Journal of Child Language (2024), **51**, 91–117
doi:10.1017/S0305000922000459

CAMBRIDGE UNIVERSITY PRESS

ARTICLE

Parent Responsivity, Language Input, and the Development of Simple Sentences

Tracy PREZA* and Pamela A. HADLEY

Department of Speech and Hearing Science, University of Illinois Urbana Champaign, USA
*Corresponding author: Tracy Preza, 901 S. Sixth Street, Champaign, IL. Email: tpreza2@illinois.edu

(Received 27 May 2021; revised 19 March 2022; accepted 19 August 2022)

Abstract
This study explored responsive and linguistic parent input features during parent-child interactions and investigated how four input categories related to children's production of diverse, simple sentences. Of primary interest was parent use of responsive, simple declarative input sentences. Responsive and linguistic features of parent input to 20 typically developing toddlers at 1;9 were coded during play in a laboratory playroom, then classified into four input categories: *responsive*, *declarative, responsive declarative*, and *neither* responsive nor simple declarative. The percentage of each input category was related to child sentence diversity at 2;6 using Spearman correlations. Parent use of *responsive declarative* and *declarative* utterances were both rare. *Responsive* input was positively correlated with child sentence diversity, and the *neither* category was negatively correlated with child sentence diversity. The findings provide new support for the importance of balanced conversational turns. Implications for defining both how input is delivered and its linguistic content are discussed.

Keywords: Parent-toddler interaction; input quality; responsivity; syntax

Introduction

Typically developing children acquire their native language efficiently, with the most rapid growth occurring during the first five years. They accomplish this with access to a communication partner and analyzable linguistic information (Hoff, 2006). Although children's current abilities are primary predictors of their future language outcomes, features of parent input can also promote later language development (Tamis-LeMonda, Kuchirko & Suh, 2018). During early childhood, different input features have been positively associated with vocabulary growth and the emergence of simple sentences, complex syntax, and decontextualized talk (Hadley, Rispoli, Holt, Papastratakos, Hsu, Kubalanza & McKenna, 2017b; Hart & Risley, 1995; Hsu, Hadley & Rispoli, 2017; Huttenlocher, Haight, Bryk, Seltzer & Lyons, 1991; Huttenlocher, Vasilyeva, Cymerman & Levine, 2002; Huttenlocher, Waterfall, Vasilyeva, Vevea & Hedges, 2010; Rowe, 2012; Silvey, Demir-Lira, Goldin-Meadow & Raudenbush, 2021).

Different perspectives on the role of input have informed researcher's definitions of input quality. Social interaction theories of language learning have investigated how features of parent-child interaction create supportive environmental conditions for language growth. Responsive and contingent interactions affirm a child's communicative power and create authentic moments of heightened engagement that support language learning (Borairi, Fearon, Madigan, Plamondon & Jenkins, 2021; Franklin, Warlaumont, Messinger, Bene, Nathani Iyer, Lee, Lambert & Oller, 2014; Girolametto, Pearce & Weitzman, 1996; Levickis, Reilly, Girolametto, Ukoumunne & Wake, 2014); Tamis-LeMonda, Bornstein, Kahana-Kalman, Baumwell & Cyphers, 1998; Tomasello & Farrar, 1986). Other studies have focused on how linguistic features of parent utterances facilitate language development, typically using general measures of lexical diversity, utterance length, and syntactic complexity (Huttenlocher et al., 2010; Rowe, 2012; Silvey et al., 2021). These two perspectives represent distinct and compatible ways of defining input quality, yet they are rarely considered in combination (e.g., Girolametto, Weitzman, Wiigs & Pearce, 1999). It is important to bring these perspectives together because they capture different contributions to the language learning process. Recent work has also called for researchers to operationalize input quality from a multidimensional perspective, including social interactive, linguistic, and conceptual features of input (Rowe & Snow, 2020). To advance our understanding of how input supports the distinct mechanisms that underlie language learning, we must define both HOW input should be delivered and WHAT the content of that input should be (Masek, Ramirez, McMillan, Hirsh-Pasek & Golinkoff, 2021b). Social interaction theories inform our definitions of HOW input should be delivered, and linguistic and psycholinguistic theory can generate testable hypotheses about the linguistic content that may be facilitative in a given development period.

Definitions of input quality must also be linked to a specific developmental period because high quality input features differ across early childhood (cf. Rowe & Snow, 2020). For example, the sheer quantity of words infants and young toddlers hear can impact vocabulary development in the earliest stages of word learning (e.g., Hart, 1991; Huttenlocher et al., 1991; Rowe, 2012). However, vocabulary diversity and use of sophisticated words in parent input to older toddlers are better predictors of vocabulary abilities later in development (Hsu et al., 2017; Rowe, 2012). Therefore, the developmental period must be clearly identified to define high quality input features because some may be more helpful early in development and less important later.

For this study, the developmental period of interest was the transition from single words to simple sentences. For typically developing toddlers, diverse sentences emerge before 3;0 (e.g., *I want juice; it fit; baby sleep*; Hadley, McKenna & Rispoli, 2018; Klee & Gavin, 2010; Lee, 1974), but little is known about how input delivery and language content work together to facilitate the emergence of simple sentences. Therefore, the purpose of this study was to describe parent input features in child-directed speech to toddlers who were not yet producing sentences on a regular basis, including both how input was delivered and its linguistic content. A secondary purpose was to explore associations between parent input categories, varying in high quality features, and children's later sentence diversity.

Responsivity in Parent-Child Interaction

Research on parent responsivity provides important insights on how input can be delivered to support language development. Responsive parent input is typically defined as utterances that are contingent and semantically related to the child's attentional focus or prior communication turn. Contingent interactions reflect prompt and meaningful back-and-forth interactions between young children and their caregivers, with the critical features of contingency changing with development (Masek, McMillan, Paterson, Tamis-LeMonda, Golinkoff & Hirsh-Pasek, 2021a; Tamis-LeMonda & Bornstein, 2002; Tamis-LeMonda, Bornstein & Baumwell, 2001; Tamis-LeMonda, Kuchirko & Song, 2014). Contingency in parent-child interaction can heighten a child's engagement and create ideal learning conditions. Temporal contingency, defined as a parent's prompt response to their child's communicative turn, is thought to bind a word to its referent. Semantic contingency refers to parent talk about the objects and events the child is attending to. Semantic contingency may help the child determine what a new word refers to and reduce the need to redirect their attention to something new. Contingent interactions and responsive parent input have been positively related to children's growth of vocalizations in infanthood, as well as vocabulary learning and early word combinations (Franklin et al., 2014; Girolametto et al., 1996; Levickis et al., 2014; Nelson, Denninger, Bonvillian, Kaplan & Baker, 1984; Tamis-LeMonda et al., 1998, 2014; Tomasello & Farrar, 1986). For example, in a longitudinal investigation, Tamis-LeMonda and colleagues (2001) examined responsive maternal speech at 9 months and 1;1 as a predictor of early language milestones between 9 months and 1;9. They discovered that both maternal responsiveness at 9 months and 1;1, and the children's own communication behaviors predicted language milestones, including the emergence of the first 50 words, ability to combine words, and the ability to discuss past events per parent report. Maternal responsiveness remained a significant predictor of child language outcomes, even after controlling for differences in children's behaviors. In a more recent investigation, Levickis and colleagues (2014) explored how a variety of parent responsive utterances with varying communicative functions predicted child language outcomes as measured by the child's performance on standardized language measures. Responsive expansions at 2;0, in which parents added words to their child's utterance in the following parent turn, were a significant predictor of children's language scores at 3;0. Thus, responsive interaction is a facilitative delivery mechanism for language learning.

With development, balanced turn-taking, defined as back-and-forth conversational turns between the parent and child, may become a more critical feature of a responsive and contingent interaction (Gilkerson et al., 2018; Hirsh-Pasek, Adamson, Bakeman, Owen, Golinkoff, Pace, Yust & Suma, 2015; Romeo et al., 2018). Hirsh-Pasek et al. (2015) studied three dimensions of parent communication quality: joint engagement, participation in routines, and fluency and connected communication, defined as equal turns between the parent and child. They found that balanced turn-taking, where neither communication partner took a disproportionate number of turns, accounted for approximately 26% of the variance on a standardized measure of expressive language in typically developing children from low-income households. Hirsh-Pasek et al. (2015) concluded that balanced turns are a key feature of high quality parent-child interactions for older toddlers.

