

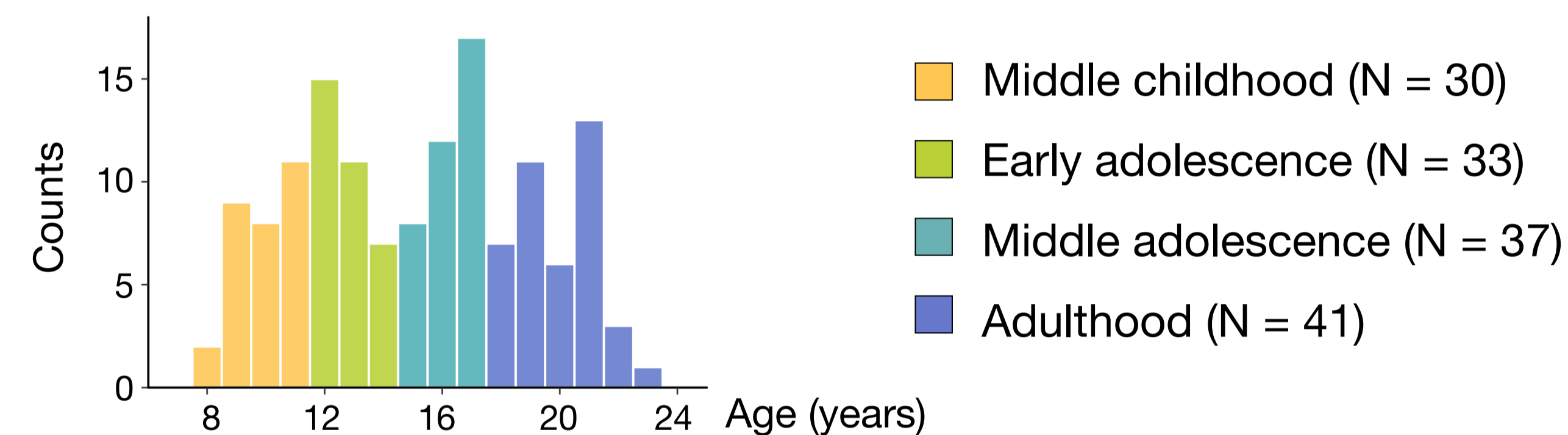
Introduction

A cornerstone of effective communication is our ability to understand what is and is not being said by conversational partners (a.k.a. pragmatic interpretation)¹. However, the developmental trajectory of pragmatic interpretation remains unclear. Several lines of research in human adults suggest that pragmatic interpretation involves a few subprocesses such as extracting relevant information from the communicative context and organizing the information in a specific way for modeling the speaker's utterance selection process^{2,3}.

