Taking the floor on time

Delay and deferral in children's turn taking

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A key part of learning to speak with others is figuring out when to start talking and how to hold the floor in conversation. For young children, the challenge of planning a linguistic response can slow down their response latencies, making misunderstanding, repair, and loss of the floor more likely. Like adults, children can mitigate their delays by using fillers (e.g., *uh* and *um*) at the start of their turns. In this chapter I analyze the onset and development of fillers in five children's spontaneous speech from ages 1;6–3;6. My findings suggest that children start using fillers by 2;0, and use them to effectively mitigate delay in making a response.

Children's linguistic input is a fundamental component of the language learning process – what children hear is essential to what they can learn. All theories of language acquisition must contend with the question of how children extract relevant information from the linguistic data around them. In the countless discussions that have taken place about children's input, researchers have focused their attention on domain-specific mechanisms, domain-general mechanisms, and a little bit of everything in between to explain how children manage to glean relevant details from the sum of available information.

In much of her work, Eve Clark has diverged from theory-driven perspectives on the internal mechanisms of language learning, encouraging us to instead reflect on the depth of children's linguistic environments. She has helped us understand that a child's linguistic upbringing is more than the sum of its words and syntactic structures. By taking a data-driven and usage-based approach to studying language, she has focused our attention on a vital truth: children learn language in interaction with others, and they learn language for the purpose of interacting with others. Consequently, children's input incorporates not only what they hear, but also what they say in response. I take up her insight in this chapter by focusing on turn taking, one key skill children must develop for interaction.

Introduction

From the start, children have a major impact on the speech they hear from their caregivers.[1] Caregivers work hard to get and maintain their children's attention, and one of the most effective techniques they have for doing so is focusing their conversation on things that are relevant to the child in the here and now (Bloom, 1975; Bloom, 1984; Snow, 1977). Children as young as 0;3 respond contingently to caregivers' prompts with smiles and vocalizations which caregivers, in turn, treat as relevant to the ongoing interaction (Balog & Roberts, 2004; Bloom, 1988; Masataka, 1993).

Once they begin to speak, children exhibit further influence on the content of conversations by introducing new information and commenting on topics that had been brought to bear previously. Children begin to initiate conversational exchanges around their second birthdays and by age three they initiate up to two-thirds of exchanges (Clark, 2009; Wellman & Lempers, 1977). By 3;6, children fluently respond to others by both ratifying the prior utterance and adding new information to move the conversation forward (Clark, 2007; Clark & Bernicot, 2008; see also Saylor, Baird, & Gallerani, 2006). Children also adapt their conversational contributions, depending on who they are talking to. Because caregivers and other interlocutors variably accommodate to younger speakers, children adjust their conversational strategies from one conversation to another in order to proceed smoothly (Dunn & Shatz, 1989; Mannle & Tomasello, 1987). So not long after children begin to talk, they also begin to actively influence the language they hear and use.

In light of this, we can view the child's linguistic input as an ongoing function of the interaction, rather than an end result of it. Caregivers' contributions are designed for children's current interests and abilities (e.g., Roy, Frank, & Roy, 2009; Tomasello & Farrar, 1986; Uther, Knoll, & Burnham, 2007; also see Weisleder & Fernald, this volume) and are embedded in the immediate context shared between caregiver and child. Children can actively engage in conversation with others by taking turns at speaking, thereby influencing the input they receive. By this token, children's turn taking skills have far-reaching ramifications for the input they get

1. I focus here on available research concerning children's conversational skills. Unfortunately, this makes for a highly western-centric analysis. Cross-cultural data on children's language practice is critical to evaluating theories of acquisition, especially those rooted in specific formats for input. Turn taking, my topic here, shows striking cross-cultural similarity in adult timing patterns (Stivers et al., 2009), and so might be expected to show similar developmental trajectories cross-culturally. However, more diverse data on children's turn taking will be essential in assessing how general these effects are.

because a chance to take the floor is a chance to learn something new, test a hypothesis, and get feedback.