Linguistic Content

Although responsive features of parent interaction are beneficial, they do not address WHAT linguistic properties of input support the acquisition of specific sentence structures (Masek et al., 2021b). In fact, most studies of linguistic features rely on general measures of lexical diversity and mean length of utterance (MLU) to characterize parent input

https://doi.org/10.1017/S0305000922000459 Published online by Cambridge University Press

quality. Although these measures may inform our general understanding of associations between parent input and child language outcomes, they are not sufficient for identifying the specific linguistic features that are most facilitative. From our perspective, investigation of linguistic content should be directly linked to the child outcome measure of interest. Therefore, in this study, we focus on simple, active declarative sentences in parent input. This feature of linguistic input aligns with our outcome measure of child sentence diversity. We hypothesized that simple, declarative sentences in parent input would present the child with the clearest, analyzable model of what is to be learned – the basic structure of simple declarative sentences. The declarative sentence, consisting minimally of a subject and a predicate, is a fundamental unit of syntactic structure. Rispoli, Hadley, and colleagues (Hadley et al., 2017b; Rispoli & Hadley, 2011; Rispoli, Hadley & Simmons, 2018) have argued that the ability to produce diverse, simple sentences is an indicator of the strength of toddlers' underlying representation of sentence structure. They have operationalized sentence diversity as the number of unique subject-verb combinations produced by a child during a parent-child conversational interaction.

Declarative input has been positively related to sentence diversity outcomes in young typically developing toddlers. In an observational study, Rispoli et al. (2018) analyzed the contribution of diverse, active declarative sentences in parent input at 1;9 to child sentence diversity at 2;6. All child participants were primarily single word users, with MLUs $\leq$ 1.25 at 1;9. Parent sentence diversity and child lexical diversity were both significantly related to later child sentence diversity. This indicates that it is not just child lexical diversity that is related to later sentence development, but also how different subjects and verbs come together. In a second quasi-experimental study, Hadley and colleagues (2017b) taught parents "toy talk" (Hadley & Walsh, 2014) to describe the actions, locations, and properties of toys and objects in the environment. This input modification strategy was expected to increase the diversity of noun subjects in declarative input sentences. Parents in the intervention group used more diverse subjects in active declarative sentences than parents in a quasi-control group. Moreover, parent subject diversity in active declarative sentences was a significant predictor of child growth in sentence diversity between 1;9 and 2;6. Taken together, these findings suggest that diverse active declarative sentences in parent input may help children produce more diverse sentences themselves. However, these studies have not examined the contribution of parent responsivity in combination with diverse declarative sentence input.

From a psycholinguistic perspective, exploring responsivity in conjunction with the linguistic content of input can provide valuable insight into how the language learning environment supports sentence development. An analyzable linguistic model is a critical component to learning the structure of a language (Gathercole & Hoff, 2007). Following Lidz and colleagues (Lidz & Gagliardi, 2015; Omaki & Lidz, 2015), we assume children extract linguistic information from input utterances to learn syntactic structure. As children hear an utterance, they first use extralinguistic skills to attend to the input sentence and hold it in memory. The next step requires children to assign syntactic structure to the utterance, to the best of their abilities, based on the current status of their linguistic knowledge. Finally, that structure feeds forward to incrementally advance their knowledge of syntax. Given the evidence for reciprocal associations among contingent interactions and child's attention (cf. Masek et al., 2021a), parent responsivity may help children extract relevant linguistic information from an input sentence more efficiently. In contrast, a non-contingent parent interaction style that frequently redirects the child's attention or delivers multiple utterances in rapid succession may not facilitate infant attention to the same extent and could negatively impact the child's ability to process input utterances in real time.

https://doi.org/10.1017/S0305000922000459 Published online by Cambridge University Press

Additionally, not all input is immediately analyzable by children who are still developing their ability to process linguistic input and assign syntactic structure to it, a process known as parsing. Parsing mechanisms develop alongside the child's language abilities and are reflective of the child's current syntactic knowledge, becoming more mature and automatic as the child's knowledge of syntactic structure develops (Omaki & Lidz, 2015). Therefore, providing input that is structurally transparent, without being too complex for the developing parser, may be beneficial for advancing syntactic development.

We posit that structurally transparent input delivered during responsive interactions can provide more optimal learning opportunities. Recent intervention research aligns with this hypothesis. Clark-Whitney, Klein, Hadley, Lord, and Kim (2022) examined the unique contributions of caregiver responsivity following six months of naturalistic developmental behavioral intervention and declarative input to child sentence diversity outcomes for 50 preschoolers with autism spectrum disorder. Caregiver responsivity was assessed by rating 21 aspects of responsive strategy use, effectiveness, and missed opportunities. The measure of declarative input was naturally occurring 'toy talk' sentences during 10-min of parent-child play at baseline. Changes in caregiver responsivity and naturally occurring toy talk sentences at baseline were both significant predictors of child sentence diversity six months later. Moreover, the effect of toy talk was stronger when caregiver responsivity improved over time. These findings suggest that caregiver use of responsive strategies help children attend to and learn from linguistic input. Moreover, the study demonstrates how input features drawn from different theoretical perspectives can and do work together to facilitate child language outcomes.

The Current Study

The purpose of the current study was to pilot a coding scheme for describing responsive and linguistic features of individual parent utterances and how to characterize parent input quality when combinations of these input features were considered simultaneously. We conceptualized responsive and linguistic 'input features' as properties of parent utterances that could be characterized as high quality on a single dimension and 'input categories' as the combination of both dimensions. The goal was to characterize parent use of four input categories that varied in their high quality features: *responsive* input, *declarative* input, *responsive declarative*, and *neither* responsive nor declarative input. We were particularly interested in parent use of *responsive declaratives* (i.e., well-timed, semantically related, active declarative sentences about observable objects and events in the play setting) and its relation to child sentence diversity. This information would be useful for characterizing baseline expectations and meaningful change in this parent input category as part of parent-implemented interventions. We also hypothesized that *responsive declaratives* in parent input at 1;9 would be a positive predictor of child sentence diversity at 2;6. The following research questions were addressed:

1. How common are high quality input features during parent-child conversational interactions and how much do these features vary?
2. How common are high quality input categories during parent-child conversational interaction and how much do these categories vary?
3. How does parent use of high quality input categories at 1;9 relate to child sentence diversity outcomes at 2;6?

Method

Participants

This study used archival data from a longitudinal study that explored the growth of tense and agreement between 1;9 and 3;0 (Rispoli & Hadley, 2013). Naturalistic parent-child interactions were collected every three months within a lab playroom setting. The original longitudinal study was reviewed and approved by the Institutional Review Board (IRB) at the University of Illinois Urbana Champaign, including the secondary data analysis presented in this study.

Participants were recruited from monolingual English-speaking households in the Champaign, Vermillion and Macon counties in Illinois. Participants were not eligible for the study if parents reported any neurological or sensory impairments, insertion of pressure equalization tubes resulting from chronic otitis media, or a delayed onset of walking or talking (i.e., after 15 months). Parent report checklists were used to gather information regarding the child's general developmental milestones and language development. *The Ages and Stages Questionnaire* (ASQ; Bricker, Squires, Mounts, Potter, Nickel, Twombly & Farrell, 1999) was used to screen for communication, fine motor, gross motor, social and cognitive development difficulties at 1;9 and 2;0. In addition, *the MacArthur-Bates Communicative Development Inventories: Words and Sentences* (CDI; Fenson et al., 2007) was used to characterize the child's expressive vocabulary and use of grammatical markers from 1;9, to 2;6 months of age.

