

Who is that person? Exploring how the brain organizes information about identity

How do we recognize someone? People can be recognized from many different cues — their face, their walk, their voice, their name, and so on. The sensory or cognitive operations that process these different cues are located in different regions of the brain. A major challenge is to understand how and where these cues interact or are integrated to give rise to our experience of the people around us.

Recognition from any one of these cues is a multi-step process (Fig. 1.). First, our brain processes, or encodes, the visual or auditory information. Second, the brain attempts to match that information to something stored in our memory (e.g. matching a face we are seeing to a store of faces we have seen before). If there is a match, we experience a sense of familiarity. That match can also activate links to other information we have about that person, so that we remember their name, their voice, and personal information about them, such as their occupation.

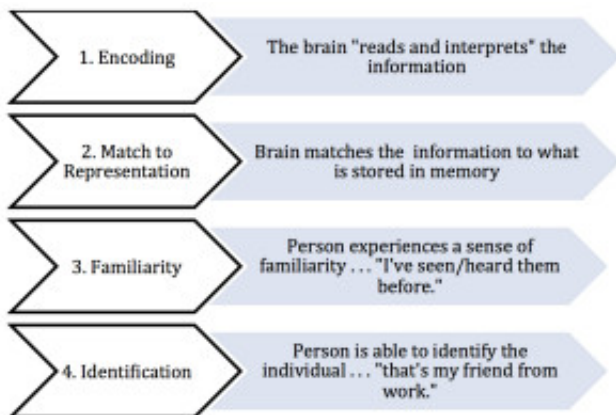


Fig. 1. Multi-step processing in person identification.

Much of the evidence regarding the stages involved in person recognition comes from neuropsychology, the study of patients with brain damage. In this paper, we reviewed all the neuropsychological studies of person recognition that had tested at least two of three modalities (i.e. face, voice, or name). We reviewed these data to determine whether this body of work could answer two key questions about person recognition.

The first question is, which stage in the recognition process gives rise to the feeling of familiarity? Does it arise, for example, from the successful match of a face to the memories of previously encountered faces? Or does it only occur when that match activates links to other cues and information about that person?

If it is a product of the former, then it should be possible for patients to have impaired familiarity for one modality but normal familiarity for another (e.g. face familiarity is impaired but voice familiarity is not). We found that there was good evidence from these studies that familiarity can be lost for one type of cue only, suggesting that familiarity does indeed arise from the modality-specific processes.

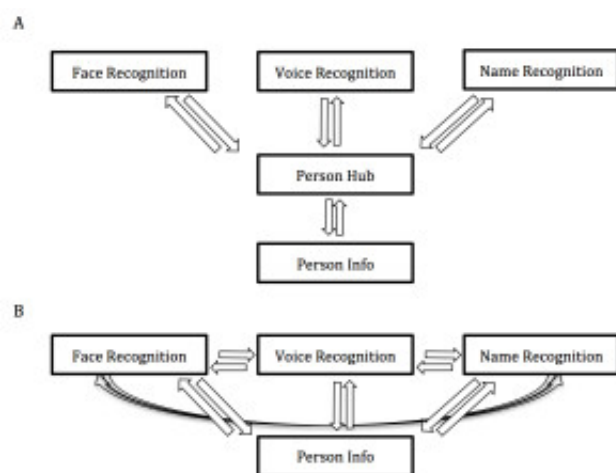


Fig. 2. (A) Person Hub Theory, (B) Distributed Theory.

The second question relates to how all these different cues about people are linked together. One theory is that there is a region that serves as a “person hub”, in that all these different cues (face, voice, name) are linked to this hub and can only interact with each other by information flowing through it. Another theory is that there is no person hub, but rather, the face, voice, and name areas can communicate with one another directly in a “distributed” fashion (Fig. 2.).

These theories lead to different predictions—if there is a damaged amodal hub that is a mandatory station for links between the different modalities, then it should not be possible to link any information together. Thus, even if the face is familiar, the patient cannot state which voice belongs to that person, what their name is, or give any personal information about them. On the other hand, in the distributed model these links can be affected separately by brain damage. Thus there should be patients who can identify which voice belongs to a face, even though they cannot provide the person’s name, for example. Unfortunately, few studies have tested all the possible links between faces, voices, names and personal information, and the evidence for or against either view is limited. We closed our review by identifying important elements of study design that are needed in future experiments to address this question more definitively.

Jason J.S. Barton and Sherryse L. Corrow
Neuro-ophthalmology, section K, VGH Eye Care Centre

Vancouver, British Columbia, Canada

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Barton JJ, Corrow SL.

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