Turn timing

When adults take conversational turns, there is usually minimal inter-speaker gap and minimal vocal overlap at the points of turn exchange. This seems to be a nearly universal property of spontaneous discourse (Stivers et al., 2009). While children's basic turn taking skills emerge in infancy (Masataka, 1993; Snow, 1977), their turn timing continues developing toward adult norms well after they turn four (Ervin-Tripp, 1979; Garvey & Berninger, 1981). On average, a four-year-old English-speaker's response latency is at least twice the norm for adults (Garvey & Berninger, 1981). Traditionally, turn taking is viewed as a competitive endeavor, during which speakers are held accountable for their lapses in timing.[2] The lack of an immediate response can result in a lost opportunity to take the floor (Sacks, Schegloff, & Jefferson, 1974), so children's slower timing can affect their ability to get a word in, depending on who else is participating in the conversation.

The number of speakers and their adjustment to the child's needs affect how easy it is to take the floor on time. Dyadic conversation (with exactly two speakers) simplifies the allocation of turns because there are fewer options for turn-exchange: selection of the other speaker or self-selection. When asking a question in dyadic conversation, there is only one speaker to whom talk could be addressed, so it may be easier for the responder to figure out when to begin to speak. Also, in making a response during dyadic conversation, a child does not have to compete with any other speakers while taking the floor.

In multi-party conversation (with three or more speakers), children need to work harder to take their turns. Young children at school and children with siblings commonly find themselves in multi-party conversations. Children must work harder in these conversations because, when turn-exchange is initiated, they have to figure out which of the two or more non-current speakers are supposed to speak next. When these children find a chance to speak, they often compete for the floor with speakers who have quicker turn-timing skills. And then when they manage to get a word in, they are likely to overlap with another person's speech, which could ultimately result in a misunderstanding or the appearance of irrelevance (Dunn & Shatz, 1989; Lieven, 1978). For these reasons, multi-party conversations can be a challenge for young children, but those who practice conversation

2. This holds for children too, but with ample slack (Balog & Roberts, 2004).

under challenging conditions (e.g., younger siblings) can hone their skills early on (Dunn & Shatz, 1989).

Children's success at turn taking also depends on how accommodating their interlocutors are. At age three, children's response latencies in conversation with their peers (Garvey & Berninger, 1981) are substantially longer than while speaking to their caregivers (Casillas, Bobb, & Clark, under review). This could be due to the fact that caregivers often design their utterances to elicit specific kinds of information; for example, caregivers frequently ask questions to which they already know the answers (Fitneva, 2012). In speaking to their children, caregivers appear to slow down their response latencies, responding to questions more slowly than they would if they were speaking to another adult (Figure 1; Casillas et al., under review). When passing the floor to their children, caregivers wait much longer than they would with adults before repeating or reformulating their questions. In a collection of nearly 930 questions directed to children, 10% of children's answers took more than 1.5 seconds to begin (Casillas et al., under review). The children were not interrupted or re-questioned by the caregiver, even though the child's response latency exceeded *six times* the adult average for question-answer sequences (Casillas et al., under review; Stivers et al., 2009; see also Balog & Roberts, 2004).

Many early interactions take place between a young child and a single caregiver. These one-on-one conversations allow even infants to appear conversational (Bloom, 1975; Bloom, 1984; Snow, 1977). But as children get older, their ability to take and hold the floor is tested. In competitive situations, children lose the floor if they do not take it on time, and they may be required to reserve their place before they have managed to prepare a response. So what do children do when it is their turn to speak and they are not quite ready to start?