Child Participant Characteristics at 1;9

From the database of 58 families, 20 parent-child dyads at 1;9 were selected for analysis (15 male, 5 female) based on child language characteristics. These 20 parent-child dyads were previously reported in Hsu et al. (2017). Child participants were selected to have relatively homogeneous vocabulary and word combination abilities because different features of input are important during different periods of language development (Rowe & Snow, 2020). The 1;9 timepoint was the first timepoint available and child vocabulary abilities were most similar at this age. We examined parent input when child vocabulary abilities were most homogeneous because parents adjust their input to their children's vocabulary (Huttenlocher et al., 2010). Homogeneity in child language abilities also increased the likelihood of observing parent input effects on child sentence diversity, reducing the influence of the child's prior abilities on later outcomes. The final 2;6 timepoint was selected because typically developing children produce diverse sentences by this age (Hadley et al., 2018), making it an appropriate end point.

All children had typical language development, and none produced more than two different simple sentences during the 30 min parent-child interaction at 1;9. It was important the children were not producing simple sentences on a regular basis, since later sentence diversity was the outcome measure of interest. Typical language development was determined from (a) a passing score on the communication section of the ASQ at both 1;9 and 2;0, and (b) expressive vocabulary at or above the 10th percentile as measured by the CDI at 2;0. At 1;9, the children's parent-reported expressive vocabulary ranged from 37 to 208 words ($M = 77.05$, $SD = 39.78$). All children had also had at least one verb and at least one adjective. Twelve participants also had at least one preposition. Since all the participants had a diverse vocabulary consisting of multiple word classes, each participant possessed the lexical and word class diversity to support the transition to simple sentences during the period under study (i.e., 1;9 to 2;6).

All participants had a MLU below 2.00 at 1;9, with MLUs ranging from 1 to 1.75. The sample's average MLU was 1.17 (SD = 0.19). To characterize the diversity of word combinations at 1;9, the number of unique syntactic combinations was computed for each participant (Hadley, 1999; Ingram, 1989). Word combinations made up of two or more words with syntactic status (e.g., noun, verb, adjective, preposition, determiner) such as *the cup, blue doll* or *go in* were counted, whereas word combinations made up of addressee terms, greetings, interjections, non-syntactic *yes/no*, or sound effects were excluded (*e.g., hi mommy, no mine, uhoh hot, down whee*). The number of unique syntactic combinations ranged from 0 to 7 (M = 2.0, SD = 2.20). Six participants did not produce any syntactic combinations. Five participants produced only a noun phrase (e.g., *a tree, my ball*). One participant produced one routine WH-question (e.g., *what's this?*). Four participants produced unique combinations with a lexical verb phrase and no subject. Finally, four participants produced 1 or 2 subject-verb sentences (e.g., *baby eat, I sit*), characterized by high frequency subjects such as *I* and high frequency verbs such as *eat.* The low number of sentences indicated that these participants were not yet producing simple sentences on a regular basis.

Parent Characteristics

The 20 parent participants (1 father) ranged in age from 23 to 40 years (M = 30.50, SD = 5.14). Parents' highest educational levels included completion of high school (n = 3), associate's degree or some college (n = 3), bachelor's degree (n = 10), and advanced degree (n = 4). Participating parents and children were primarily White, non-Hispanic (n = 16). One parent self-identified as White Hispanic and three parents self-identified as Black (n = 3). Because the original study focused on the acquisition of tense and agreement, all parents and children were speakers of mainstream American English.

Procedures

This study used transcripts from 30-min of parent-child free play with a standard set of toys. Parents were instructed to play as they would at home. The archival language samples were transcribed in the *Systematic Analysis of Language Transcripts* (SALT) software (Miller & Chapman, 2000) by a team of trained transcribers. Acceptable levels of agreement with the gold standard transcript were set at 90% for adult transcription and 80% for child transcription. Transcription of adult and child utterances was completed by separate research assistants from video and audio recordings. Discrepancies in transcription were addressed through a consensus transcription pass. For further details on transcription, see Hadley, Rispoli, Holt, Fitzgerald, and Bahnsen (2014).

For the current study, additional information about children's non-verbal communicative turns and the timing between utterances were added to the archival transcripts in two passes. On the first pass, the investigator or a trained transcriber added non-verbal communicative gestures to the existing transcripts by watching a video recording of the parent-child interaction. Non-verbal communicative gestures were operationalized as child point, show, give, reach gestures, shakes or nods of the head, or other conventional or symbolic gestures (Romano, Kaiser, Lounds-Taylor & Woods, 2019). Non-verbal communicative gestures as well as verbal turns were counted as a child communicative turn the parent could respond to.

On a second pass, the transcriber marked any points during the interaction that had a pause of ≥ 3 seconds between parent utterances, or between a parent and child utterance (McDuffie & Yoder, 2010). This timing information was used to determine turn taking codes described below.

Parent Input Coding

The coding scheme used for this study was developed to characterize high quality input for facilitating the development of diverse, simple sentences. For this developmental period, high quality parent input was defined as a bundle of responsive and linguistic features, specifically a well-timed, semantically related, simple declarative sentence about objects and events in the playroom. Parent utterances were coded for the presence and/or absence of responsive features following the work of Roberts and Kaiser (2015). In addition, parent utterances were also coded for linguistic features following the work of Hadley, Rispoli, and colleagues (Hadley et al., 2017b; Rispoli et al., 2018).

Codes were applied to all complete and intelligible parent utterances that contained a word, phrase, or sentence. Since we were specifically interested in how linguistic features of parent input were related to children's sentence diversity, parent utterances made up exclusively of non-syntactic interjections or sound effects were not coded. These social engagement turns lack analyzable lexical or grammatical characteristics, and therefore, they could not be coded for linguistic features.

Parent Input Coding for Responsive Features

Each utterance received minimally one code for its responsive features. Coding for responsive features was completed while watching the video recording of the parent-child interaction. The responsive coding scheme (see Appendix A) was designed to characterize utterances based the presence or absence of responsive features. An utterance was considered responsive if it was BOTH semantically related and well-timed, defined below.

Semantic Relatedness

A semantically related parent utterance was defined as an utterance that directly related to something in the child's attentional focus (Tamis-LeMonda et al., 2014). Because most parent utterances were expected to be semantically related, an unrelated [UR] code was inserted when a parent utterance was unrelated to the child's attentional focus (e.g., the parent talks about blocks while the child is playing with the baby) or when the parent utterance redirected an engaged child's focus to a new activity. The number of semantically related utterances was calculated by subtracting unrelated utterances from the parents' total number of utterances.

Turn-Taking Codes

Parent utterances were also classified based on whether they were well-timed or poorly timed conversational turns. Well-timed [WT] codes were used when the parent responded to their child's verbal or nonverbal communicative turn within 3-sec (i.e., temporally contingent), or when they followed their own utterance after wait time of 3-sec or more (McDuffie & Yoder, 2010). We hypothesized that a 3-sec pause would give children time to comprehend a single input utterance and the chance to take a communicative turn.

There were four situations when the parent produced two consecutive utterances and the second utterance received a [WT] code. This occurred when the parent's first turn was: (a) a social engagement word or phrase (e.g., *please, look, thank you, etc.*), (b) a repetition of a word or phrase from the child's prior turn that was then expanded into a sentence (e.g., *Dog. The dog is hungry*), (c) a single word that was then expanded into a sentence, or (d) a simple, contrasting sentence with the same syntactic structure (e.g., *This one is wet. This one is dry; Your pig is hungry. My pig is hungry too*). In these situations, we did not expect the first utterance to have a negative impact on the comprehension of the second.

Four other mutually exclusive turn-taking codes were used to classify parent utterances that were NOT well-timed. Consecutive parent utterances with less than a 3-sec pause were coded as back-to-back [BB]. An [OVERLAP] code was used for parent utterances that overlapped with a child utterance. We hypothesized that children would have fewer cognitive resources available to comprehend these input sentences if they were formulating utterances at the same time (Omaki & Lidz, 2015). A temporally non-contingent [TNC] code was used when the parent responded directly to the child, but the response occurred more than 3-sec after the child utterance. For example, if the child vocalized and pointed to an object, and the parent labeled that object five seconds later, it received a [TNC] code. And finally, a missed opportunity [MO] code was used when the parent did not respond to a child utterance.

