![bcbl logo] **BASQUE CENTER ON COGNITION, BRAIN AND LANGUAGE**

Linguistic input drives brain network configuration during language comprehension.

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Background:

The distinction between syntactic and semantic processes and their specific roles in language comprehension has been the focus of many investigations in the last decades[1,2].

Syntax ⟷ Semantics

The vast majority of studies have explored formal and conceptual factors separately, assuming there is no interaction between them.

Assessing the synchrony and interplay between distributed neural regions might be key to understanding how the language system operates.

Main Goals:

☐ **Whether and how the neural network(s) underlying the building of syntactic structures combines the formal and conceptual factors embedded in our linguistic code.**

☐ **Can the language network re-orchestrate the function(s) of critical nodes to combine formal and conceptual cues when building syntactic structures?**

Experimental Design:

Using the Spanish gender agreement system we manipulated the gender congruency between nouns and others sentence constituents and the type of gender system a noun belongs to – i.e., Conceptual and Formal.

| 2 x 2 Factorial Design (Grammaticality judgment task)	Grammatical	Ungrammatical
Conceptual Gender	La abuela era sabia ([The grandmother]fem.sing. was wisefem.sing.)	*La abuela era sabio ([The grandmother]fem.sing. was wisemasc.sing.)
Formal Gender	La película era larga ([The film]fem.sing. was long fem.sing.)	*La película era largo ([The film]fem.sing. was long masc.sing.)

Main Results:

