



How Infants Babble Impacts the Content of Caregivers' Responses

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Background

Sensitive and contingent responses to infant behavior have long-term effects on infant language learning.

- Caregivers consistently provide feedback to infants' prelinguistic vocalizations (Goldstein & West, 1999).
- Maternal responsiveness to vocalizations in the first two years predicts later language development (Tamis-LeMonda, Bornstein, & Baumwell, 2001).

Mothers provide more sensitive responses when infants vocalize at objects and when infants produce more advanced vocalizations (Albert, Schwade, & Goldstein, 2018).

The current study investigated the following questions:

1. Do non-mothers exhibit different response patterns to infant vocalizations than mothers?

- Non-mothers have less experience perceiving infant vocalizations so non-mothers may be less sensitive to vocal quality than mothers when responding.
- Mothers teach words by asking questions that they already know the answer to (Yu, Bonawitz, & Shafto, 2019). We predicted that mothers would use more pedagogical questions when responding than non-mothers.

2. Do micro characteristics of infant behavior impact the type of sensitive responses caregivers provide?

- We predicted that caregivers would provide more specific pieces of information (e.g., descriptions) following object-directed vocalizations than undirected vocalizations.

Participants: 60 women (M = 33.22 years; range 21-47 years) participated and were classified by parity (e.g., number of births).

Stimuli: Participants watched 7-second video clips of unfamiliar 9-month-old infants playing while vocalizing. The stimulus clips were created by recombining audio and visual images of infant behavior on two dimensions: where infants were looking (Directedness) and the acoustic quality of their vocalization (Infraphonology; Oller, 2000).



Method: Playback Paradigm

Procedure: Participants provided an in-the-moment vocal response to 80 audio-visual examples of infant vocalizations as if they were really interacting with the infants on screen.

Data Analysis: Participants' contingent vocal responses were coded into one of five categories (Tamis-LeMonda et al., 2001). Questions were further broken down into three sub-types (adapted from Yu, Bonawitz, & Shafto, 2019)

| Response Type | Definition | Example |
|---------------|---|------------------------------|
| Affirmation | Words that hold a place in the conversation without providing new information | Uh-huh, I know |
| Description | Statements that describe the infant, infant's action, or objects near infant | That's a ball. You're so big |
| Question | Pedagogical: Questions about the infant's current actions that would encourage a verbal response | Is that a ball? |
| | Filler: Questions that acknowledged the infant's vocalization without providing new information | What's that? |
| | Emotional: Question's about the infant's emotional or physical state | Are you happy? |
| Play Prompt | Prompts that guide an infant to perform an action | Roll me the ball! |
| Imitation | Duplications of the infant's vocalization | Baby: [ba] Mom: [ba] |

Summary of Findings

- Parity type had minimal impact on responding. Caregiving experience only impacted responses to the least mature sounds.**
 - Primiparous (first-time) mothers asked more pedagogical questions to advanced vowels and more filler questions to immature vowels (Figure 1).
 - Non-mothers were equally likely to respond to mature and immature vowels (Figure 3).
- Regardless of parity type, infant gaze while vocalizing is a highly salient cue that organizes caregiver responding.**
 - Caregivers respond with more descriptions and play prompts following object-directed vocalizations than undirected vocalizations (Figure 2).
- Infant vocal maturity impacted response rate and content.**
 - Mothers responded more to mature vowels than immature vowels (Figure 3)
 - Immature consonant-vowels elicited more questions while mature syllables were more likely to elicit an imitation from women (Figure 4).

References

Albert, R.R., Schwade, J.A., & Goldstein, M.H. (2018). The social functions of babbling: Acoustic and contextual characteristics that facilitate maternal responsiveness. *Developmental Science*, 21(5):e12641.

Goldstein, M.H., & West, M.J. (1999). Consistent responses of human mothers to prelinguistic infants: The effect of prelinguistic repertoire size. *Journal of Comparative Psychology*, 113, 52-57.