Parent Input Coding for Linguistic Features

Each complete and intelligible parent utterance was also coded for its linguistic features. This was done to characterize the features of linguistic input directed to children in this developmental period. We hypothesized that simple, active declarative sentences that modeled adult sentence structure and referred to objects and events in the play environment would be the most transparent linguistic structure for children learning to produce simple sentences. An active declarative sentence (ADS) was defined as a sentence in which the subject appeared before the verb, the verb was in active voice, and the sentence was a statement (see Appendix B for the linguistic coding scheme). A simple, ADS was coded as [ADS:V] if it contained an overt subject and lexical verb (e.g., *he's got a hat on; your sink's getting full*) or [ADS:COP] if it had an overt subject with an adjective phrase or prepositional phrase (e.g., *the baby's in the chair; the sink is over here*). Several additional codes were used to identify grammatical complexity and variation in parent sentences with ADS structure that were not hypothesized as optimal in this developmental period. These codes were mutually exclusive with the [ADS:V] and [ADS:COP] codes. Two codes excluded parent utterances with ADS that were hypothesized to be too long and complex. Declarative sentences with compound noun phrases, verb phrases, and sentences joined together by the conjunctions *and*, *but*, *or* were coded as compound [L:CP]. Declarative sentences that contained two or more copula or lexical verbs such as infinitival verb complements (e.g., *I wanna go to the kitchen*), nonfinite complements (e.g., *I need you to sit down*), or finite complements (e.g., *I think the bear is hungry*) were coded as complex [L:CX] (Hadley, 2020). Three codes were used to exclude parent ADS with grammatical variation from our definition of a high-quality ADS. A reduced structure [RS] code was used to identify reduction of sentence structure in an ADS that is acceptable in casual

https://doi.org/10.1017/S0305000922000459 Published online by Cambridge University Press

conversation, or is conversationally acceptable in the local dialect, such as reduction of copula or auxiliary BE in intonation only questions (e.g., *you hungry? you cooking).* An ungrammatical [UG] code was used to identify omission of an obligatory grammatical structures (e.g., argument of the lexical verb, tense/agreement morpheme) in an ADS. And, if the adult ADS was acceptable in the adult grammar but did not align with the event in the play environment, a mismatch [MM] code was used.

Finally, two codes were used to identify parent utterances with ADS structure that were not referentially transparent. These codes were also mutually exclusive with the [ADS:V] and [ADS:COP] codes. Following the work of Hadley and colleagues, we required the sentence subject for an ADS to refer to a concrete object in the play environment. If it did NOT, it was coded as no referent [NR]. These included sentences with an existential subject (e.g., *it's raining*), gerunds as subjects (e.g., *cooking is fun*), or abstract subjects that often referred to behavior (e.g., *it's ok; that's good*). In addition, any ADS that referred to people, objects, and events not in the play environment were coded as decontextualized [DC]. These utterances were hypothesized as conceptually challenging, and so they were not considered high quality sentences for children in this developmental period. Therefore, utterances with these codes were also excluded from the set of high-quality ADS.

To characterize the number of ADS relative to other linguistic features, all other complete and intelligible utterances containing at least one word with syntactic status were coded exhaustively. Phrases and sentences that named objects were coded as labels [L:LAB]. These included single words (e.g., *apple),* stand-alone noun phrases (e.g., *blue shirt*), and sentences with nominal predicates taking the form of pronoun+copula+noun phrase (e.g., *that's a chicken; you're a girl*), including those with post-noun modifiers (e.g., *that's a chicken over there*). We coded sentences with nominal predicates as [L:LAB] to distinguish them from ADS with locative, adjectival, and verbal predicates for three major reasons. First, sentences with nominal predicates simply name the object; they do not predicate something about the sentence subject such as its location, property, or action. Given our interest in children's development of predication in simple sentences, the coding of adult input matched the predicate types of primary interest. Second, nominal predicates are thought to have a simpler underlying grammatical structure than locative, adjectival, and verbal predicates (cf. Becker, 2000). And finally, the structure of nominal predicates lend themselves to high frequency combinations of subject pronouns with contracted copula forms (e.g., *it's a ___; that's a ___, here's a ___*; Frank & Jaeger, 2008). These high frequency combinations may make it more challenging for the child learner to identify the subject-predicate constituent boundary in parent input sentences (Hadley, Rispoli & Holt, 2017a). Finally, three different non-declarative sentence types were coded. An [L:YN] code was inserted for a structural yes/no question, a [L:WH] code was inserted for structural WH-question, and an [L:IMP] code was inserted for imperative sentences without a subject or an inflected verb. Any utterance that was not an ADS, label, structural question, or imperative received a [L:OTH] code for other.

Parent Input Measures

To provide a general description of parent input properties, four general measures were computed. These measures are commonly used in the developmental literature. Parent total number of utterances reflects how much parent input was delivered during the 30-min play sample. Parent turn length in utterances characterizes the average number of parent utterances per communicative turn, relative to the child. Parent MLU in

https://doi.org/10.1017/S0305000922000459 Published online by Cambridge University Press

Table 1. Four Parent Input Categories

Input Category	Operational Definition	Example
Responsive	Semantically related and well-timed parent utterances, regardless of the utterance's linguistic features.	C ball. **M you want the ball [WT][ADS:V].** ---- M that looks fun [WT][ADS:V]. *:04 sec pause* **M did you need that [WT][L:YN]?**
Declarative	A simple, active declarative sentence with a lexical verb (coded as [ADS:V]), or copula verb with an adjective phrase or prepositional phrase (coded as [ADS:COP]), regardless of the presence or absence of responsive features. All simple declaratives were also well-formed and referentially transparent.	C {points to tower}. **M this kitchen is cool [UR][WT] [ADS: COP].** ---- **M I like your shoes [WT][ADS:V]** **M Those shoes fit [BB][ADS:V].**
Responsive Declarative	A simple, active declarative sentence (e.g., [ADS:V] or [ADS: COP]) that is also semantically related *and* well-timed. All responsive declaratives were also well-formed and referentially transparent.	C {uhoh}. **M the tower fell [WT][ADS:V]!** ---- **M I am over here [WT][ADS:COP].**
Neither	An adult utterance that was not responsive (i.e., not well-timed and/or unrelated), nor a simple ADS.	C what that? : 05 *sec pause* **M that's a ball [TNC] [L:LAB].** ---- M Stop kicking it [WT] [L:IMP] **M what color is the block [BB][L:WH]?**

Note. Responsive declaratives included only the subset of utterances with both responsive AND declarative features. This category was not mutually exclusive from the responsive category and declarative category. Therefore, these parent utterances were represented in all three input categories.

morphemes, and number of different words (NDW) describe average utterance length and lexical richness, respectively.

To quantify differences in the quality of parent input utterances at 1;9, all coded parent utterances were classified into four input categories (See Table 1). The first category was *responsive*, defined as any parent utterance that was well-timed and semantically related, regardless of its linguistic structure. The second was *declarative*, defined as any parent utterance that was a simple, active declarative sentence with a lexical verb [ADS:V] or copula [ADS:COP], regardless of its responsive characteristics. The third was *responsive declarative*, which were well-timed, semantically related, simple declaratives about objects and events in the playroom. The *responsive declarative* category included only the subset of utterances with high quality features from both perspectives. This classification was not mutually exclusive from the *responsive* and *declarative* categories. That is, these parent utterances were represented in all three input categories. The final category was *neither*, defined as an utterance without high quality responsive or linguistic features. This category included any utterance that was

https://doi.org/10.1017/S0305000922000459 Published online by Cambridge University Press

not well-timed and/or semantically related, nor a simple declarative. We computed a percentage for each input category by dividing the number of utterances in an input category by the parent's total number of utterances. As such, the input category measures reflected the percentage of utterances with varying combinations of high quality responsive and linguistic features.

Child Sentence Diversity Measures

This study's outcome measure was child sentence diversity at 2;6, following the operational definition of Rispoli et al. (2018). Child sentence diversity was computed from spontaneous, complete and intelligible ADS. Structural questions, imperatives, and other syntactic combinations were not considered because we were interested in the development of short, simple declarative sentences. Sentence diversity was operationalized as the number of unique subject + verb combinations appearing in one of the following ADS types: (a) subject + lexical verb (e.g., *I want, tower fall*) (b) subject + copula BE-adjective phrase (e.g., *it's hot*), or (c) subject + copula BE-prepositional phrase (e.g., *baby is out*). The presence of an overt copula BE form was required to meet the operational definition of a basic clause (i.e., subject + verb). Subjects could be either a pronoun or lexical noun (e.g., *it broke; the pig go in here*). If a child used a noun in both its singular and plural forms, or used the same root verb with a different tense or agreement inflection, this was not counted as a unique sentence. For example, if the child produced *cat is drinking, and cat drink,* only one unique sentence would be counted, because the root form for each of those sentences is *cat* + *drink*. For descriptive purposes, the number of unique subjects and unique verbs in child ADS were also computed.

