

## THE PHENOMENON OF SYNESTHESIA: A NEUROLOGICAL MYSTERY IN THE PROCESS OF BEING RESOLVED

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### INTRODUCTION

**Synesthesia** is a neurological phenomenon in which the stimulation of a sensory /cognitive pathway leads to automatic experiences in other sensory /cognitive pathways (Cytowic, 2002).



**Fig.1** Senses involved in the phenomenon of synesthesia

### PURPOSE

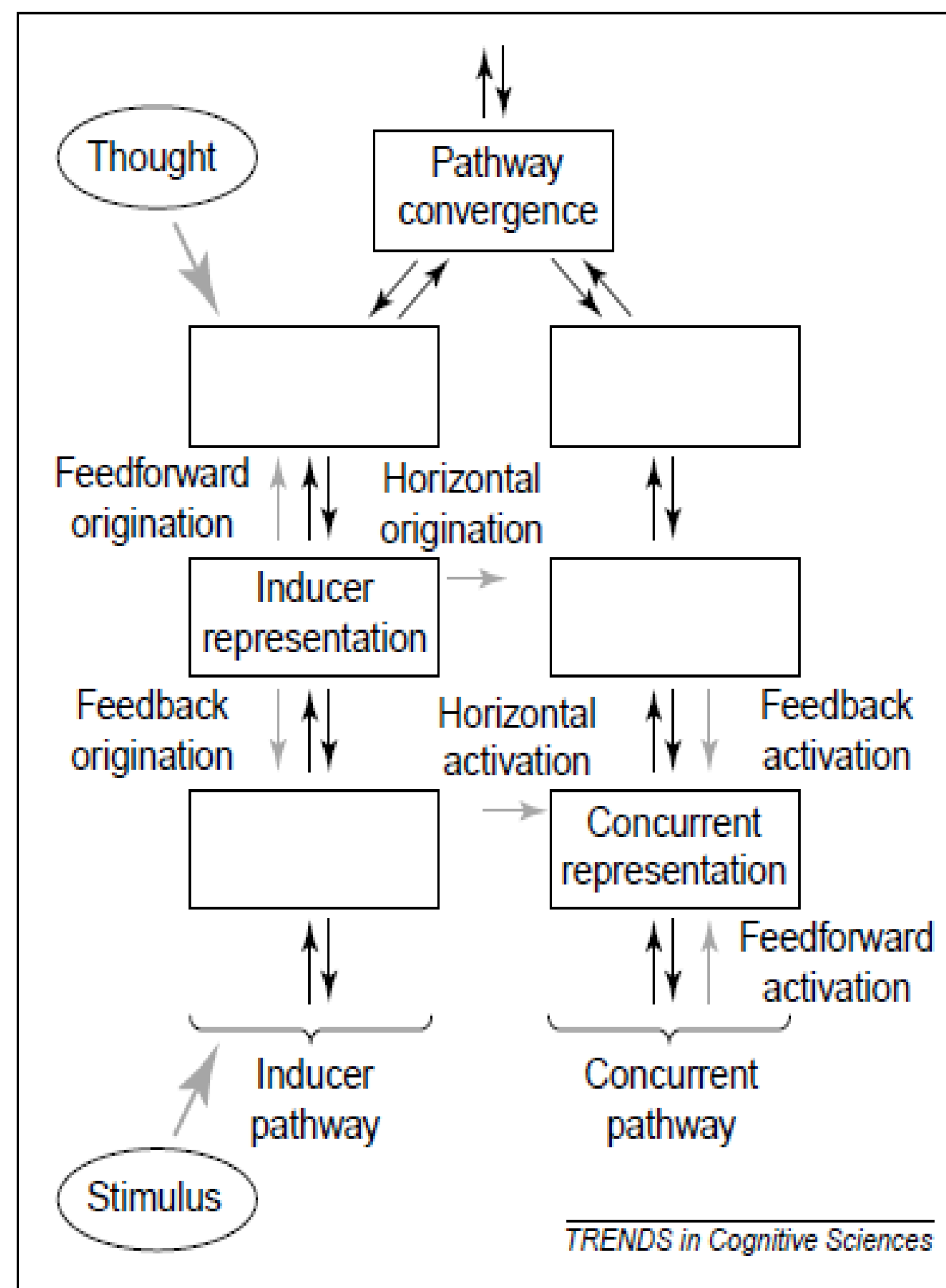
- to form a clear picture of the phenomenon of synesthesia;
- to explain the mechanism of occurrence;
- to present its neurological importance.

