Supplementary Online Material

It has been brought up in recent years in discussions about developmental science that virtually all infant studies are underpowered (Frank et al., 2017), thus it might be that we should question our results in Experiments 1, 2, and 4 due to low power. To assess the robustness of our results, we performed three additional sets of statistical analyses, based on a power analysis on previous infant pattern learning studies (Ferguson & Lew-Williams, 2016), which indicated that N=18 for an individual pattern type would yield 80% power to reject the null hypothesis.

First, we collected data from 18 additional 7-month-old infants and familiarized them to an ABA rule after an Informative exposure (mirroring the Informative ABA condition of Experiment 1). We then fit a meta-analytic hierarchical model to data from this new sample combined with the original sample of infants in the Informative condition familiarized to the ABA rule. This model included Trial Type (Familiar, Novel) and Trial (1-12) as fixed effects (sum-coded and centered prior to fitting). It also included random intercepts and Trial slopes by subject; and random intercepts, Trial, and Trial Type slopes by Experiment. Converging with our interpretation of data from the original sample, this model yielded a significant overall effect of Trial Type (β=1.05, SE=.40, $\chi 2(1)$=4.31, p=.038). After being familiarized to ABA rules in an Informative context, infants showed a significant novelty preference across the original and replication samples.

We also took a similar approach to examining the absence of a novelty preference after familiarization to ABB rules. To further evaluate the null finding among infants who were familiarized to the ABB pattern in Informative conditions, we collapsed the subset of infants who participated in this condition in Experiment 1 with those who participated in Experiment 4, for a total of N=20. We then fit the same meta-analytic hierarchical model to these data, nesting

participant observations within the two experiments in a higher-powered analysis. Despite this increase in statistical power, we once again did not find a significant effect of Trial Type (β=-.52, SE=.62, $\chi^2(1)$=.86, p=.35). Infants looked equally to novel and familiar trials after being familiarized to ABB rules in an Informative context.

Finally, to further evaluate the null finding among infants who were familiarized to the ABB pattern in Uninformative conditions, we collapsed the subset of infants who participated in the Uninformative condition with the ABB pattern in Experiment 1 with those who participated in Experiment 2, for a total of N=24. Using the same meta-analytic hierarchical modeling approach as above, we once again did not find a significant effect of Trial Type (β=-.31, SE=.43, $\chi^2(1)$=.54, p=.46). Infants familiarized to ABB rules did not show a novelty preference at test in the Uninformative conditions .Together, these three additional, high-powered analyses yielded results that converged with the pattern observed in each experiment.

Reference

Frank, M. C., Bergelson, E., Bergmann, C., Cristia, A., Floccia, C., Gervain, J., . . . Yurovsky, D., 2017. A collaborative approach to infant research: Promoting reproducibility, best practices, and theory-building. Infancy 22, 421-435.