

Maternal Speech Content During Toy Play at 9 and 12 Months: Longitudinal Stability and Predictions of Infant Language

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INTRODUCTION

Maternal speech quantity and content predict language development in infancy and early childhood. Variables in caregivers' speech to children, such as the amount of talking and range of vocabulary, predict young children's receptive and productive language skills (Hart & Risley, 1995). These predictions hold true for diverse samples that cover a wide socio-economic spectrum. It is less clear whether child language outcomes depend on differences in maternal speech within more homogeneous samples; for example, among middle-class, college-educated parents. Furthermore, little is known about how differences in maternal speech content influence child language outcomes. Questions, imperatives, and other repetitive sentence frames might draw infants' attention to co-occurrences between words, objects, and actions.

Present Study

As part of a longitudinal study of infant social and language development (Deák et al., 2013), we investigated maternal speech during in-home play interactions between 41 college-educated mothers and their infants at 9 and 12 months of age. In addition, preliminary results taken from a subset of the infants ($n = 28$) at 6 months of age are reported.

Maternal input was analyzed for lexical quantity and diversity, and for distribution of utterance-types (e.g., question, imperative). Stability of individual mothers' speech patterns across a 6-month interval was examined.

Research Questions

- Are quantity and content of maternal speech consistent from 9 to 12 months?
- Are differences in maternal speech quantity and diversity associated with differences in content?
- Is the relationship between maternal speech and early language ability mediated by the content of maternal utterances at the level of frames or speech act type?

Participants: Mother-infant dyads ($N = 41$)

- Gender: M = 19, F = 21
- Maternal Education: 16.1 years, $SD = 1.8$
- Sessions taken 6, 9 and 12 months. To date, $n = 28$ 6-month sessions have been transcribed.

ACKNOWLEDGEMENTS

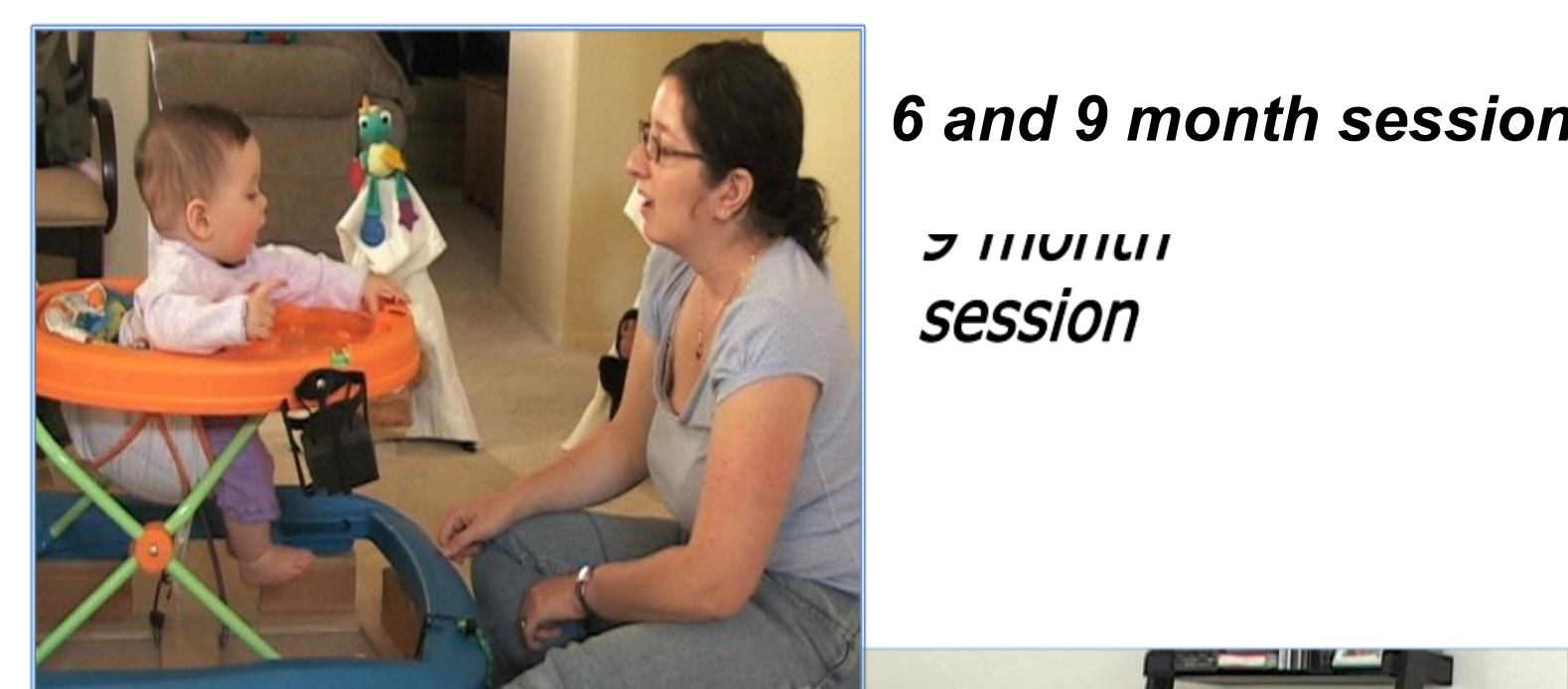
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METHOD