Analyses

Descriptive analyses were used to characterize individual differences in the responsive and linguistic features of parent input utterances, parent input categories, and for child sentence diversity. Spearman coefficients were computed to explore how the percentage of utterances in each input category related to child sentence diversity at 2;6. Using a percentage rather than a frequency measure allowed us to control for parent talkativity, while using a non-parametric correlation based on rank order, to limit the potential effects of outliers. Finally, we related the four input categories to parent MLU, NDW, mean turn length per utterance, and total number of utterances to characterize how the input categories were associated with general measures of parent input more commonly used in the literature on parent input.

Reliability

After completing training on practice transcripts, a second coder completed responsive and linguistic input coding independently. Four, 30-min randomly chosen transcripts were independently coded for responsivity, and four, 30-min transcripts were randomly selected for independent linguistic coding. Cohen's kappa was used to compute reliability between the reliability coder and the first author. The criteria for reliability was set at .80, which is considered as an acceptable level of agreement (Sprent & Smeeton, 2001). For responsive coding, the average kappa was .856 (*range* = .762 – .903). For linguistic coding, the average kappa was .936 (*range* = .912 – .968).

Results

To provide a backdrop for the study specific input measures, descriptive statistics for general parent input measures at 1;9 are provided in Table 2. Parents used an average of 422.20 utterances (*SD* = 108.64) during the 30-min sample. Parent talkativity varied considerably, ranging from 226 to 689 utterances. The average parent took 2.6 utterances per turn (*SD* = .73; *range* = 1.72 to 4.22), had an average MLU of 3.78 (*SD* = .60; *range* = 2.57 to 4.74), and had an NDW of 239.55 (SD = 48.59; *range* = 161 to 368).

Table 2 also reports descriptive statistics for the primary outcome measure, child sentence diversity at 2;6. Recall that only active declarative sentences that contained (a) an explicit subject and lexical verb, or (b) an explicit subject, copula, and adjectival or prepositional phrase were included. Child sentence diversity ranged from 1 to 47. On average, children produced 23.35 sentences with unique subject-verb combinations (*SD* = 10.34), 8.05 different subjects (*SD* = 3.33), and 15.80 different verbs (*SD* = 5.56) in the 30-min sample.

Variability of Responsive and Linguistic Features in Parent Input

The first research question addressed variability of high quality responsive and linguistic input features at 1;9. Parent use of each responsive and linguistic code was converted to a percentage, given the variation observed in parent talkativity. Descriptive statistics for each responsive code are reported in Table 3. Semantically related utterances were very frequent, accounting for approximately 97.26% of parent utterances (*SD* = 2.93%). This indicates that most parent utterances were related to the child's attentional focus. Unrelated utterances were not characteristic of parent input to the toddlers in the context of free play.

Parent use of well-timed or back-to-back utterances was common and variable. The average percentage of well-timed parent utterances was 55.17% (*SD* = 9. 18%), ranging from 39.19% to 72.57%. The average percentage of back-to-back utterances was 40.91% (*SD* = 9.39%), ranging from 23.89% to 57.04%. On average, all other turn-taking codes

Table 2. General Measures of Parent Input at 1;9 and Child Sentences at 2;6

Measures	Mean	SD	Min	Max
Parent General Measures at 1;9				
Total Utterances	422.20	108.64	226.00	689.00
MeanTurnUtt	2.60	0.73	1.72	4.22
MLUm	3.78	0.60	2.57	4.74
NDW	239.55	48.59	161.00	368.00
Child Sentence Measures at 2;6				
Unique Subjects	8.05	3.33	1.00	14.00
Unique Verbs	15.80	5.56	1.00	25.00
Sentence Diversity	23.35	10.34	1.00	47.00

Note. MeanTurnUtt = Mean turn length in utterances, MLUm = mean length of utterance in morphemes, NDW = number of different words, Unique Subjects = number of different subjects in child ADS, Unique Verbs = number of different verbs in child ADS, Sentence Diversity = number of different subject+verb ADS

https://doi.org/10.1017/S0305000922000459 Published online by Cambridge University Press

Table 3. Variability of parent interactive codes at 1;9

Interactive Codes	Mean %	SD %	Min %	Max %
Semantic Codes				
Semantically Related	97.26	2.93	88.94	100.00
Unrelated	2.74	2.93	0.00	11.06
Temporal Codes				
Well-Timed	55.17	9.18	39.19	72.57
Back-to-Back	40.91	9.39	23.89	57.04
Overlap	3.41	2.00	0.67	8.04
Non-Contingent	0.38	0.29	0.00	0.92
Missed Opportunity	5.84	4.39	0.29	18.14

(i.e., overlap, missed opportunity, temporally non-contingent) accounted for less than 10% of parent utterances combined.

Descriptive statistics for each linguistic code are reported in Table 4. Recall that we operationalized well-formed, simple active declaratives about objects and events in the play environment as optimal for promoting child sentence diversity. The mean percentage of active declarative sentences with a lexical verb was 7.58% (*SD* = 2.83%) and 2.10% (*SD* = 1.42%) with a copula. Declaratives that were excluded from our operational definition of a high-quality ADS were infrequent or rare. Declaratives with compound structures made up less than 1% of all parent utterances. Complex declaratives made up 5.39% of parent input utterances. Declaratives with exclusionary grammaticality codes (i.e., ungrammatical, mismatch, reduced structure), non-referential subjects, and decontextualized talk were rare, with all codes accounting for less than 3% of parent utterances.

The other linguistic codes were used more often. The most common code was *other*, which captured single words, phrases, social engagement expressions, and sentences with locative movement or ellipsis (e.g., *there you go, here it is; yes, I can*). The mean percentage of *other* was 25.05% (*SD* = 6.94%), ranging from 15.00% to 38.92%. The percentages for labels and the three non-declarative sentence types were similar: labels (*M* = 15.06%; *SD* = 4.76%), *yes/no* questions (*M* = 13.27%; *SD* = 5.19%), WH questions (*M* = 13.27%; *SD* = 5.06%), and imperatives (*M* = 11.64%; *SD* =9.01%).

In summary, semantically related utterances were very frequent with little variability among parents in the context of play in a lab setting. In contrast, considerable variation was observed in well-timed parent turns. By comparison, high quality active declarative sentences, defined as simple, well-formed, and referentially transparent, were infrequent in parent input.

Variability in Parent Input Categories

The second research question examined the percentage of four parent input categories: *responsive* input, *declarative*, *responsive declarative*, and *neither* responsive nor declarative at 1;9. Table 5 presents descriptive statistics for each parent input category. Recall that responsive utterances were both semantically related and well-timed, but could vary with regard to their linguistic features. Responsive parent utterances accounted for

https://doi.org/10.1017/S0305000922000459 Published online by Cambridge University Press

Table 4. Variability of parent linguistic codes at 1;9

Linguistic Codes	Mean %	SD %	Min %	Max %
Adult-like ADS				
ADS:Verb	7.58	2.83	2.27	12.53
ADS:Copula	2.10	1.42	0.00	5.88
Excluded ADS				
Compound Declaratives	0.06	0.14	0.00	0.59
Complex Declaratives	5.84	2.38	0.67	12.16
Reduced Structure	0.48	0.38	0.00	1.29
Ungrammatical	1.16	1.03	0.00	3.93
Mismatch	0.93	0.87	0.00	3.33
No Referent	2.20	1.75	0.00	5.87
Decontextualized	0.26	0.32	0.00	0.98
Other Linguistic Types				
Labels	15.06	4.76	7.45	21.43
WH Questions	13.27	5.19	4.39	23.88
Yes/No Questions	14.16	6.44	1.45	24.11
Imperatives	11.64	9.01	2.08	37.19
Other	25.05	6.94	15.00	38.92