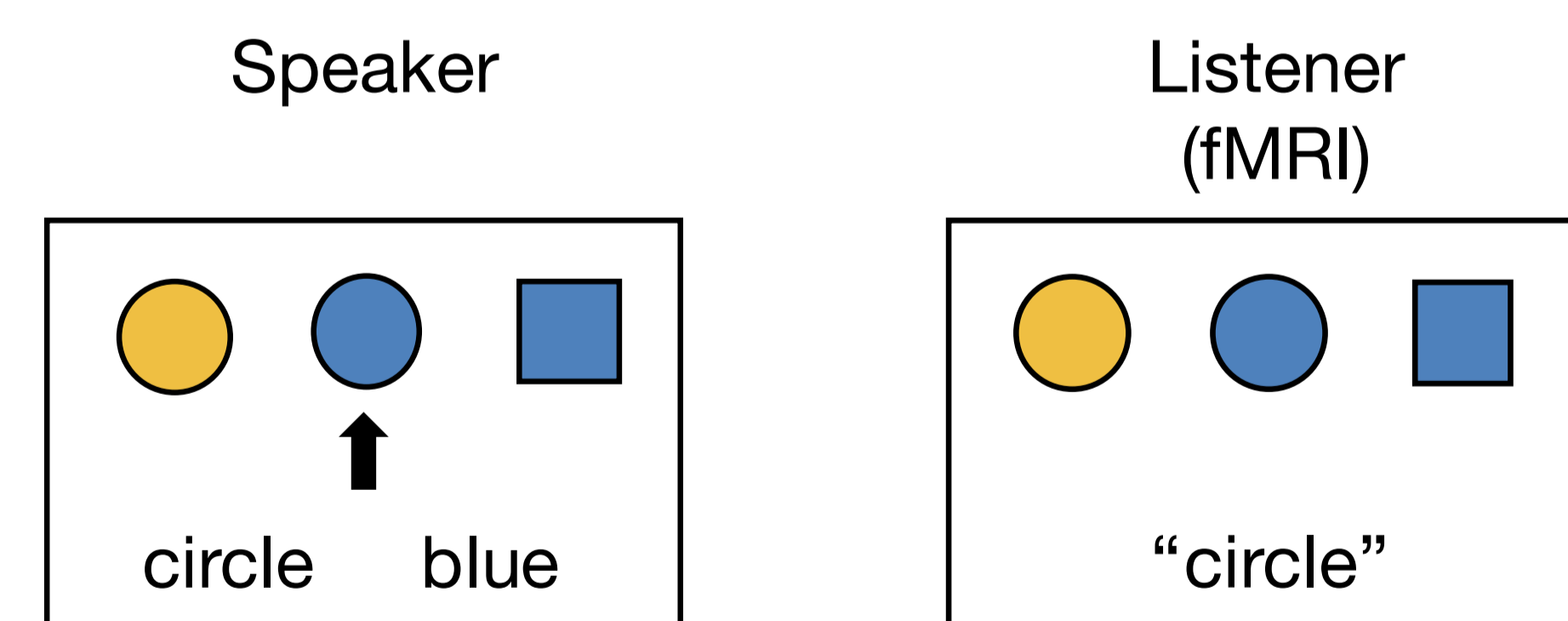
Here, by combining model-based fMRI and computational and experimental pragmatics, we tested for the functional development of brain regions separately recruited for the latent cognitive operations and their relationships with behavioral changes.

Participants

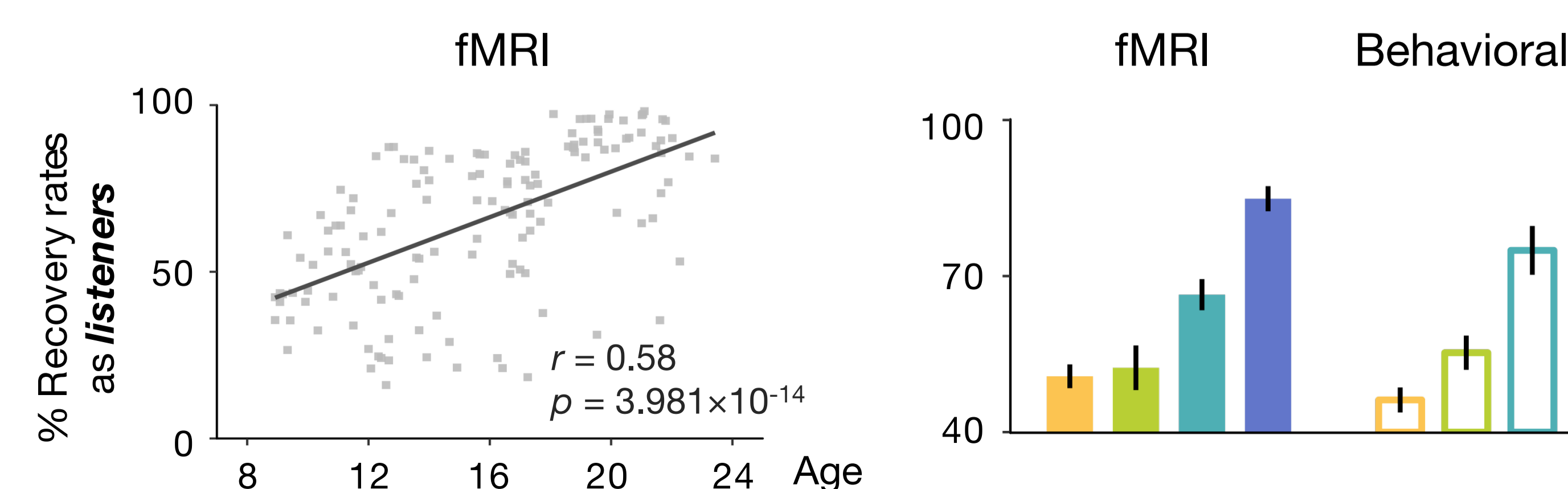
- Behavioral: N = 175 (ages 8 – 17 years, female = 82)
- fMRI: N = 141 (female = 75)



