et al. (this issue) emphasize, establishing that a phenomenon is category-specific – whether it involves the clustering of neural responses within a particular brain region or the selective impairment of behavior – is challenging. For instance, previous PMO studies have described individuals who reported seeing distortions only on faces in daily life and who, when tested with a variety of visual categories in the lab, did not perceive distortions in nonface objects (Almeida et al., 2020; Dalrymple et al., 2014). However, as Ritchie et al. (this issue) argue, such apparent categorical differences may arise as unintended consequences of factors like stimulus undersampling. Thus, they suggest that studies should use larger and more naturalistic stimulus sets, such as the THINGS database (Hebart et al., 2019, Hebart, Contier et al., 2023).

We share this view and recently assessed five participants with PMO using 1,120 naturalistic images: 1,020 photographs of objects from THINGS (two per category; 510 categories in total) and 100 photographs of faces (Kerns et al., 2025). To select THINGS stimuli, we employed a computational model that estimates the fMRI response in the fusiform face area (FFA) to individual images (Contier et al., 2023; Murty et al., 2021), and we then chose nonfacial categories that generated the strongest responses. This data-driven selection enabled us to broadly sample object categories near the high end of FFA activation, such as other body parts and food, thereby increasing the likelihood of eliciting nonfacial distortions and mitigating the chance that stimulus undersampling would lead us to interpret differences as categorical. The relevance of this approach is well

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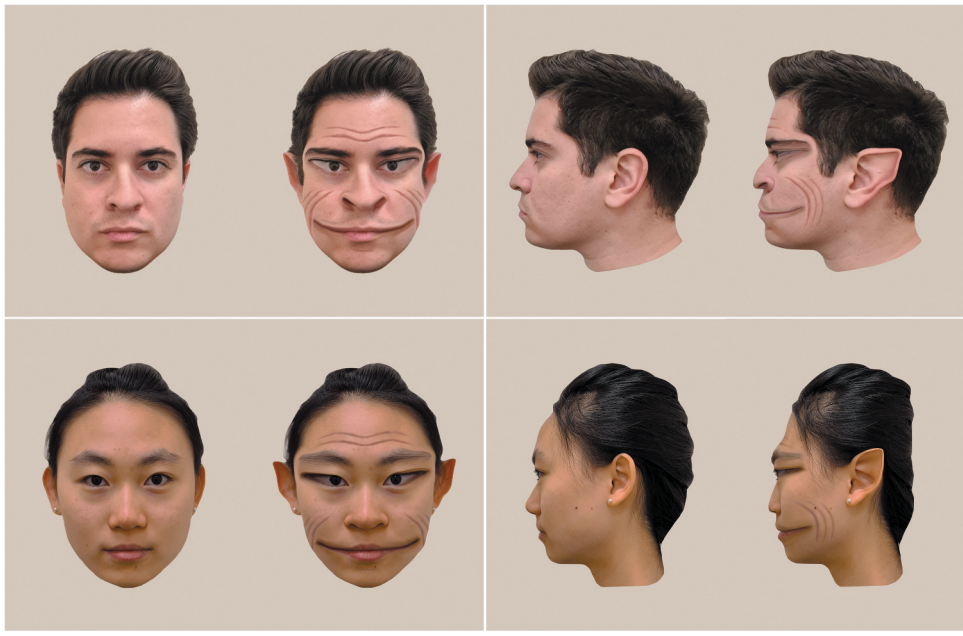

Figure 1. Photorealistic visualizations of facial distortions as perceived by an individual with bilateral PMO. *Note.* Reprinted from *The Lancet*, Vol. 403, A. Mello, D. Stehr, K. Bujarski, and B. Duchaine. *Visualising facial distortions in prosopometamorphopsia*, p. 1176, Copyright 2024 by Elsevier. Reprinted with permission from Elsevier.

illustrated in Figure 2b of Ritchie et al. (this issue), which shows the graded selectivity profile to THINGS objects in FFA.

Despite using a data-driven, stimulus-diverse approach, we observed face-specific distortions in two of the five participants we tested. Both individuals, A. S. and Aurora, reported distortions for all 100 faces viewed, whereas none of the remaining 1,020 images appeared distorted – even mildly (Kerns et al., 2025). These results are aligned with their self-reports from daily experience. A.S. has lived with PMO for 15 years (Dalrymple et al., 2014), while Aurora developed the condition nearly 2 years ago, and both have experienced distortions only on faces.

Ritchie et al. (this issue) recommend that we consider another factor beyond visual diversity in investigations of visual function: the goal dependency of behavior. This is a welcome suggestion. It seems unlikely to us that participants such as A.S. and Aurora – who have continuously examined their visual environment to plan and execute complex behaviors (e.g., social interaction and spatial navigation) for years – would fail to notice distortions in other objects. Still, we cannot rule out the possibility that the distortions in A.S.'s and Aurora's cases result from disruptions to neural mechanisms involved in planning social interaction rather than perceiving faces *per se*. In that regard, we agree that task manipulation could provide a critical test of our evidence for category specificity, and we invite the authors to consider some hypothetical scenarios with us. For example, the authors describe a task in which participants must navigate through a room full of people – should we expect A.S. not to see, or to see less severe, facial distortions during this task (spatial navigation)? Aurora reports seeing distortions in her own face in the mirror – should we predict that these distortions would be absent or weaker when she looks at her reflection while applying makeup (object manipulation)? Reflecting on such scenarios may help guide the next steps in our research while also offering a strong test of the authors' proposal centered on the interactive nature of behavior.

In sum, we share Ritchie et al.'s view that advancing our understanding of visual function requires reexamining the theoretical and empirical assumptions underlying the category-selectivity framework. Successful models of visual function within OTC, however, will need to be able to predict, and ultimately account for, a wide variety of phenomena, and we believe that PMO offers a unique opportunity to test, challenge, and refine these models.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This work was supported by the Hitchcock Foundation under grant number 250-4156 to BD.

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