

RELATIONS AMONG INFANT FACE-VOICE MATCHING, CANONICAL BABBLING, AND EXPRESSIVE LANGUAGE

BACKGROUND

- Canonical babbling is a well-established predictor of expressive language outcomes^{1,2}
- Findings from the Multisensory Attention Assessment Protocol (MAAP)³ demonstrate that 12-month intersensory processing of synchronous faces and voices predicts 18-month vocabulary, holding well-established predictors (e.g., parent language input, socioeconomic status) constant.⁴
- Few studies have characterized the relations between canonical babbling and intersensory matching of faces and voices
- The current study assessed relations among intersensory matching of faces and voices and canonical babbling and the extent to which each predicted unique variance in expressive vocabulary size.

METHODS

Participants

- Infants ($N = 90$) participated in a longitudinal study from 3-72 months of age.

Measure	Participants N (% male)	Mean Age (months)
Parent-Child Interaction	85(45.9%)	12.04
MAAP	75 (46.7%)	11.9
MB-CDI	51 (50.98%)	18.05

Procedure

- **Predictors at 12 months:**
- *Canonical babbling:* Infants participated in an 8-minute semi-structured parent-child interaction to measure infants' proportion of canonical syllables relative to total number of syllables
 - Vocalization production was segmented and annotated from video recordings using ELAN
- *Intersensory matching:* Infants also participated in the MAAP, to assess face-voice matching
 - Infants viewed two women speaking side-by-side in the presence of a central distractor event, along with a soundtrack synchronous with one of the two women (see Figure 1).

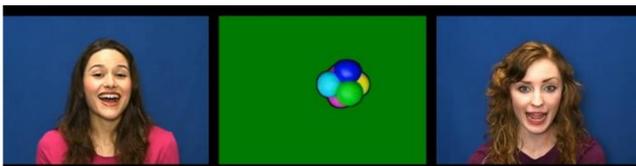


Figure 1. Static image of the dynamic audiovisual high-competition social events from the MAAP

- **Language outcome at 18 months:**
 - We used the MB-CDI, a parent report measure of language, to measure expressive vocabulary size.
- **Data Analysis:**
 - FIML was used for all analyses to estimate missing data
 - We conducted correlations among predictors and outcomes, as well as two mediation models:
 1. Canonical babbling predicting expressive vocabulary, mediated by intersensory matching
 2. Intersensory matching predicting expressive vocabulary, mediated by canonical babbling

MAIN FINDINGS

Intersensory matching of faces and voices **significantly and fully mediates** the relation between canonical babbling and expressive vocabulary.

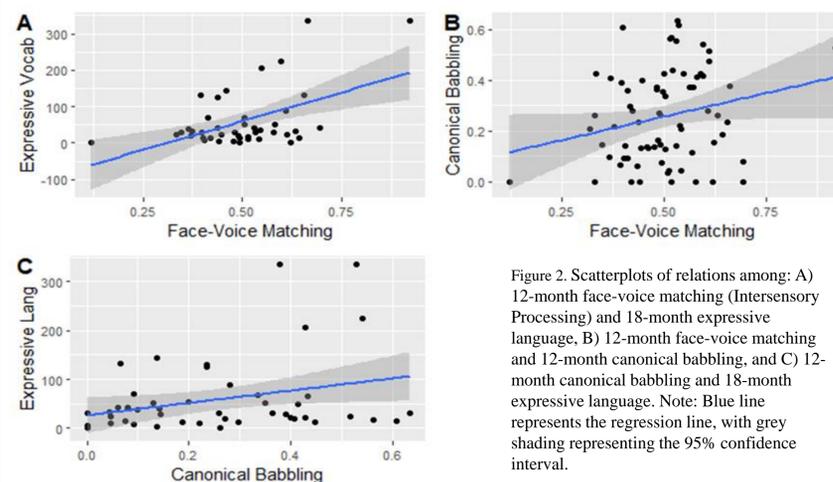


Figure 2. Scatterplots of relations among: A) 12-month face-voice matching (Intersensory Processing) and 18-month expressive language, B) 12-month face-voice matching and 12-month canonical babbling, and C) 12-month canonical babbling and 18-month expressive language. Note: Blue line represents the regression line, with grey shading representing the 95% confidence interval.