Behavior in the referential game

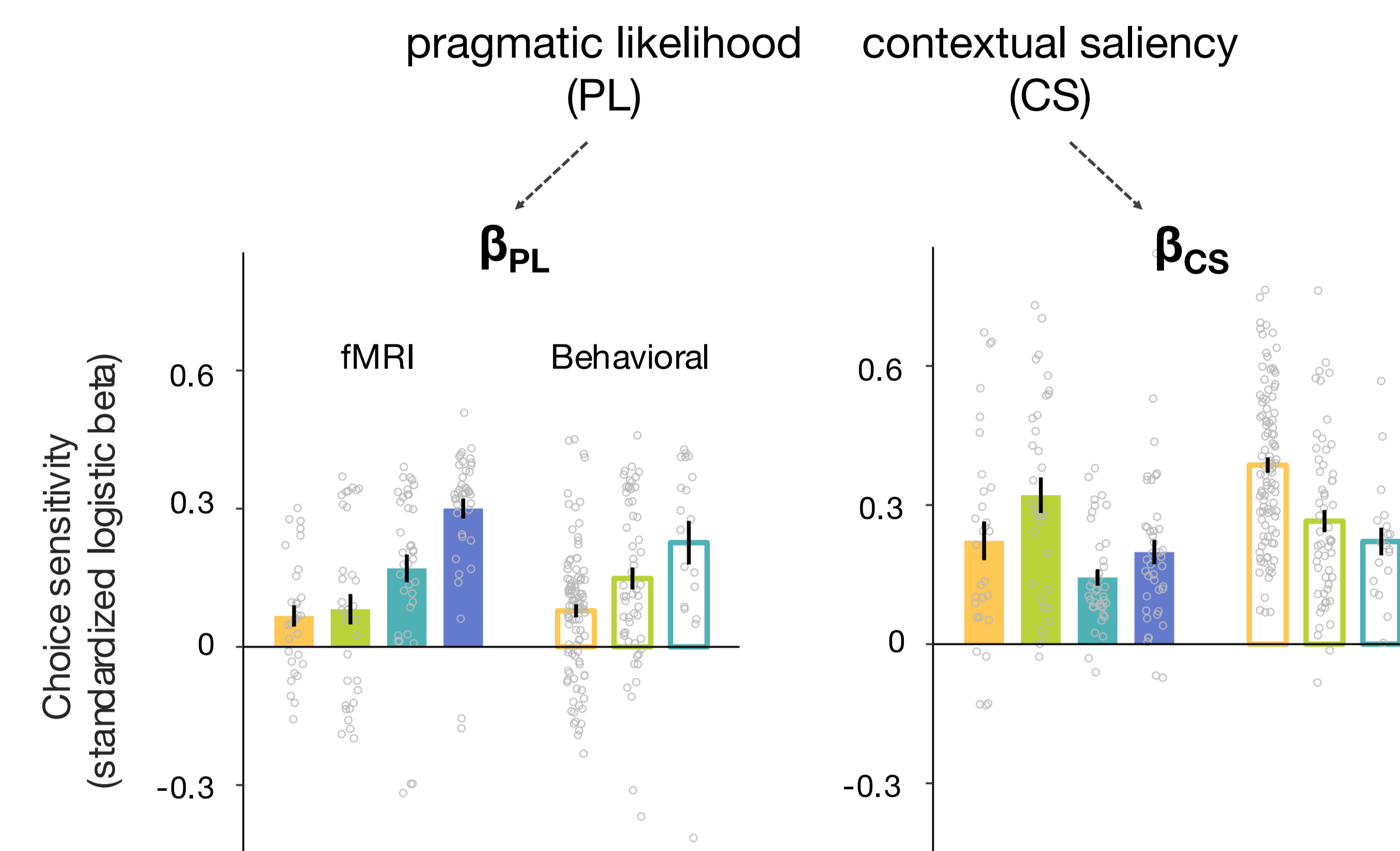


The ability of pragmatic interpretation continuously develops into adulthood

