Contingency in Child-Caregiver Naturalistic Conversation: Evidence for Mutual Influence

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Abstract

To be able to hold conversations, children need to learn contingency, i.e., the ability to contribute to a dialog with relevant utterances. We study this skill in the context of child-caregiver naturalistic interactions. While much of previous work has focused on the caregiver or on the child, here we study contingency in the dyad as a whole, allowing for a deeper understanding of how both children and caregivers influence the course of the dialog.

1 Introduction

How do children learn to become competent conversational partners? The current study focuses on the development of one skill that is at the core of the very definition of conversation: *Contingency*, which we can be understood, in broad terms, as the ability of children to contribute with utterances that connect with the interlocutor's previous turn and with the topic of the ongoing exchange more generally, allowing for a coherent back and forth between the interlocutors (e.g., Slomkowski and Dunn, 1996).

Previous related work has either focused the caregiver's contingency (with respect to the child's behavior/utterance) (see review in Masek et al., 2021) or on the child's contingency (Bloom et al., 1976; Hale and Tager-Flusberg, 2005; Nadig et al., 2010; Pagmar et al., 2022). The novelty of the current work is that it studies the development of early dialog contingency by investigating how both the child's and caregiver's contingent behaviors (or lack thereof) influence each other in naturalistic interactions.

2 Method

2.1 Data

We used data from the French "Paris Corpus" (Morgenstern and Parisse, 2012), publicly available[1] on CHILDES repository (MacWhinney, 2000). The corpus is made of longitudinal recordings (and their transcriptions) of children spontaneously interacting with their caregivers at home. The participants were videotaped (by a researcher) once a month, over a developmental period ranging from 1 to 5 years of age. Based on the quality of the recordings, we studied the data of two female children (Anae and Madeleine) and two males (Adrien and Theophile). We sampled, for each child, 6 transcripts. We made sure these picked transcripts spanned the entire developmental range of the corpus. We ended up with a total of 24 transcripts, each lasting around 1 hour.

2.2 Coding

Question, Response, Follow-up (QRF)

We focus on parts of the dialog that are initiated with a question. The reason is that questions are frequent in child-caregiver dialogues, making the Question, Response, Follow-up sequence (hereafter QRF) a rather time-stable micro-structure, within which we can study children's contingency starting from young age (Chouinard et al., 2007). Besides, researchers have suggested that questions are a way caregivers initiate children to the exercise of contingency (Foster, 1986). Our data yielded a total of 402 child-initiated QRF units and 2,815 caregiver-initiated QRF units (across all 24 transcripts).

Contingency coding

The coding proceeded in two steps. First, we coded the sequences using a fine-grained coding scheme based on the literature on child-initiated QRF (e.g., Kurkul and Corriveau, 2018), while introducing slight adjustments to capture *both* child- and caregiver-initiated QRFs. Inter-annotation agreement based on a sample of about 20% of the data, coded independently by two annotators, led to Cohen's kappa values of 0.8 for child-initiated QRF

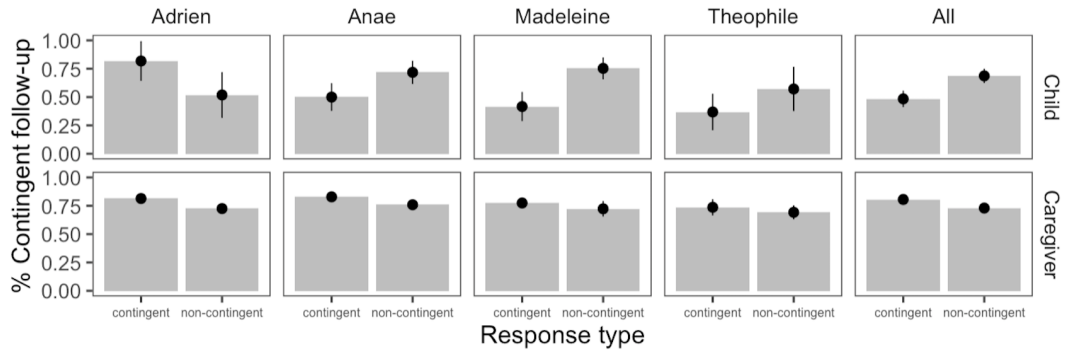[1]The corpus link: https://phonbank.talkbank.org/access/French/Paris.html

Figure 1: Percent of contingent follow-ups per response contingency status (summed over all ages and transcripts for maximal statistical power). Dots and ranges represent the means and % 95 confidence intervals.

data and 0.9 for caregiver-initiated QRF data, both reflecting "strong" agreement (McHugh, 2012).

Second, we classified the fine-grained categories given for responses and follow-ups into contingent vs. non-contingent, as follows. A response was considered non-contingent if it was classified by the annotators as: no answer given, irrelevant, unsatisfactory, or unintelligible. As for the follow-up, we chose to judge its contingency with respect to the question asked, not with respect to the response. It was considered non-contingent if it was classified by the annotators as: no follow-up given, changing the topic of the question, or ambiguous such as when the follow-up is not explicitly communicative (e.g., laugh) or does not add specific informational content (e.g., 'hum').

3 Results and Discussion

To investigate how caregivers' response contingency (or lack thereof) influences the child's follow-up (and vice-versa), we compared follow-ups after contingent vs. non-contingent responses. The results are shown in Figure 1.

For children's (top row), we found that *more* contingent follow-ups were given following *non-contingent* responses from caregivers.[2] This effect was consistent among all children except for one. This finding suggests that children expect their questions to elicit responses and they expect these responses to be contingent. When this is not the case, i.e., when the caregiver's response is not contingent, children are more likely to follow up contingently, mostly by suggesting an answer to their own question (34% of total follow-ups vs. only 15% in the contingent case) or by persisting

via re-asking the same question (11.2% of their total follow-ups vs. only 3.2% in the contingent case) (See also Frazier et al., 2009).

For adults (bottom row), we found — interestingly — the opposite pattern: More contingent follow-ups were given following *contingent* responses from children.[3] This pattern was consistent among all caregivers. It reflects the fact that caregivers are adapting to the children's responses, often with the purpose of keeping the conversation alive. Indeed, when the child's response is contingent, they follow up more on their original question to extend the exchange and/or provide expressions of agreement ("yes, that's right" repeating the child's utterance, etc.). When the child's response is not contingent, their slightly lower contingent follow-ups indicate that they do not necessarily persist, as children do, by bringing the conversation back to the original question (although they often do; given that the percentage is still quite high). However, they seem to also be happy to switch to the child's new focus of attention or initiate a new, perhaps, more engaging topic of discussion.

Limitations and Future work

This paper investigated an aspect of mutual influence in child-caregiver conversations. The limitation, however, is that hand annotation allowed for the study of only a small sample of children. Besides, the annotation relied primarily on verbal data. In future research, we will extend this work both via automatic labeling to test the scalability of the findings (e.g., Cervone and Riccardi, 2020; Nikolaus et al., 2021) and via using corpora that allow for the study of multimodal signaling (e.g., Bodur et al., 2021, 2022).

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[2]We verified this observation statistically by fitting a mixed-effects logistic regression. The numbers are not shown due to space constraints.

[3]We verified this observation statistically by fitting a mixed-effects logistic regression.

Acknowledgments

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