Oller, D. K. (2000). *The emergence of the speech capacity*. Mahwah, NJ: Erlbaum.

Tamis-LeMonda, C.S., Bornstein, M.H., & Baumwell, L. (2001). Maternal responsiveness and children's achievement of language milestones. *Child Development*, 72, 748-767.

Yu, Y., Bonawitz, E., & Shafto, P. (2019). Pedagogical questions in parent-child conversations. *Child Development*, 90, 147-161.

Results

Impact of Parity on Question Responses to Immature Vocalizations

| Parity | Description |
|-------------|--|
| Nulliparous | Women who do not have children (n=20) |
| Primiparous | Mothers to a nine-month-old infant (n=20) |
| Multiparous | Mothers to a nine-month-old infant and at least one older child (n=20) |

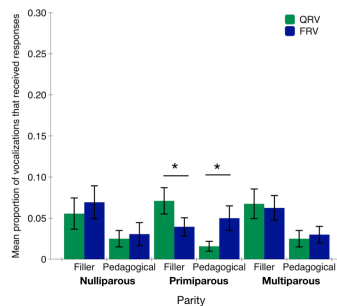


Figure 1. Participants' mean question responses to vowel stimuli (± 1 SE) by vowel type and parity. * $p < .05$. Primiparous mothers asked more filler questions to immature vowels (QRV) but more pedagogical questions to mature vowels (FRV).

Directedness of Infant Vocalizations



Object Directed Vocalizations Undirected Vocalizations

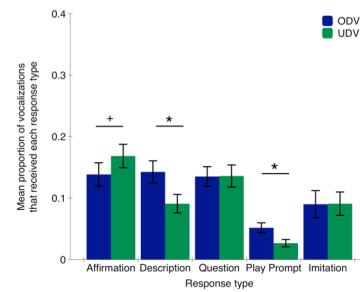


Figure 2. Participants' mean verbal responses to stimuli (± 1 SE) by directedness and response type. * $p < .051$. Women provided more descriptions and play prompts following ODVs but trended towards more affirmations following UDV's.

Impact of Vowel Quality on Responding

| Syllabus Type | Description | Example |
|----------------------------|--|---------|
| Quasi-resonant vowel (QRV) | Vowel produced with a closed vocal tract, resulting in nasalized vocalizations | [grunt] |
| Fully-resonant vowel (FRV) | Vowel produced with an open vocal tract | [ah] |

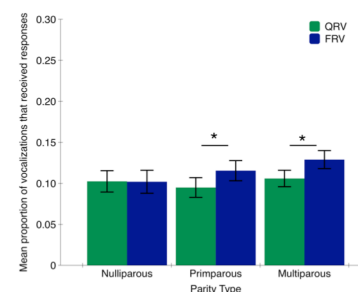


Figure 3. Participants' mean verbal responses to vowel stimuli (± 1 SE) by vowel type and parity. Mothers were more responsive to mature vowels (FRV) than immature vowels, while non-mothers were equally responsive to both vowel types.

Impact of Syllable Quality on Response Type

| Syllabus Type | Description | Example |
|-------------------------|--|---------|
| Marginal Syllable (MS) | Slow sequences of consonant-vowel articulation | [bwaa] |
| Canonical Syllable (CS) | Fast consonant-vowel transitions with a FRV | [ba] |

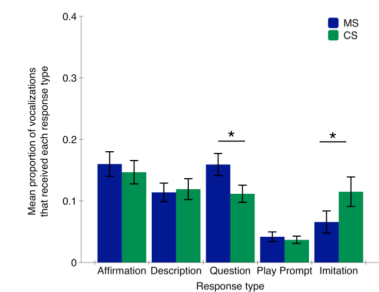


Figure 4. Participants' mean verbal responses to consonant-vowel stimuli (± 1 SE) by response type. When responding to CVs, women ask more questions (both filler and pedagogical) following marginal syllables (MS) and were more likely to imitate canonical syllables (CS).