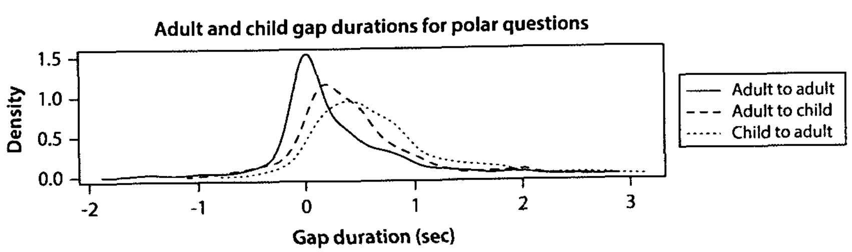

Figure 1. Distribution of response times to *yes-no* questions for adult responders to adult questioners (—), adult responders to child questioners (—), and for child responders to adult questioners (· · ·).

Marking delays in children's conversation

When adults expect a delay in their ability to take the floor, they use verbal and non-verbal signals such as *uh*, *um*, and facial expressions to indicate an upcoming pause. Clark and FoxTree (2002) found that speakers use *uh* and *um*[3] to indicate the initiation of short and long delays, respectively. They argue that these delay markers are contrasting lexical items used when speakers anticipate noteworthy delays in their speech.[4] Using evidence from prosody and syllabification, they argue that *uh* and *um* are planned parts of the speech signal. Word prolongation (e.g., *theee*, *ummm*) also initiated longer pauses when combined with *uh* and *um*, but the effect was independent, and the choice of *uh* or *um* had a much stronger role in predicting delay prolongation.

Children who are not able to respond in a timely manner could similarly use delay markers to their advantage when trying to get a word in during conversation, indicating the length of the upcoming delay while allowing them to keep the floor. To compensate for an inability to jump in at just the right time, young children may initially use physical or verbal intrusions to get a word in, such as tugging at a sleeve or tapping a shoulder repeatedly. Prior work has shown that, by four years, English-speaking children productively use *uh* and *um* when retelling stories and describing their toys, but don't use *uh* and *um* to indicate upcoming delay length until age five (Hudson Kam & Edwards, 2008). Even then, they only systematically us the contrast in describing toys, and not when telling a story (Van Der Wege & Ragatz, 2004).

The late acquisition of these delay markers is likely due to their complexity; to anticipate noteworthy delays and to determine if they will be long or short, children must develop sensitive self-monitoring skills and an awareness of conversational timing. But even before children work out the contrastive use of *uh* and *um*, these delay markers can serve children's turn taking. When used utterance-initially they help children get the floor, and when used utterance-internally they help children keep the floor.

Prior work on children's acquisition of *uh* and *um* has primarily relied on elicited speech in a restricted setting (Hudson Kam & Edwards, 2008; Van Der Wege & Ragatz, 2004). To get at children's spontaneous use of delay markers during everyday speech, we need to look at interaction in the home. Here I present data from a small sample of at-home interactions. These data do not represent a comprehensive study, but give some idea of trends in children's everyday delay marking. I find that children begin to use delay markers by age two, that children use a wide

3. Sometimes written *er* and *erm* in British English.

4. Contrasting delay marker pairs are also noted in German, Dutch, Swedish, Norwegian, Spanish, French, Hebrew, and Japanese (Clark & Fox Tree, 2002).

variety of conventional (e.g., *uh*, *um*, and prolongation) and unconventional (e.g., fronting) strategies, and that children who use conventional delay markers most often prefer to use *um* over *uh*. I also find initial patterns suggesting that, before 4;0, children may begin to differentiate their use of *uh* and *um* in the same way adults do, using *um* before longer delays and more disfluent speech.

Delay marking at home

I extracted all of the transcribed instances[5] of *uh* and *um* from the Providence corpus of the CHILDES database (Demuth, Culbertson, & Alter, 2006; MacWhinney 2012). Providence includes a collection of at-home video and audio recordings of six children (*Female* = 3) between one and four years old. The recordings were made approximately every two weeks for about one hour each, though each child had a slightly different age range and recording frequency. This corpus is one of the densest longitudinal corpora in the CHILDES database and provides good enough audio for phonetic measurement of any pauses in speech.