### MATERIALS AND METHODS

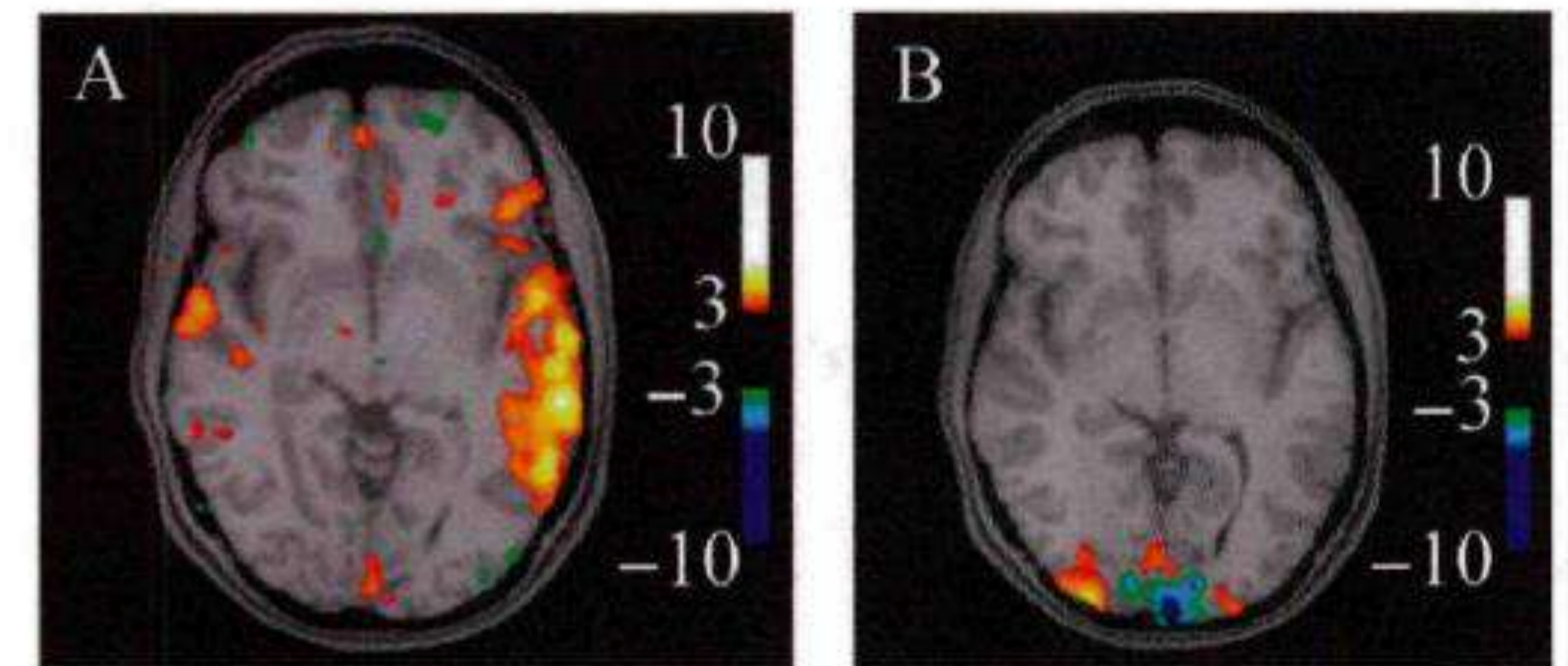
The study of the specialized literature, of about 75 articles, of the scientific sources, of the books published on this subject.



### RESULTS



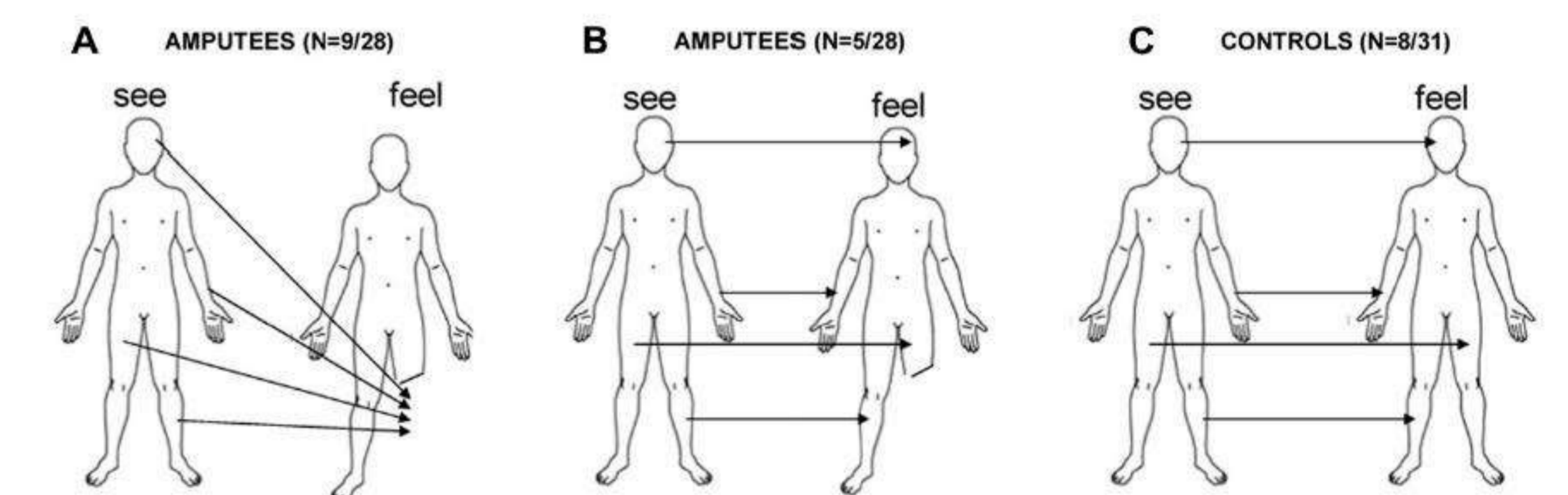
**Fig.2** Schematic depiction of neural mechanisms in synesthesia (Grossenbacher, 2001)



**Fig.3** fMRI shows visual activation from auditory stimulation. Auditory-evoked activity from (A) corresponds to central visual field on the left in (B) (Afra, 2012)



**Fig.4** Auditory-visual synaesthesia and migraine (Podoll, 2002)



**Fig.5** The connection between synesthesia, the phantom limb and the mirror neurons (Goller, 2013)

### CONCLUSIONS

- The phenomenon can be congenital or acquired;
- Its mechanism is not elucidated, but it is assumed that the neural connections between sensory analyzers, mirror neurons and / or empathy are involved;
- It has been observed in: migraine, phantom limbs, autism, epilepsy, etc.

### KEYWORDS

synesthesia  
neuropsychology  
migraine  
pain