Note. ADS= Simple Active Declarative Sentence

Table 5. Variability of parent input categories at 1;9

Input Category	Mean %	SD %	Min %	Max %
Responsive	53.90	9.33	39.04	72.12
Declarative	9.42	2.91	3.71	14.32
Responsive Declarative	4.30	1.86	1.31	7.98
Neither	41.30	8.99	23.89	56.89

Note. Because responsive, declarative, and responsive declarative input categories are not mutually exclusive, mean percentages do not sum to 100%.

approximately half of parent utterances ($M = 53.90\%$, $SD = 9.33\%$), ranging from 39.04% to 72.12%. In comparison, declarative parent utterances were infrequent, with a mean of 9.42% (SD = 2.91%), ranging from 3.71% to 14.32%. Less than half of declarative parent utterances were also responsive. That is, the average percentage of *responsive declarative* utterances was 4.30% ($SD = 1.86\%$), ranging from approximately 1.31% to 7.98%. Finally, parent utterances that were *neither* responsive nor declarative were common, accounting for an average of 41.30% ($SD = 8.99$) of all parent utterances, ranging from 23.89% to 56.89%.

Relation between Parent Input Categories and Child Sentence Diversity

The third research question explored the relation between the four input categories and child sentence diversity nine months later. The percentage of each input category, *responsive*, *declarative*, *responsive declarative*, and *neither* at 1;9 were related to child sentence diversity at 2;6. Due to the small sample size of only 20 parent-child dyads, Spearman correlations were used to protect against the disproportionate effects of outliers.

Figure 1 displays the scatterplots for the *responsive* and *neither* input categories with child sentence diversity. Counter to our hypothesis, no significant relation was found between the percentage of parent *responsive declaratives* and child sentence diversity ($r_s = .278$, $p = .117$), or for *declarative* utterances with child sentence diversity

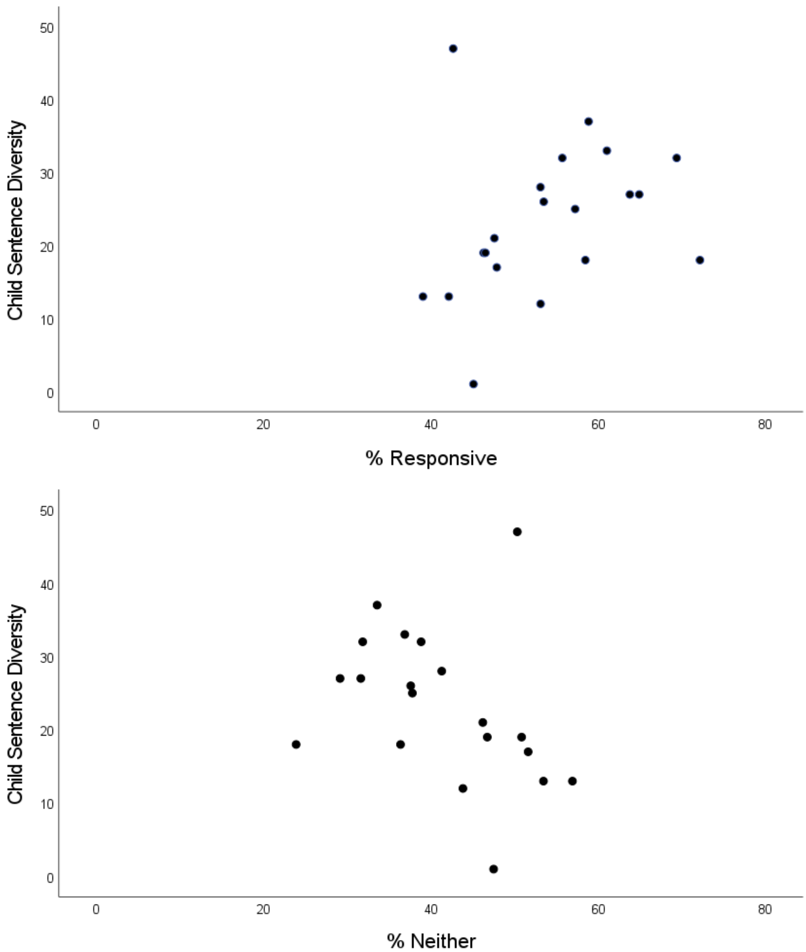

Figure 1. Scatterplots of percentage of **responsive** and **neither** input categories at 1;9 with child sentence diversity at 2;6

https://doi.org/10.1017/S0305000922000459 Published online by Cambridge University Press

($r_s = .173$, $p = .234$). On the other hand, the percentage of parent *responsive* utterances at 1;9 was significantly related to child sentence diversity at 2;6 ($r_s = .423$, $p = .031$). In addition, a significant negative relation was found between the percentage of parent utterances that were *neither* and child sentence diversity ($r_s = -.453$, $p = .022$).

To better interpret these findings, we also related the input categories to the descriptive, general measures more commonly encountered in the developmental literature. A significant negative correlation was observed for the total number of parent utterances and the percentage of *responsive* utterances ($r_s = -.630$, $p = .003$), whereas a significant positive correlation was observed with the percentage of *neither* utterances ($r_s = .659$, $p = .002$). This suggests that parent talkativity influenced the percentage of utterances in both the *responsive* and *neither* input categories. In contrast, the percentages of utterances in the *declarative* and *responsive declarative* input categories were unrelated to parent talkativity. Correlations between the four input categories with parent turn length further revealed the influence of parent talkativity on the associations with the input categories. A high, significant negative correlation was apparent for parent turn length with the percentage of utterances in the *responsive* category ($r_s = -.853$, $p < .001$) and the much smaller percentage of utterances in the *responsive declarative* category ($r_s = -.526$, $p = .017$). In contrast, a high, significant correlation was revealed with the percentage of utterances in *neither* ($r_s = .774$, $p = <.001$). The negative association with responsivity indicates that parents with a high percentage of responsive utterances produced fewer utterances in each of their turns, and in doing so, dyads had more balanced turn-taking. In contrast, the positive association with *neither* indicates that the low-quality input category was made up of many back-to-back parent utterances, or unbalanced parent-child turns. Finally, parent MLU was positively related to *responsive* ($r_s = .474$, $p = .035$), and unrelated to the other three input categories. Parent NDW was not significantly related to any input category.

In summary, the percentage of parent *responsive* utterances at 1;9 was positively related to child sentence diversity at 2;6. Parents with a higher percentage of responsive utterances also produced fewer utterances, fewer utterances per turn, and longer utterances. In contrast, the percentage of parent utterances that were *neither* responsive nor declarative were negatively related to child sentence diversity. Parents with a higher percentage of low quality utterances in the *neither* category produced more utterances and more utterances per turn.

Discussion

The purpose of this study was to characterize high quality input features during parent-child interactions with toddlers who were not yet producing sentences on a regular basis. Our primary goal was to determine how common a bundle of high-quality features were in naturally occurring conversational interactions, by defining both how input was delivered, as well as its linguistic content. We considered the presence and absence of responsive and linguistic features in each parent utterance to create four categories of parent input quality – *responsive*, *declarative*, *responsive declarative*, and *neither.* Two categories were common and variable: *responsive* utterances and utterances that were *neither* responsive nor declarative. These two categories accounted for an average of 53% and 41% of parent utterances, respectively. In contrast, high quality *declarative* sentences were infrequent in naturally occurring parent input, accounting for less than 10% of parent utterances. Instead, parents often used questions and other linguistic forms such as social engagement expressions (e.g., *there it is, good job*) to encourage child participation in play and communication. The subset of *responsive declaratives* was rare accounting for only 4% of parent utterances. The fact that only 4% of declaratives were also responsive was due to parents' tendency to produce consecutive back-to-back utterances.

