

The reproducibility of infant fNIRS studies: a meta-analytic approach

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Introduction: As the volume of fNIRS research has grown, especially in developmental cognitive neuroscience, so has the concern for the reproducibility of findings. Meta-analytic approaches are a powerful tool to assess the robustness of empirical findings but have been little applied to fNIRS data. Here we describe a meta-analysis of fNIRS studies on repetition-based rule learning in infants (de la Cruz-Pavía & Gervain, 2021).

Methods: We aggregated 19 fNIRS studies testing brain responses to repetition- (e.g. ABB: “mubaba”, ABA, AAB) and diversity-based (e.g. ABC: “mubage”) linguistic rules. The sample included 355 newborns, 104 6-month-olds, 13 7-month-olds and 15 9-month-olds. We computed individual as well as meta-analytic effect sizes for brain responses in the left temporal lobe to repetition-based rules vs. baseline (R vs 0), diversity-based rules vs. baseline (N vs 0) and repetition- vs. diversity-based rules (R vs N), and explored how effects are moderated by Laboratory, Age and RuleType.

Results: The magnitude of the effect was 0.27 (95% CI= [0.144, 0.398], $p < 0.001$) for the R vs 0 comparison, 0.18 (95% CI= [0.03, 0.33], $p < 0.05$) for N vs 0 and 0.08 (95% CI= [-0.06, 0.22], ns) for R vs N. No analysis revealed an effect of Lab. Age was a significant moderator: responses to repetitions were larger in 6-month-olds than in newborns, then decreased for 7-to-9-month-olds.

Conclusion: Our meta-analysis revealed no variability in infants’ responses to repetition- and diversity-based rules attributable to Laboratory, indicating that effects were robust. Further, we found differential developmental trajectories for the two types of rules.

References

de la Cruz-Pavía, I. , & Gervain, J. (2021). Infants' perception of repetition-based regularities in speech: A look from the perspective of the same/different distinction. *Current Opinion in Behaviora!Sciences*, 37, 125- 132. <https://doi.org/10.1016/j.cobeha.2020.11.014>