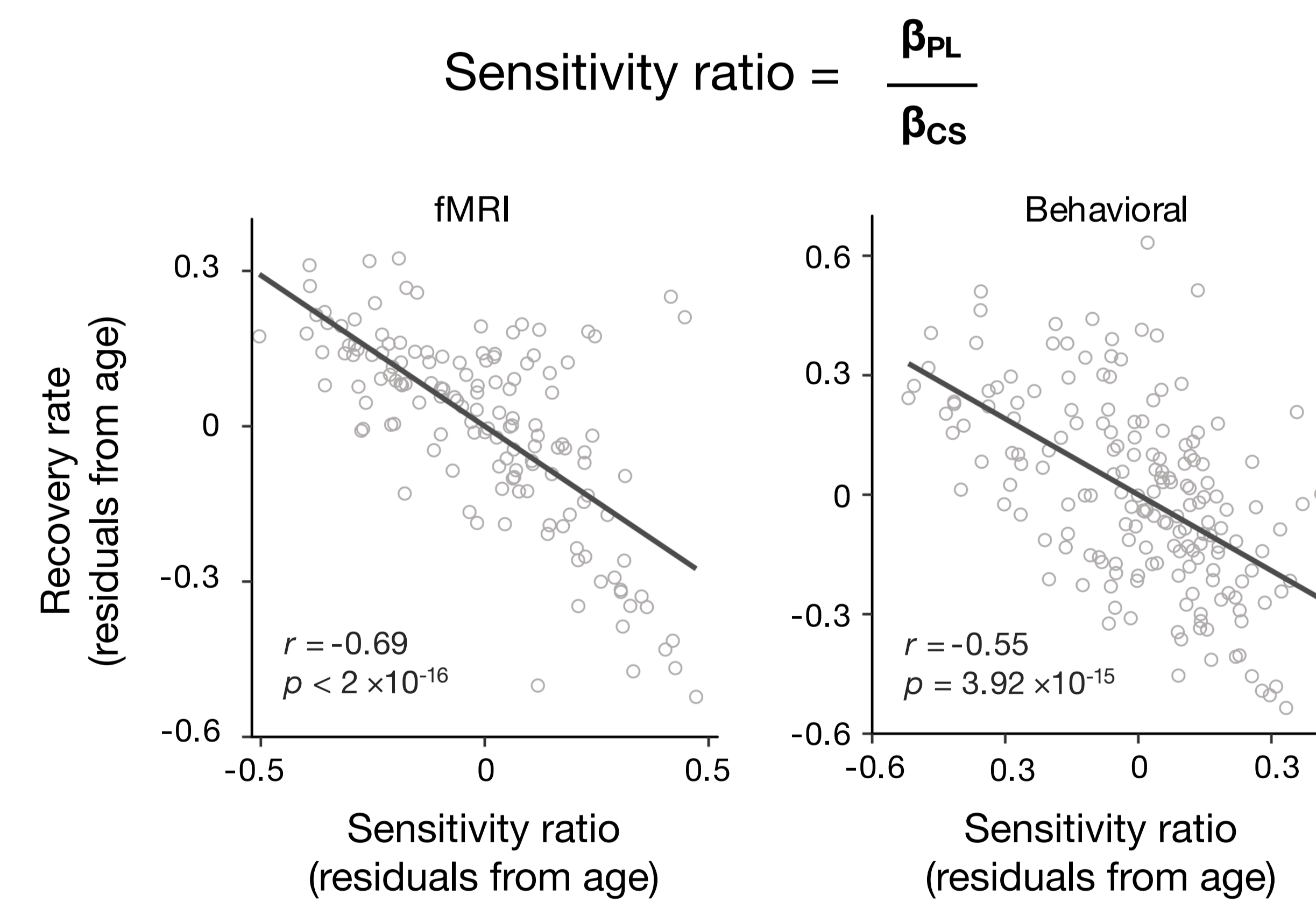


Rational speech act model

$$P_L(\text{circle} | \text{circle}, c) \propto P_S(\text{circle} | \text{circle}, c) \times P_0(\text{circle})$$