The secondary goal of this study was to explore how parent input categories at 1;9 related to child sentence diversity at 2;6. The positive association observed between *responsive* utterances and child sentence diversity adds to the body of work demonstrating links between caregiver responsivity and child language outcomes for expressive vocabulary and word combinations (Girolametto et al., 1999; Levickis et al., 2014; Tamis-LeMonda et al., 2001, 2014). Yet parent responses in this study were rarely non-contingent or semantically unrelated, two features of caregiver responsivity that have been the focus of many previous studies. We suspect that temporal and semantic contingency may be easier for parents when their children already communicate intentionally with words and word combinations. Rather, the lower percentages of responsive utterances observed in the current study were attributable to parents producing consecutive utterances without waiting at least 3 seconds for the child to take a communicative turn. For some parents, more than half of their utterances were coded as back-to-back. This novel finding was apparent because we coded every parent utterance, not just those immediately following child turns. The follow-up analyses relating parent input categories to general input measures confirmed that the percentage of *responsive* parent input was associated with balanced turn-taking (i.e., fewer parent utterances per turn), whereas the percentage of *neither* was associated with unbalanced turn-taking (i.e., more parent utterances per turn). These findings align with investigations documenting the importance of back-and-forth conversational turns (Romeo et al., 2018) and the fluency and connectedness of parent-child interactions to child language outcomes (Hirsh-Pasek et al., 2015) and provide new evidence that balanced turn-taking is a critical aspect of how input should be delivered to toddlers.

The evidence related to balanced turn-taking is also consistent with the view that reciprocal relations between contingent interactions and attention lay a strong foundation for language development (Masek et al., 2021a). That is, balanced turns may build children's capacity to sustain attention, participate in longer conversations, and learn more from the linguistic content of a parent utterance in the moment. Fewer parent utterances with longer wait time between utterances may also create more optimal learning opportunities by providing the child's developing parser more time to comprehend and process the input sentence (Lidz & Gagliardi, 2015; Omaki & Lidz, 2015). In contrast, it may be more difficult for children to make use of linguistic content delivered in a rapid flow of consecutive utterances, particularly for those with immature grammatical systems and less well-developed attention.

On the other hand, *responsive declaratives* were not significantly related to child outcomes in sentence diversity nine months later. This finding was contrary to our hypothesis. Although high quality declaratives may simply be too sparse in the input to have a significant impact on the children's sentence diversity outcomes, several methodological decisions may have contributed to the non-significant finding observed. First, our sample size of only 20 parent-child dyads may have been too small to detect facilitative input effects for declaratives, an infrequent structure in naturally-occurring parent-child interaction. In previous studies where associations between use of parent declaratives and later child sentence diversity have been detected, sample sizes have been larger, ranging from 28 to 50 dyads (Clark-Whitney et al., 2022; Hadley et al., 2017b; Rispoli et al., 2018). Second, our desire to code the intersection of responsive and linguistic features at the level of the individual utterance led to using a frequency measure of declaratives in parent input rather than the diversity of noun subjects (Hadley et al., 2017a) or the diversity of subject-verb combinations (Rispoli et al., 2018) in active declarative sentences. We also included declaratives with 1st and 2nd person pronoun subjects (i.e., *I, you, we*). Hadley, Rispoli, and colleagues have argued that the DIVERSITY of words in the subject and main verb positions of input sentences helps make clause structure more salient to the child (cf. Hadley et al., 2017b; Rispoli et al., 2018). Therefore, we recommend retaining diversity measures in future studies of linguistic input and using alternative methods for exploring how responsive and linguistic features of input work together to promote child language outcomes. The recent study by Clark-Whitney et al. (2022) provides an example of an alternative approach. Recall they combined ratings of caregiver responsivity over time with the baseline frequency of toy talk sentences (i.e., third person declarative sentences about objects and events in the play environment). They found that changes in caregiver responsivity moderated the effects of toy talk sentences on sentence diversity outcomes for preschoolers with ASD.

Several additional methodological limitations should be noted. First, this study used the same set of participants at 1;9 as Hsu et al. (2017). Authors explored relations between the frequency and diversity of parent verb use at 1;9 and child verb lexicon diversity at 2;3, but did not examine any responsive properties of parent input. Use of this participant sample meant that we had some prior knowledge of individual differences in parent input characteristics at the start of this study. However, the non-significant findings between parent responsive declaratives and subsequent child sentence diversity reduces this concern insofar as our primary hypothesis was not supported. Second, our participant sample was small and not demographically diverse. The participants were composed primarily of White, non-Hispanic parents with a bachelor's degree or advanced degree. This limits the generalizability of our findings. Third, the data for this study were collected in a laboratory playroom during free play. Parent-child play was uninterrupted and there were no competing demands for parents' attention. This context likely contributed to the high levels of temporal contingency and semantic relatedness observed. Therefore, our characterizations of parent input may not be truly representative of parent-child conversations that occur in the everyday activities of the home environment. Finally, this study only examined two time points, parents at 1;9 and child sentence diversity at 2;6. Assessing change in parent input and child sentence diversity at multiple time points during the 9-month interval and controlling for children's vocabulary development could have provided more precise characterizations of how parent input properties work together with children's current language abilities to predict growth in sentence diversity (see Hadley et al., 2017b for an example).

Implications and Future Directions

The findings of the current study affirm the importance of caregiver responsivity, and more specifically balanced turn-taking, to early language learning. These characteristics of input delivery may be especially important for toddlers with language delays who may need more supportive learning conditions (Girolametto et al., 1996; Hampton, Kaiser & Roberts, 2017; Roberts & Kaiser, 2015). In existing parent-implemented intervention approaches, parents are often taught to observe, wait expectantly, and listen carefully to their child (Weitzman, Girolametto & Drake, 2017), and to match their utterances to their child's (Kaiser & Hampton, 2017). Caregiver use of these strategies create a supportive language learning environment and promote positive expressive and receptive child language outcomes (Girolametto et al., 1996; Hampton et al., 2017; Roberts & Kaiser, 2015). The rationale for balanced turns is often couched within a social interactive perspective that emphasizes the importance of giving children opportunities to participate in meaningful communication exchanges (Romeo et al., 2018) and more recently for strengthening children's underlying attention (Masek et al., 2021a). We propose that balanced turns should also be considered from a psycholinguistic perspective (Lidz & Gagliardi, 2015; Omaki & Lidz, 2015). That is, the way input is delivered may affect the child's ability to comprehend and use the linguistic content of an input sentence in the moment to advance their developing knowledge of grammar because attention and working memory are developing at the same time. Future empirical research investigating this possibility is warranted.

The linguistic coding scheme developed for this study provided a more comprehensive and fine-grained characterization of the linguistic properties of parent input beyond general measures of parent utterance length and lexical diversity. Although the current study did not reveal an association between the percentage of *responsive declaratives* in parent input and children's sentence diversity outcomes in this small sample of typically developing children, high quality declarative input may be more important for children with, or at-risk for, language disorders, who struggle with the transition from words to sentences. Future studies are needed to test this possibility. The efficacy of a parent-implemented intervention is underway that coaches parents of toddlers at-risk for developmental language disorders on responsive interaction and sentence-focused strategies to increase the diversity of declarative sentences with diverse subjects (Kaiser, Roberts & Hadley, 2018). The findings of the current study have also provided general expectations for *responsive declarative* use in naturally occurring parent-child conversations during play. The finding that these sentences occur only 4% of the time provides a benchmark for interpreting baseline use of responsive declaratives in parent input and change during the intervention. The clinical trial will also evaluate the extent to which increases in parents' responsive declarative input sentences with diverse subjects promote children's sentence diversity outcomes.

Moving forward, researchers should consider both features of how input is delivered and what the linguistic content of that input is when defining input quality and exploring individual differences in rate of development. By drawing upon complementary theories of learning and language, parents, clinicians and educators can create concentrated exposure to high quality input. Although contingent and responsive interaction appear to support and heighten child engagement, attention, and readiness to process linguistic input throughout early childhood, additional research is needed to determine how to tailor the linguistic content of input to promote the development of sentence structure. Investigating these complementary perspectives during different developmental periods and with different child populations will advance our understanding of how social interaction and linguistic input support the learning mechanisms underlying language acquisition.