Procedure

6 and 9 Months	12 Months
-Free play with toys at home (~12 min)	-Free play with toys at home (~12 min).
-Video from 3 angles	-Video from 2 angles
-Includes unscripted play with three toys; pointing to puppets	-Includes unscripted play with three sets of toys



12 month session

12 month session

Infant Language and Cognitive Measures

Bayley Scales of Infant Development (BSID-III)

- Cognitive scores at 12 months ($n = 35$);
- Receptive and Expressive Communication scores at 18 months ($n = 36$) (Bayley, 2005)

MacArthur Communication Development Inventory (MCDI) short form (Fenson et al., 2000)

- Parent-report checklist of productive vocabulary at 22 months ($n = 30$)

Coding and Analysis

Transcription

Maternal speech, non-linguistic utterances, and infant vocalizations were transcribed using ELAN (EUDICO Linguistic Annotator; Lausberg & Sloetjes, 2009). All vocalizations were time-locked to videos (start and stop frame) with 0.1 sec precision.

Analysis of Maternal Speech

Token counts and lexical diversity (D) were calculated using CLAN (Computerized Language Analysis; MacWhinney, 2000).

Discourse Types

Each maternal utterance was classified as Declarative, Imperative, Wh-question, Yes/No Question, Repetition, Social routines, Conversation placeholders, Isolated Verbs, and Child's Name.

RESULTS

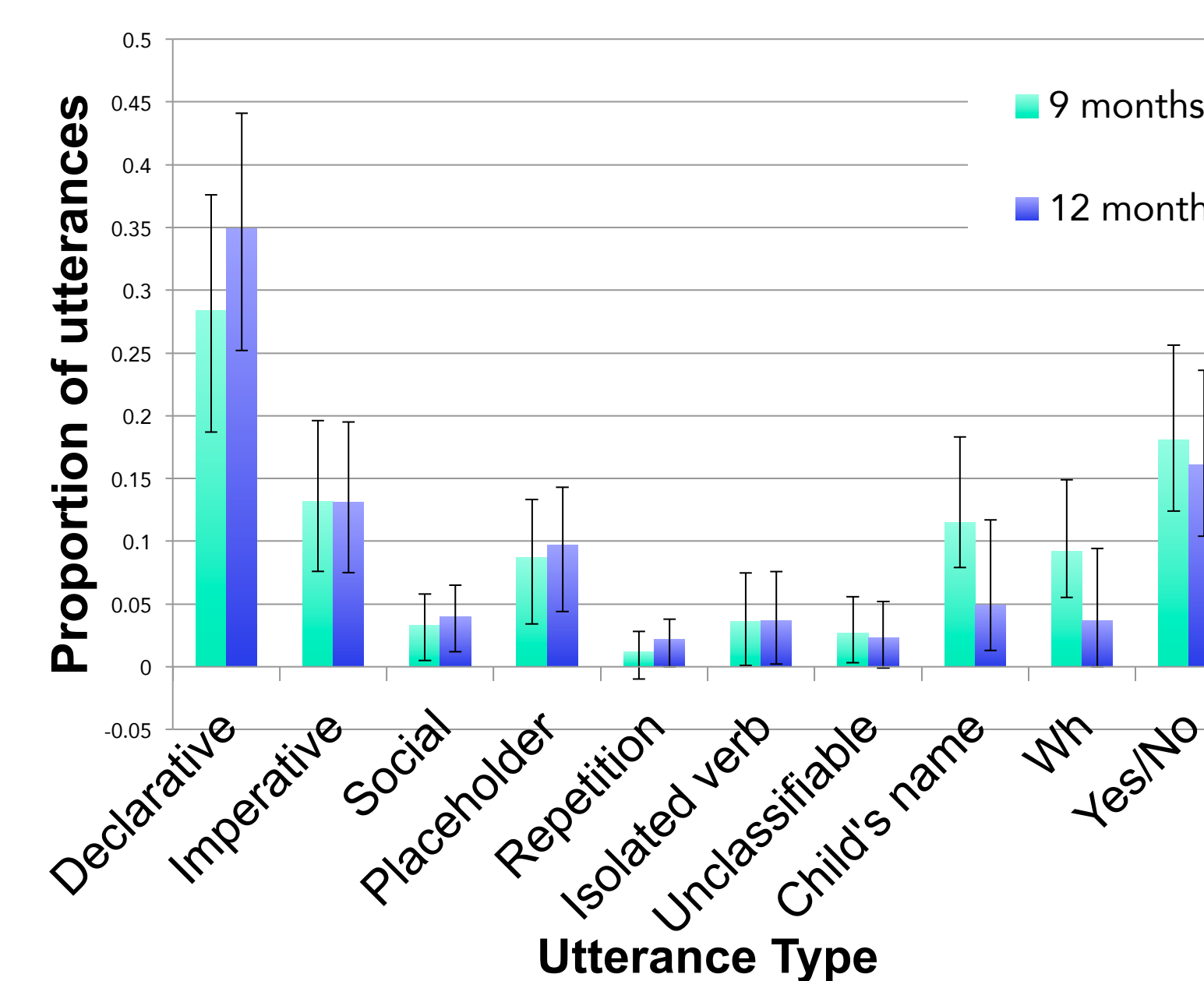
Descriptive Statistics	Mean	SD
6 mth D	32.6	11.4
9 mth D	40.4	16.0
12 mth D	56.6	13.8
6 mth Tok/min	64.5	17.9
9 mth Tok/min	65.0	21.3
12 mth Tok/min	57.1	17.8