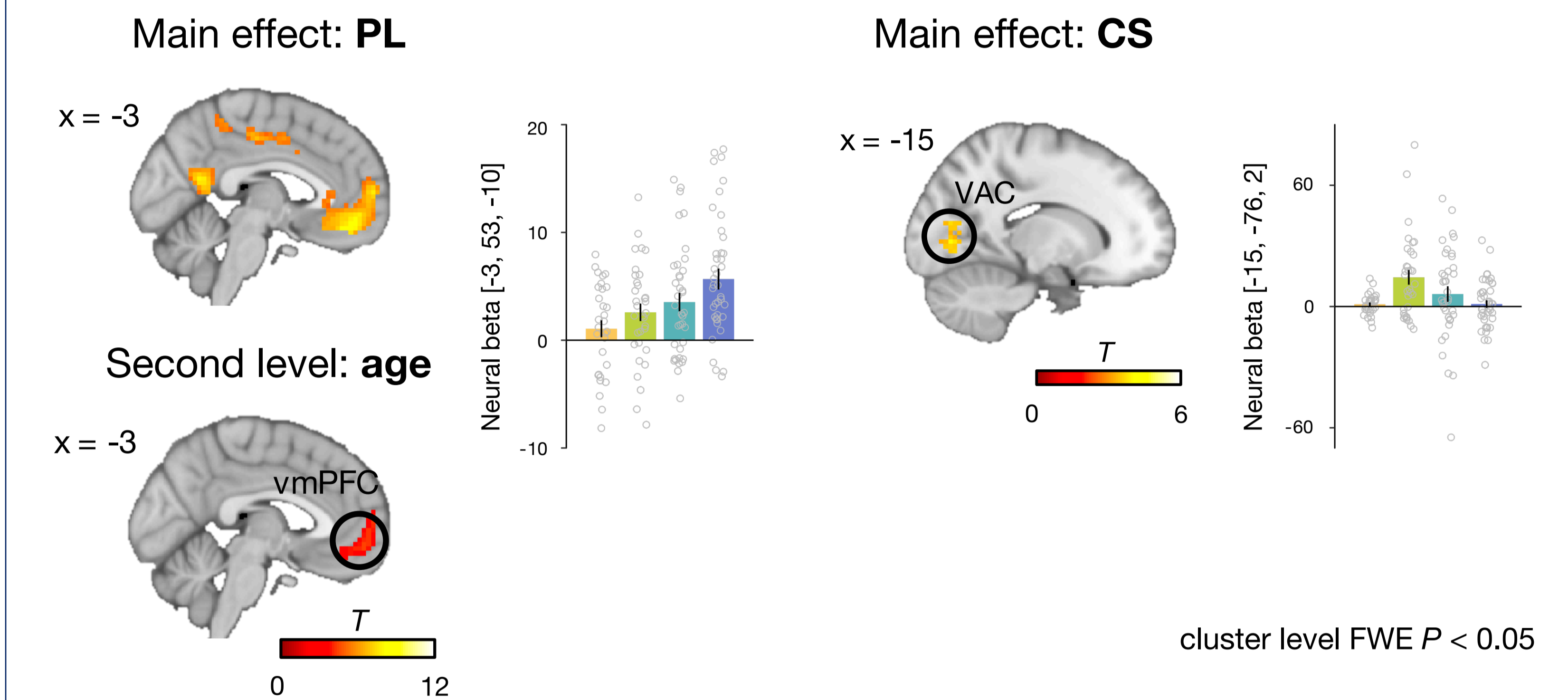


Behavioral sensitivity ratio predicts recovery rate

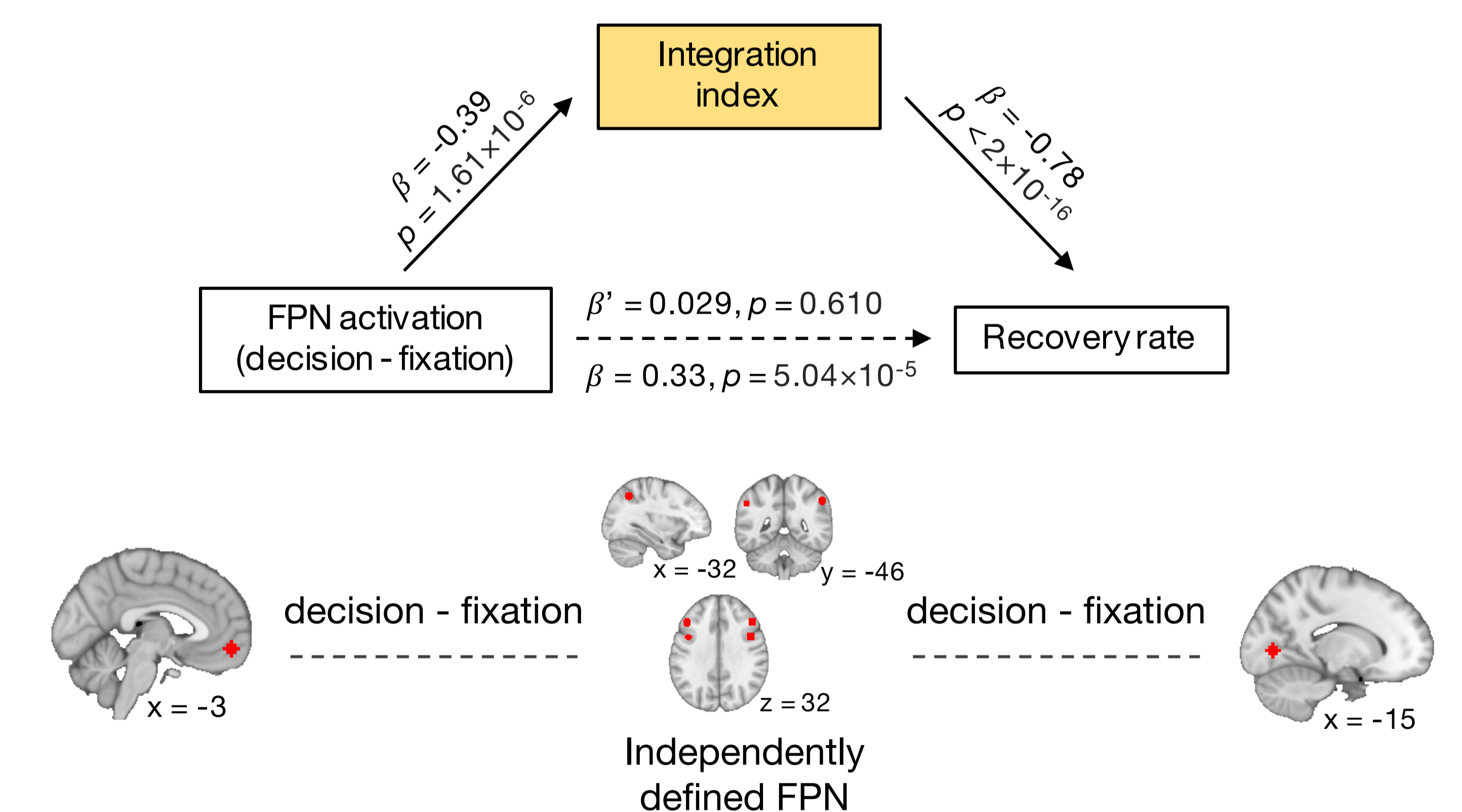


Neuroimaging results

Differential trajectories of PL and CS

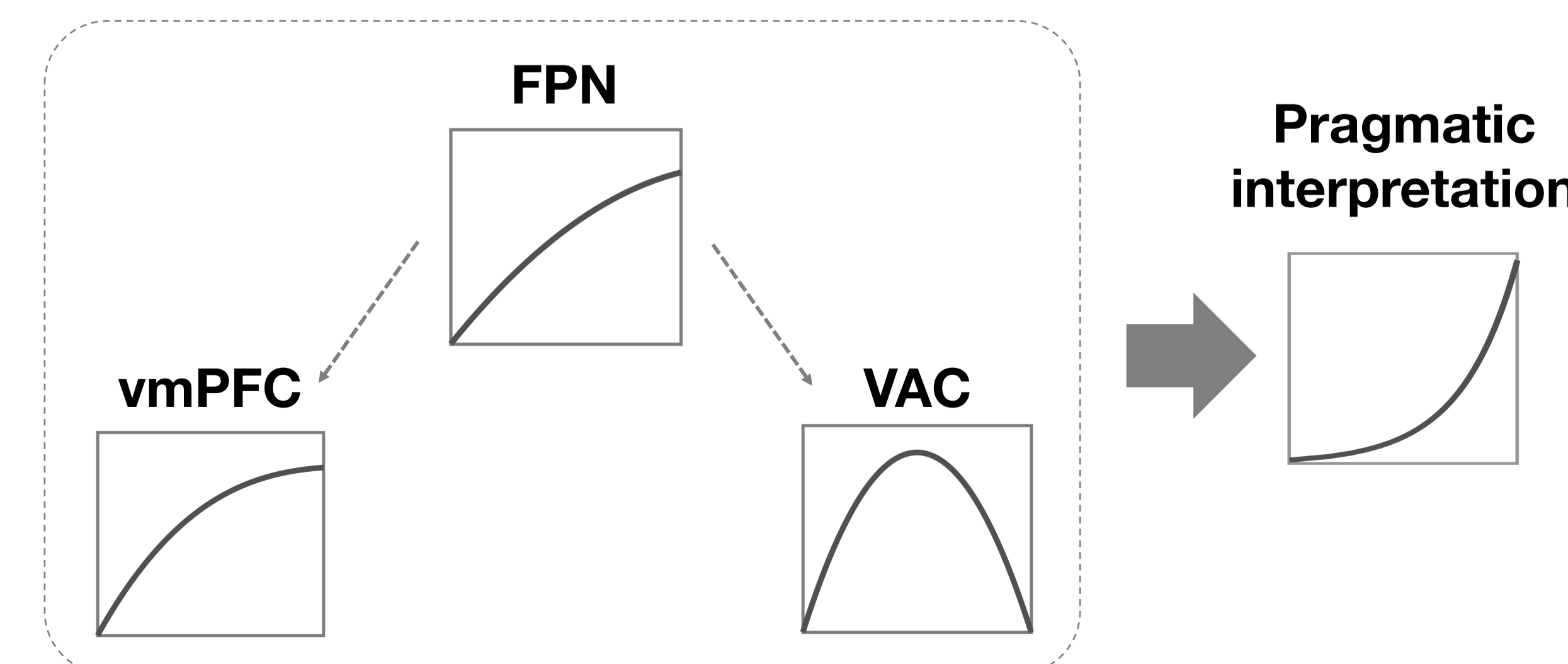


The frontoparietal network (FPN) affects the integration of PL and CS



Discussion

Our results suggest that separable neurodevelopmental trajectories whose interplay contributes to the maturation of pragmatic interpretation from middle childhood through adolescence to adulthood, and the continuous maturing of FPN plays a crucial role in supporting social communication, more generally, social cognition development.



Reference

- Grice, H. P. In *Syntax and Semantics* (1975).
- Frank, M. C. & Goodman, N. D. *Science*. (2012).
- Mi, Q., Wang, C., Camerer, C. F., & Zhu, L. *bioRxiv*. (2019).

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