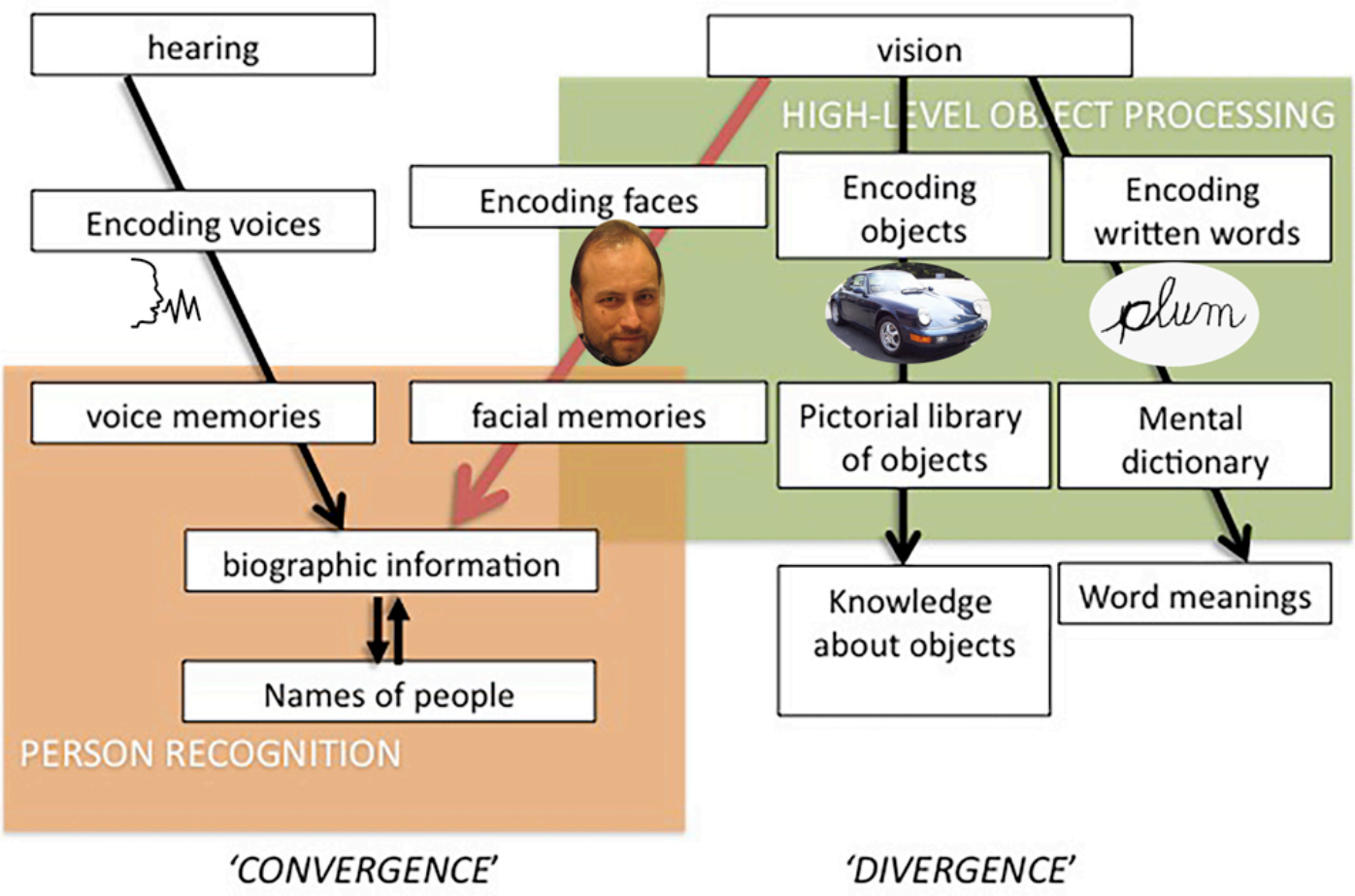
Selectivity in acquired prosopagnosia

Face recognition is a special skill at which most humans are adept. Whether this also means that it involves special resources in the human brain has been debated for many years. A lot of the evidence in this debate comes from the study of patients who have lost the ability to recognize faces, a condition known as prosopagnosia. This article reviewed prior studies and provided new data from prosopagnosic patients on how face recognition relates to the recognition of three things: objects in general, words, and voices (Figure).



1.All vision starts in the eye and most passes through the occipital lobe, but from this point on visual information fans out or 'diverges' into many specialized regions of the brain. The degree to which this causes face recognition to separate from the recognition of other visual objects is uncertain. While there are many conflicting reports in prosopagnosia about whether these patients can recognize things like sheep, cars, money or flowers, one problem is that most did not take into account how familiar or expert the patients were with these other visual objects. Humans may be 'face experts', but for most other objects humans vary widely in how good they are at recognizing

these. This study first showed that the car recognition of healthy subjects was accurately predicted by their verbal knowledge about cars, and then revealed that prosopagnosic subjects recognized fewer cars than their verbal expertise predicted.

2.Written word recognition is of special interest in prosopagnosia. First, literate humans are both word and face experts. Second, a divergence of written word recognition from face recognition involves a division between the left and right hemispheres, with words involving the left hemisphere and faces the right. However, imaging studies suggest that this is not complete: faces create a small amount of activity in the left hemisphere and words likewise in the right, and the areas activated by faces and words overlap. Hence an important question is, while prosopagnosic patients generally can read, is their reading nevertheless affected in subtle ways?

This study measured how quickly prosopagnosic subjects read words, and whether it took them longer to read when words had more letters, an index of the amount of visual processing required. It did not find any problem if the patients only had damage to the right hemisphere. It also checked whether they could match words across variations in handwriting and font, and again prosopagnosic patients could do this. However, prosopagnosic patients had difficulty matching the handwriting or the font. Thus they had problems seeing the style rather than the word content of written text.

3.We recognize people not just by their faces, but also by their voices, names and other cues. Thus information from vision and hearing comes together or ‘converges’ when we recognize a person. Prosopagnosic patients can often recognize names, but rarely has their voice recognition been tested, even though most of them insist that they recognize others by their voice. This study found that most prosopagnosic patients could tell familiar from unfamiliar voices, especially true if their brain damage was confined to the right side. Only the two patients who had damage to both right and left temporal lobes had trouble with voices.

Thus, the prosopagnosic data does not provide strong support for a divergence of face from other ***expert*** visual object recognition. It also suggests that the mechanisms for face recognition are involved in perceiving the style of text but not its word content. On the other hand, the processes in the right hemisphere for face recognition do not converge with those for voice recognition.

Publication

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