There are 1,945 transcribed *uh* and *um* tokens in the corpus (1,354 *ums* and 591 *uhs*).[6] Overall, children showed an *um* bias, with 2.29 *um* tokens for every 1 *uh* token (but also see footnote 5). In general, *uh* and *um* are infrequent before children turn two years old. *Um* emerges as the overall more frequent delay marker from early on (Figure 2), but the frequency of use for each delay marker varied widely by child (Table 1). Half of the children actually show an *uh* bias – Ethan uses *uh* twice as often as *um* – but these children tend to have fewer *uhs* and *ums* overall (Table 1).

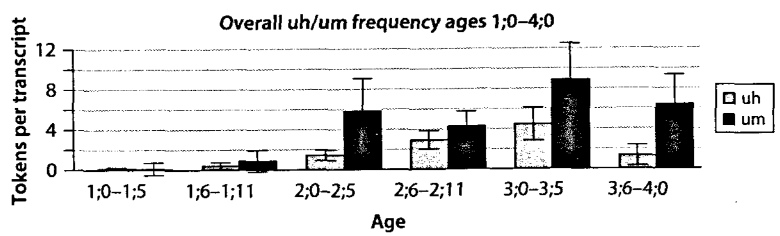

Figure 2. Use of *uh* and *um* from 1;0-4;0 collapsed over all six children. Vertical bars indicate the standard error of the mean. Each recording was approximately one hour long.

5. By carefully reviewing two randomly selected recordings for each of the six children, I determined that the transcriptions missed ~10% of the total uses of *uh* and *um* on average. Nearly two thirds of these misses were *uh* (about 1.25 missed tokens per recording) meaning that in the analyses I present below, *uh* tokens are slightly underrepresented.

6. I extracted tokens from 208 transcripts: Ethan (0;11-2;11, 19 recordings), Naima (1;0-3;10, 25 recordings), Alex (1;5-3;5, 32 recordings), Violet (1;2-4;0, 31 recordings), William (1;4-3;4, 30 recordings), and Lily (1;1-4;0, 71 recordings).

Table 1. Average delay marker use per transcript for each child in the Providence corpus, and the dominant option used by each child. Percent use of the dominant delay marker is given in parentheses.

Child (gender)	*Uhs* + *ums* per transcript	Preferred DM (and percent use)
Ethan (M)	1.08	*uh* (67%)
Naima (F)	1.08	*uh* (67%)
Violet (F)	3.94	*um* (55%)
Will (M)	4.38	*uh* (73%)
Alex (M)	5.23	*um* (77%)
Lily (F)	19.15	*um* (83%)

What is causing the wide dispersion in children's use of *uh* and *um*? In a separate study using two children's data from the same corpus (Providence: Demuth et al., 2006; see Casillas et al., under review), I analyzed children's turn-initial disfluency markers in a set of 1,280 question-answer sequences from ages 1;6-3;6. Of these, 142 had turn-initial delay markers; but only 49 of those were *uh* or *um*. The other 93 instances began with alternative delay markers, including repetition, recycling, fronting, and prolongation (see example 1). The two children used nearly an equal amount of delay markers overall, but expressed a consistent preference for one type over another throughout the corpus: Alex primarily used *uh* and *um* to indicate upcoming delays (40 *uh*/*um* and 25 other DMs), while Naima preferred other markers (9 *uh*/*um* and 68 other DMs). Thus, children who appear to use *uh* and *um* infrequently (as in Naima; Table 1) may rely more heavily on other delay-marking processes. Such as those in example 1.