Maternal Speech Measures are Stable From 9 to 12 Months

Pearson's Correlations	9 mth D	9 mth Tok/min	12 mth Tok/min
12 mth D	.552 **	.266	.356 *
12 mth Tok/min	.340 *	.570 **	-
9 mth Tok/min	.301	-	-

* $p < 0.05$, ** $p < 0.001$. D = Lexical Diversity, Tok/min = Individual word tokens per minute.

Utterance Types at 9 and 12 Months



Proportion of utterances of each type at 9 and 12 months. Error bars: SD

High Lexical Diversity is Associated With More Declaratives but Fewer Isolated Verbs, Conversation Placeholders & Child's Name

Pearson's Correlations	Declarative	Isolated Verb	Conversation Placeholder	Child's Name
9 and 12 mo. averaged D	.39 *	-.33 *	-.32 *	-.36 *

* $p < 0.05$, Examples of placeholders: "yeah", "huh". All other speech types were not significantly related to lexical diversity.

Relations of 9-12 Maternal Speech to 18-Month Language Skills

Pearson's Correlations	9-12 mo. Avg D	9-12 mo. Avg Tok/min
22 months MCDI	.293	.127
18 months BSID Language	.270	-.034

Lexical Diversity Predicts 18 Month Language Skills

Partial correlations, controlling for Maternal Education, 12 mth BSID Cognitive, Distribution of Discourse Types	Avg D	Avg Tok/min
22 mth MCDI	.47, $p = 0.01$.27, $p = .18$
18 mth BSID Language	.44, $p = 0.01$.23, $p = .24$

Preliminary 6 Month Data Suggest Speech Consistency From Early Age

Pearson's Correlations	9 mth D	12 mth D
6 mth D	.622**	.723 **

CONCLUSIONS

- Quantity and quality of maternal speech to infants are consistent from 9 to 12 months despite some variation in context.
- Maternal speech contains a variety of different discourse types, which are associated with differences in lexical diversity, a numerical measure of speech quality.
- Lexical diversity of maternal speech predicts language development independently of discourse types and general infant intelligence.

FUTURE QUESTIONS

- Future studies will investigate temporal relations among maternal speech, infant and maternal gaze, and infant and maternal manual actions (de Barbaro, 2013, PhD Thesis).
- Is contingent verbal responding conditioned on joint attention?
- Do mothers use different utterance types contingent on specific infant behaviors?

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