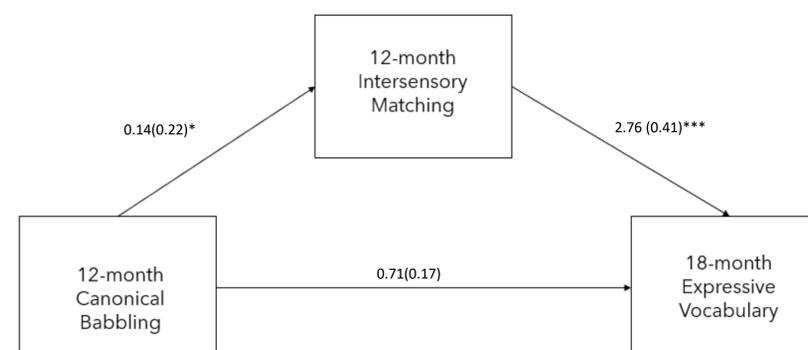


Figure 3. Canonical babbling predicting expressive vocabulary mediated by intersensory matching; standardized coefficient (unstandardized coefficient); * $p < .05$, *** $p < .001$

In fact, **intersensory matching of faces and voices accounts for 16% unique variance** in predicting expressive language, while canonical babbling accounts for 4%.

RESULTS

- **Correlations:**
 - Canonical babbling predicts intersensory matching of faces and voices, $r = .20, p = .05$.
 - Intersensory matching predicts expressive vocabulary size, $r = .37, p < .001$.
 - Canonical babbling predicts expressive vocabulary, $r = .16, p = .05$.
- **Mediation Model:**
 - Canonical babbling at 12 months significantly predicted intersensory matching at 12 months, $p < .05$
 - In turn, intersensory matching significantly predicted expressive vocabulary, $p < .001$
 - However, canonical babbling did not significantly predict expressive vocabulary, holding matching constant
 - Thus, intersensory matching of faces and voices significantly and fully mediates the relation between canonical babbling and expressive vocabulary.
 - An alternative mediation model revealed that canonical babbling did not mediate the relations between intersensory matching and expressive vocabulary.

CONCLUSIONS

- Consistent with the literature, we found that infant canonical babbling at 12 months and intersensory matching at 12 months predicted expressive language outcomes at 18 months.
- Findings also demonstrate evidence of a novel relation between canonical babbling and intersensory matching.
- Our mediation analysis revealed that intersensory matching fully mediates the relation between canonical babbling and expressive language outcomes.
- Greater canonical babbling leads to better intersensory matching and in turn better expressive language outcomes

REFERENCES

- ¹ Fagan, M. K. (2009). Mean Length of Utterance before words and grammar: Longitudinal trends and developmental implications of infant vocalizations*. *Journal of Child Language*, 36(3), 495-527. <https://doi.org/10.1017/S0305000908009070>
- ² Oller, D. K., Eilers, R. E., Neal, A. R., & Schwartz, H. K. (1999). Precursors to speech in infancy: The prediction of speech and language disorders. *Journal of Communication Disorders*, 32(4), 223-245. [https://doi.org/10.1016/S0021-9924\(99\)00013-1](https://doi.org/10.1016/S0021-9924(99)00013-1)
- ³ Bahrick, L. E., Todd, J. T., & Soska, K. C. (2018). The Multisensory Attention Assessment Protocol (MAAP): Characterizing individual differences in multisensory attention skills in infants and children and relations with language and cognition. *Developmental Psychology*, 54(12), 2207-2225. <https://doi.org/10.1037/dev0000594>
- ⁴ Edgar, E. V., Todd, J. T., & Bahrick, L. E. (2022). Intersensory matching of faces and voices in infancy predicts language outcomes in young children. *Developmental Psychology*. <https://doi.org/10.1037/dev0001375>

ACKNOWLEDGEMENTS

We would like to thank the children and families who participated in this longitudinal study with the Infant Development Lab. This research was also made possible through the following grants through the NICHD: R01 HD094803 and R01 HD053776-11 awarded to the last author.



For contact information, poster, and handout, please scan the QR Code to the left or visit: <https://sites.google.com/view/icis2022poster/presentation>