(1) Other types of delay markers in child data
  a. *Repetition:* but but but but but we could sing some other songs (nai71; 3;1)
  b. *Restarts:* liz- lizards nurse (nai36; 1;10)
  c. *Fronting:* wool cut her wool (nai37; 1;11)
  d. *Prolongation:* uh: just brown (ale44; 3;1)
  e. *Other:* name, jelly beans (nai26; 1;8)

When children use delay markers turn-initially, it should enable them to start speaking without delay, even when there is a hitch in planning their response. In the same study of question-answer sequences (Casillas et al., under review), I found that utterances with response-initial markers were significantly longer and more complex than utterances without. But the complexity of the marker-initial response did *not* result in slower turn onset. In fact there was no significant timing difference between utterances with and without markers ($p = 0.14$), so children's use of delay markers keeps gap lengths similar across more and less difficult responses. Because children use delay markers effectively we can infer that they (1) anticipated a noteworthy delay and (2) took action to mitigate the upcoming latency. Adults do this, but additionally differentiate short and long delays with *uh* and *um*, respectively. The prior work from elicited speech did not find such differentiation in children's use of delay markers before age five (Van Der Wege & Ragatz, 2004; Hudson Kam & Edwards, 2008), but conversational contexts may provide greater communicative need to indicate the timing of upcoming delays.

To determine whether or not children also differentiate *uh* and *um*, I randomly selected 40 *uh* and 40 *um* tokens from the last year of the corpus (3;0–4;0). I then extracted the audio clip for each *uh*/*um* utterance, and measured the pause between the end of the marker and the beginning of the next segment of speech, which was not necessarily the beginning of the rest of the proposition (example 2 below). I bounded my measurement by the next segment of speech, assuming that a subsequent instance of *uh* or *um* is an additionally planned production that initiates a new delay (Clark & FoxTree, 2002).

(2) The following pause: Measured portions are marked with an "_"
  a. *Fluent speech:* and uh_what about these? (wil41; 3;2)
  b. *Another marker:* and uh_um a worm (ale51; 3;4)
  c. *Disfluency:* can you um_can you put me can you put me right there? (lil79; 3;10)

The results indicate that pauses following *uh* and *um* mirrored the speech of adults and older children: *um* initiated longer pauses than *uh* (median durations of 0.54 sec and 0.38 sec; Figure 3). The difference is not significant ($p = 0.3$),[7] following prior work (Hudson Kam & Edwards, 2008; Van Der Wege & Ragatz, 2004). However, the trend may suggest that children are just beginning to use *um* to initiate longer delays and *uh* to initiate shorter ones.

These data alone do not provide enough evidence that children use *uh* and *um* to contrastively mark delay before age four. But by comparing these effects to other indirect measures of planning difficulty (e.g., word prolongation and speech fluency), we can get a more comprehensive picture of delay-based contrasts in children's speech. If we see consistency across different measures, it would indicate a stronger pattern in how children mark short vs. long delays.

Using the same 80 measurements as before, I coded whether or not the delay marker was prolonged (e.g., *uh* vs. *uhhh*) and what type of speech followed the

7. I entered the data into a linear mixed-effects model, with child as random effect and filler type and prolongation as fixed effects.

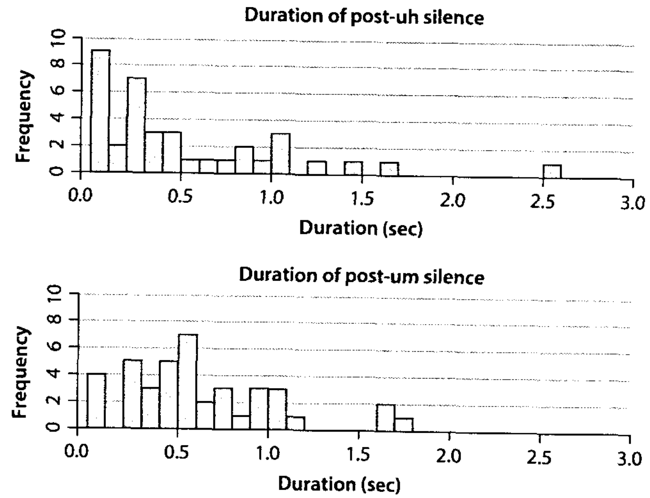

Figure 3. Histogram of silence duration following *uh* and *um* tokens. Phonetic measurements were made from the offset of the DM to the onset of the next bit of speech (See example 2).