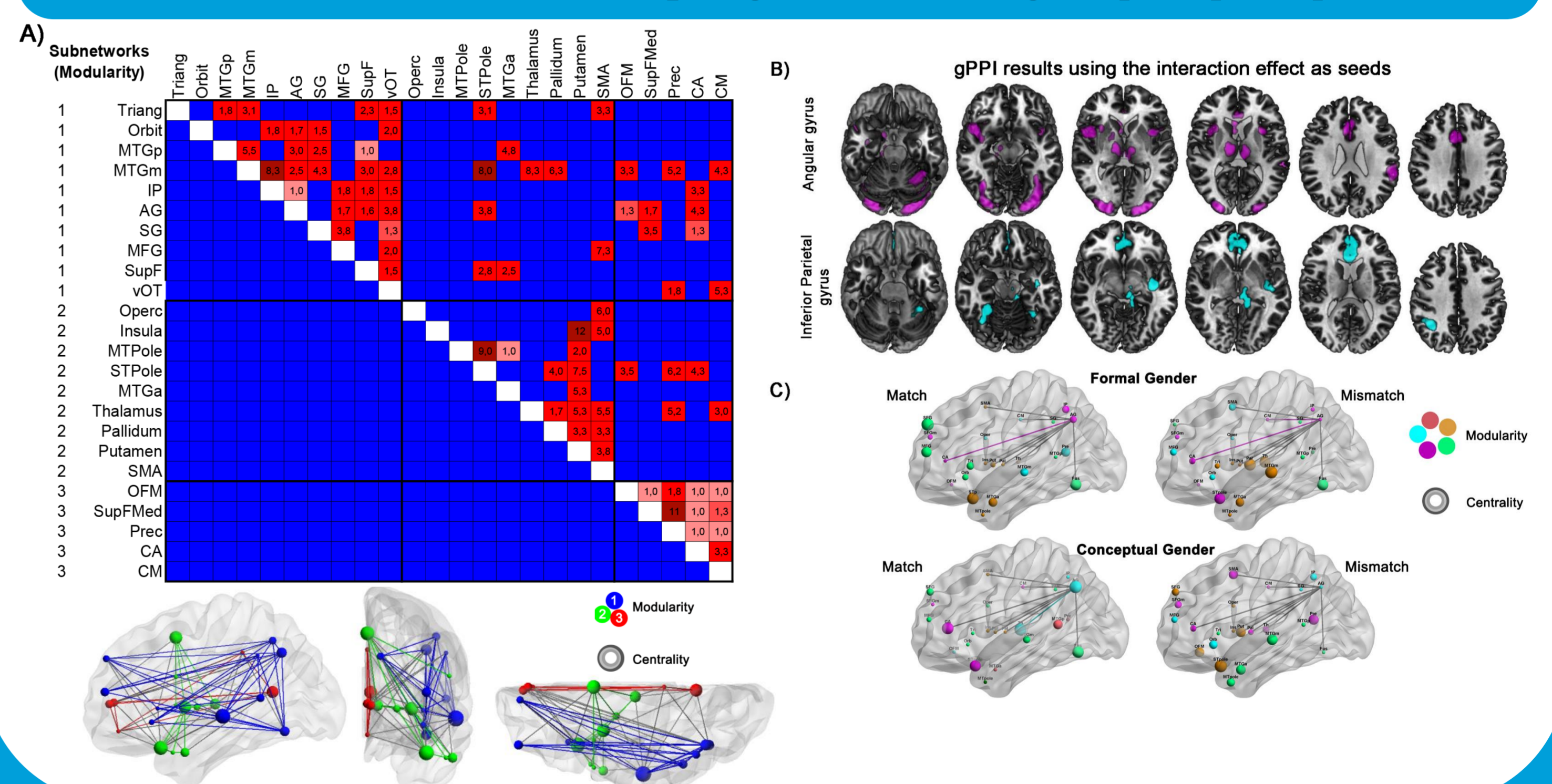### Main effect of Gender Congruency
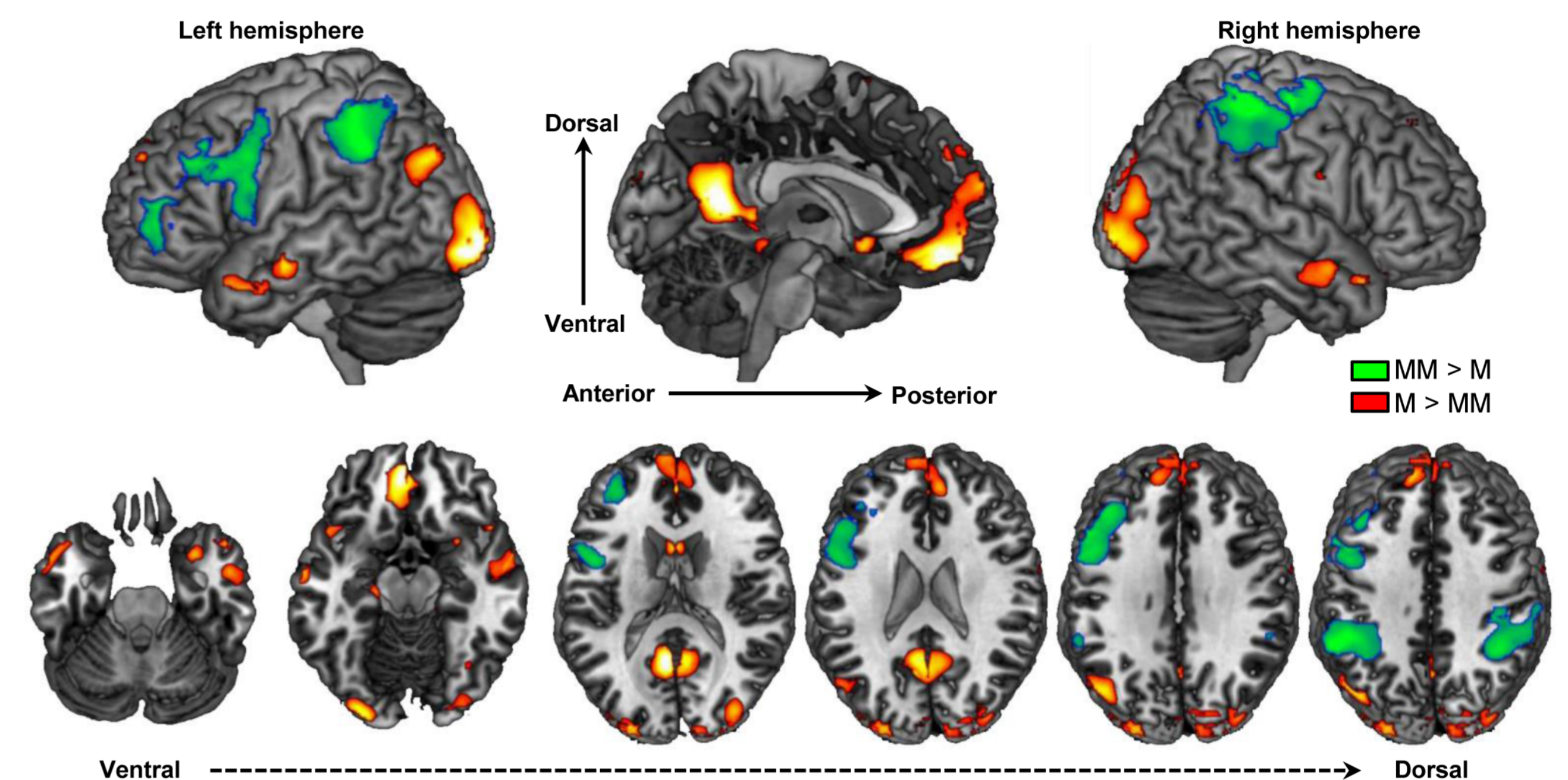
HRFs (Congruency effect)
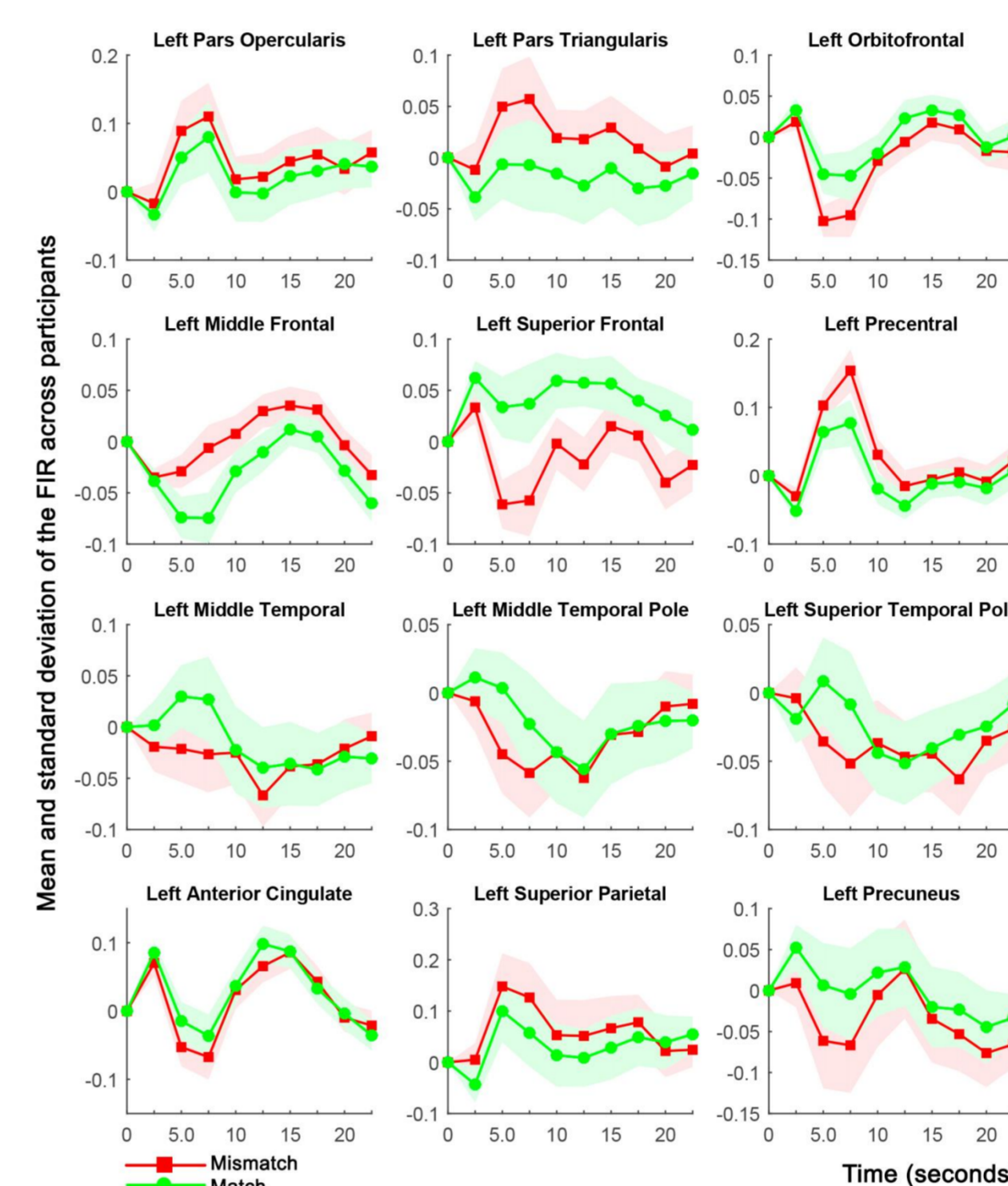
Congruency x Gender Type Interaction
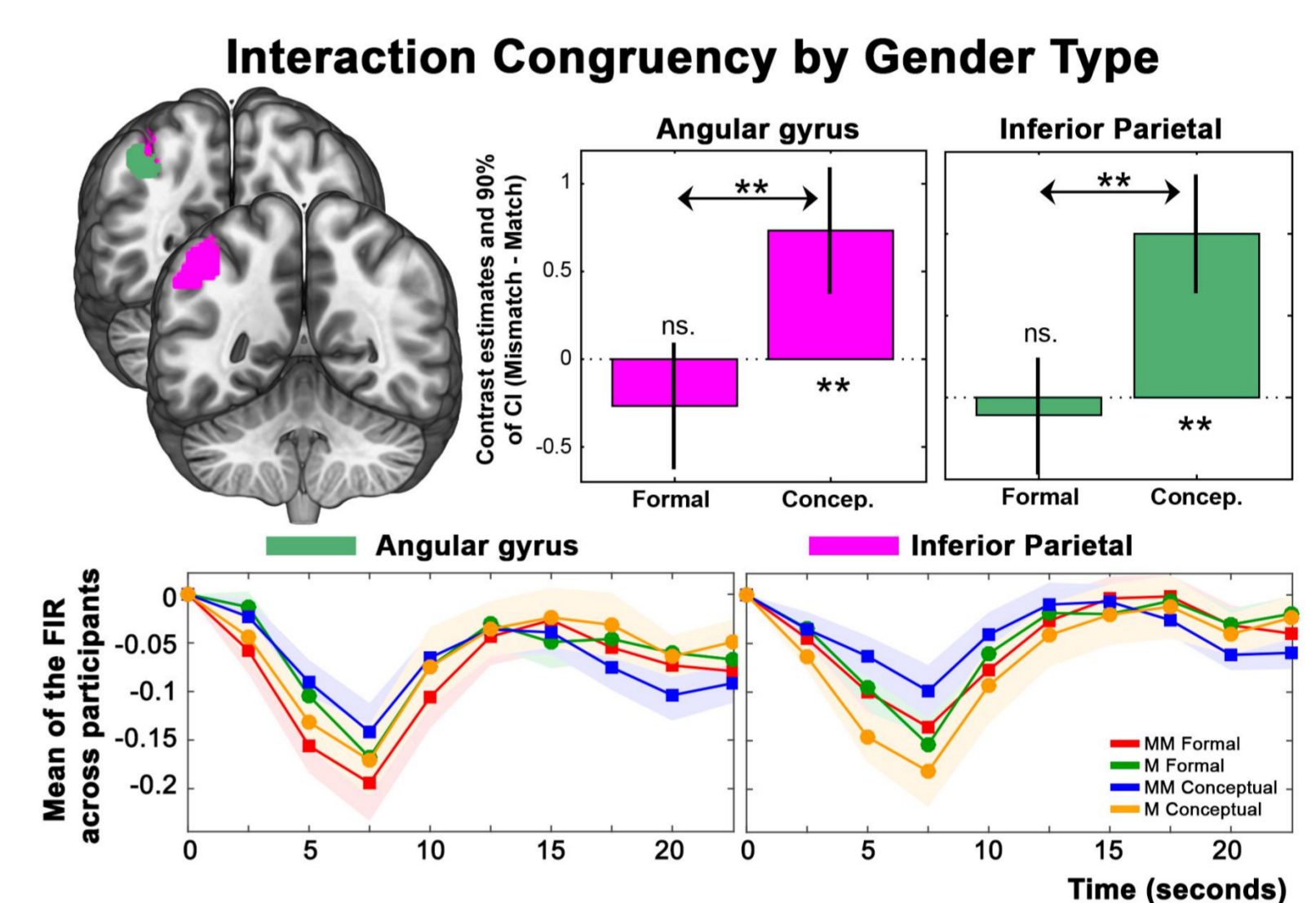
Functional Connectivity (gPPI and graph properties)

Discussion (see in BioRxiv Quinones et al., 2020):

☐ **During comprehension of phrases and sentences multiple neural networks operate in a coordinated fashion. We demonstrated clear evidence for interactions between them.**

Left-lateralized perisylvian circuit typically associated with language-specific functions[1,2] ⟷ **A bilaterally distributed domain-general conflict monitoring system**

The main contribution of this study was the parietal involvement we identified during access, retrieval and integration of formal and conceptual information.

References

1. Friederici AD. 2011. The brain basis of language processing: from structure to function. Physiol Rev 91:1357-1392.

2. Hagoort P. 2013. MUC (Memory, Unification, Control) and beyond. Frontiers in psychology 4:416.

Promoted by:

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