Table 2. Median values (in seconds) for delay durations following regular and prolonged *uh* and *um*.

Delay Marker	Regular	Prolonged
uh	0.29	0.40
um	0.45	0.77

pause (fluent, disfluent, or other). Overall, *uh* was more likely to be prolonged than *um* (57.5% vs. 22.5%). For both words, prolongation indicated longer upcoming delays (Table 2). The effect of prolongation is not significant ($p = 0.3$), but the pattern showed that, for both regular and prolonged tokens, delays following *um* are longer than delays following *uh*.

In most cases (63.8%), speech following the use of *uh* and *um* was a fluent continuation of the child's turn. But almost one-third of the time (31.3%), speech following *uh* and *um* started with another delay marker, recycled speech, or continued disfluency. The fluency of post-marker speech varied with marker type. *Uh* was more likely than *um* to be followed by fluent speech (72.5% vs. 55%), and slightly less likely than *um* to be followed by an interruption from the caregiver (2.5% vs. 7.5%; Table 3). This secondary source of evidence indirectly suggests that children use *um* more often than *uh* when their upcoming speech presents significant difficulty.

Table 3. Types of speech following children's use of *uh* and *um*.

Following Speech	*Uh*	*Um*
Fluent	72.5% (29)	55% (22)
Continue	67.5% (27)	52.5% (21)
Move on	5% (2)	2.5% (1)
Disfluent	25% (10)	37.5% (15)
New Disfluent	7.5% (3)	17.5% (7)
Delay marker	15% (6)	12.5% (5)
Recycle	2.5% (1)	7.5% (3)
Other-interruption	2.5% (1)	7.5% (3)

Taken together these data suggest a few things about children's development of delay markers. First, they emerge early in children's speech. *Uh* and *um* start regularly appearing by the time children turn two with use of both the regular and prolonged versions. *Um* emerges early on as the most frequent option, especially for the children who are most productive with *uh* and *um*. Before children turn four, their use of *uh* and *um* begins to pattern like adult data because their prolongation and choice of marker may indicate the durations of upcoming delays, though we would need more data to say if these effects are significant. Speech following *uh* is more fluent than speech following *um*, which suggests that children are facing less significant planning delays when they use *uh* compared to when they use *um*.

Strong evidence for discrimination between *uh* and *um* is minimized in a small sample like this one, but the secondary measurements of pause duration in prolonged tokens and post-pause speech fluency both suggest that before age 4;0 children have developed some differentiation in their use of *uh* and *um*. Related work suggests that children's use of *uh* and *um* helps them come in quickly when they're planning a complex contribution (Casillas et al., under review), and that when they're not using *uh* and *um*, children are likely using other ways of marking delay. These alternate delay markers may even emerge earlier in development because of their simpler execution (e.g., prolongation and repetition).

Once children begin to have an active role in conversation, their ability to get and keep the floor becomes critical for making controlled contributions. Even in contexts where turn taking isn't overtly competitive, it is to children's advantage to claim the floor as an indication of their intention to respond. If they don't, they run the risk of breaking the ongoing interaction, and may cause the conversation to veer in a new direction (e.g., toward an attempt at repair). At that point, the child's delayed response might no longer be relevant, or the child may need to come up with a new response. This may be cause for some bumpy interaction, e.g.:

(3) Re-prompting and repair (nai64; 2;7.13)
MOT: How many? (points to pencil cars; no response from child)
MOT: What're these? (repeats point; no response from child)
MOT: These're pencil cars.
MOT: How many pencil cars?
CHI: One, two, three, four, five, six, seven, eight.
MOT: Yes.

To keep interaction smooth, it is to children's advantage to keep gaps short. By using delay markers, children uphold something akin to the minimal-gap-minimal-overlap timing pattern we see in adult conversation, only at a slower pace. Importantly, their use of delay markers implies that children know there is an appropriate time to respond, even if they can't manage to keep up with the pace of the conversation. This is curious at first, since we know children's response delays before 6;0 are lengthy compared to that of adults (Garvey & Berninger, 1981). But their eye movements reveal that by 24 months, children expect immediate turn-switches while watching the conversations of others (Casillas & Frank, 2013; Von Hofsten, Uhlig, Adell, & Kochukhova, 2009). Children's assumption that responses will come immediately displays an early inclination toward temporal contingency in conversation, one which may develop initially in pre-verbal interactions with their caregivers (Bloom, 1975; Bloom 1984; Masataka, 1993).

In light of this, it is less surprising that children – even at 2;0 – might have a sense of the "right" time to respond and mark delay accordingly.[8] We saw here that in marking delay, children pick up on all sorts of turn-initial cues from ambient adult speech, from *uh* to repetition to prolongation, and use them in conventional and creative ways to get and hold the floor on time. By age 2;0, children are active participants in conversation, and are thus partially responsible for keeping the interaction smooth and intact. So even in children's early conversations, delay markers can effectively aid turn taking by making it clear who is claiming the floor next and how long their delay will be in producing the content of a response.

General discussion

The way children learn language is bound to their interactional environment. Simple as it seems, it is easy to take this fact for granted. In theories of language

8. As adults, their sense of the "right" timing may help them infer unspoken meanings when a response comes after "too short" or "too long" of a delay (Brennan & Williams, 1995; Burgoon, Buller, & Guererro, 1995; Roberts, Francis & Morgan, 2006; Smith & Clark, 1993).

acquisition, the conception of linguistic "input" is a primary determinant of proposed native and non-native skills and knowledge, and has been the basis for many arguments about the learnability of language (Gold, 1967; Wexler & Culicover, 1983). The term "input" itself suggests automatic processes as if, for the first five years of their lives, children have no role in their language learning. But everyday interactions between young children and their caregivers tell a different story. Caregivers tailor their utterances to their young children, and young children take control of conversation early in their development. As we have seen here, they even begin managing the timing of their interactions from age two.

In this chapter I have briefly investigated children's acquisition of turn timing to begin addressing how they gain active influence over their input. Specifically, I discussed how they use *uh*, *um*, and other delay markers to get and hold the floor in conversation. We saw extensive individual variation in how children accomplish timely turn taking. This variation may be key to understanding the different ways that children engage in conversation to learn about the world around them.

By keeping turn taking smooth during interaction, children enable themselves to make more meaningful contributions, handling their responses within a timeframe *they* control. Smooth interaction allows children to make the most use of across-turn learning contexts (e.g., feedback and hypothesis testing) with less interruption from vocal overlap, conflicting prompts, and misunderstandings. In the results I have presented here, children begin to develop delay-marking and general turn taking skills early on. The realization of these skills, as they develop, helps children to engage successfully in conversation, even when their linguistic abilities lag behind those of their interlocutors.

Turn taking is one of many conversational skills that might fundamentally affect how children learn language. Many details about how to proceed in interaction are wrapped within culture-specific conventions, but basic principles of verbal exchange, like turn taking, are shared cross-culturally (Levinson, 2006; Stivers et al., 2009). While acquiring a language, children around the world learn to take turns effectively because it allows them to gain access to the linguistic and social world around them through coordinated interaction. By exploring the early stages of these skills, we can get insight into how the motive for learning language – to communicate with others – affects the trajectory of children's language development and the ultimate outcome of their learning. Eve Clark has challenged us to fully embrace this perspective in the study of language acquisition.

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