Acknowledgements. Collection of the archival database used in this study was supported by NSF BCS-08-22513 awarded to Matthew Rispoli. This article is based upon Tracy Preza's master's thesis, completed as a graduate student at the University of Illinois, supported in part by NIH U01 DC017135. Portions of these findings were presented at the 2022 Symposium for Research on Child Language Disorders in Madison, Wisconsin. We extend sincere appreciation to the parents and children that made the work possible, to Mary Kate Buchheit, Emily Harrington, and Jossemia Webster for their contributions to data processing and reliability, and to Marie Channell and Laura Mattie for their feedback on study design and interpretation.

References

Becker, M. (2000). *The Development of the Copula in Child English: The Lightness of Be*. IRCS Technical Reports Series. **36**. https://repository.upenn.edu/ircs_reports/36

Borairi, S., **Fearon, P.**, **Madigan, S.**, **Plamondon, A.**, & **Jenkins, J.** (2021). A mediation meta-analysis of the role of maternal responsivity in the association between socioeconomic risk and children's language. *Child Development*, **92**(6), 2177–2193.

Bricker, D., **Squires, J.**, **Mounts, L.**, **Potter, L.**, **Nickel, R.**, **Twombly, E.**, & **Farrell, J.** (1999). *Ages and stages questionnaire*. Baltimore, MD: Paul H. Brookes Publishing.

Clark-Whitney, E., **Klein, C. B.**, **Hadley, P. A.**, **Lord, C.**, & **Kim, S. H.** (2022). Caregiver Language Input Supports Sentence Diversity in Young Children With Autism Spectrum Disorder. *Journal of Speech, Language, and Hearing Research*, **64**, 1465–1477.

Fenson, L., **Marchman, V.**, **Thal, D.**, **Dale, P.**, **Reznick, J.**, & **Bates, E.** (2007). *MacArthur-Bates Communicative Development Inventories: User's guide and technical manual* Baltimore: Brookes Publishing Company.

Frank, A. F., & **Jaeger, T. F.** (2008). Speaking rationally: Uniform information density as an optimal strategy for language production. In *Proceedings of the Annual Meeting of the Cognitive Science Society* (pp. 939–944). Washington, D.C.

Franklin, B., **Warlaumont, A. S.**, **Messinger, D.**, **Bene, E.**, **Nathani Iyer, S.**, **Lee, C. C.**, **Lambert, B.**, & **Oller, D. K.** (2014). Effects of parental interaction on infant vocalization rate, variability and vocal type. *Language Learning and Development*, **10**(3), 279–296.

Gathercole, V. C. M., & **Hoff, E.** (2007). Input and the acquisition of language: Three questions. *Blackwell handbook of language development*, 107–127.

Gilkerson, J., **Richards, J. A.**, **Warren, S. F.**, **Oller, D. K.**, **Russo, R.**, & **Vohr, B.** (2018). Language experience in the second year of life and language outcomes in late childhood. *Pediatrics*, **142**(4). 2–11.

Girolametto, L., **Pearce, P. S.**, & **Weitzman, E.** (1996). Interactive focused stimulation for toddlers with expressive vocabulary delays. *Journal of Speech and Hearing Research*, **39**, 1274–1283.

Girolametto, L., **Weitzman, E.**, **Wiigs, M.**, & **Pearce, P. S.** (1999). The relationship between maternal language measures and language development in toddlers with expressive vocabulary delays. *American Journal of Speech-Language Pathology*, **8**, 364–374.

Hadley, P. A. (1999). Validating a rate-based measure of early grammatical abilities: Unique syntactic types. *American Journal of Speech-Language Pathology*, **8**(3), 261–272.

Hadley, P. A. (2020). Exploring sentence diversity at the boundary of typical and impaired language abilities. *Journal of Speech, Language, and Hearing Research*, **63**(10), 3236–3251.

Hadley, P. A., **McKenna, M. M.**, & **Rispoli, M.** (2018). Sentence diversity in early language development: Recommendations for target selection and progress monitoring. *American Journal of Speech-Language Pathology*, **27**(2), 553–565.

Hadley, P. A., **Rispoli, M.**, & **Holt, J. K.** (2017a). Input subject diversity accelerates the growth of tense and agreement: Indirect benefits from a parent-implemented intervention. *Journal of Speech, Language, and Hearing Research*, **60**(9), 2619–2635.

Hadley, P. A., **Rispoli, M.**, **Holt, J. K.**, **Fitzgerald, C.**, & **Bahnsen, A.** (2014). Growth of finiteness in the third year of life: replication and predictive validity. *Journal of Speech, Language, and Hearing Research*, **57**(3), 887–900.

Hadley, P. A., **Rispoli, M.**, **Holt, J. K.**, **Papastratakos, T.**, **Hsu, N.**, **Kubalanza, M.**, & **McKenna, M. M.** (2017b). Input subject diversity enhances early grammatical growth: evidence from a parent-implemented intervention. *Language Learning and Development*, **13**(1), 54–79.

Hadley, P. A., & **Walsh, K. M.** (2014). Toy talk: Simple strategies to create richer grammatical input. *Language, Speech, and Hearing Services in Schools*, **45**(3), 159–172.

Hampton, L. H., **Kaiser, A. P.**, & **Roberts, M. Y.** (2017). One-year language outcomes in toddlers with language delays: An RCT follow-up. *Pediatrics*, **140**(5).

Hart, B. (1991). Input frequency and children's first words. *First Language*, **11**(32), 289–300.

Hart, B., & **Risley, T.** (1995). *Meaningful differences in the everyday experience of young American children.* Baltimore, MD: Paul H Brookes Publishing.

Hirsh-Pasek, K., **Adamson, L. B.**, **Bakeman, R.**, **Owen, M. T.**, **Golinkoff, R. M.**, **Pace, A.**, **Yust, P.K.S.**, & **Suma, K.** (2015). The contribution of early communication quality to low-income children's language success. *Psychological science*, **26**(7), 1071–1083.

Hoff, E. (2006). How social contexts support and shape language development. *Developmental review*, **26**(1), 55–88

Hsu, N., **Hadley, P. A.**, & **Rispoli, M.** (2017). Diversity matters: Parent input predicts toddler verb production. *Journal of child language*, **44**(1), 63–86.

Huttenlocher, J., **Haight, W.**, **Bryk, A.**, **Seltzer, M.**, & **Lyons, T.** (1991). Early vocabulary growth: relation to language input and gender. *Developmental Psychology*, **27**(2), 236–248.

Huttenlocher, J., **Vasilyeva, M.**, **Cymerman, E.**, & **Levine, S.** (2002). Language input and child syntax. *Cognitive psychology*, **45**(3), 337–374.

Huttenlocher, J., **Waterfall, H.**, **Vasilyeva, M.**, **Vevea, J. L.**, & **Hedges, L. V.** (2010). Sources of variability in children's language growth. *Cognitive Psychology*, **61**(4), 343–365.

Ingram, D. (1989). *First language acquisition: Method, description and explanation*. Cambridge university press.

Kaiser, A. P., & **Hampton, L. H.** (2017). Enhanced milieu teaching. In R. McCauley, M. Fey, & R. Gilliam (Eds.), *Treatment of language disorders in children* (2nd ed.). Baltimore, MD: Brookes.

Kaiser, A. P., **Roberts, M. Y.**, & **Hadley, P. A.** (2018). *Maximizing Outcomes for Preschoolers with Developmental Language Disorders.* National Institute on Deafness and Other Communication Disorders.

Klee, T., & **Gavin, W.** (2010). *LARSP reference data for 2- and 3-year old children*. University of Canterbury Research Repository. http://hdl.handle.net/10092/4980

Lee, L. L. (1974). *Developmental sentence analysis: A grammatical assessment procedure for speech and language clinicians*. Northwestern University Press.

Levickis, P., **Reilly, S.**, **Girolametto, L.**, **Ukoumunne, O. C.**, & **Wake, M.** (2014). Maternal behaviors promoting language acquisition in slow-to-talk toddlers: prospective community-based study. *Journal of Developmental & Behavioral Pediatrics*, **35**(4), 274–281.

Lidz, J., & **Gagliardi, A.** (2015). How nature meets nurture: universal grammar and statistical learning. *Annual Review of Linguistics*, **1**(1), 333–353.

Masek, L. R., **McMillan, B. T.**, **Paterson, S. J.**, **Tamis-LeMonda, C. S.**, **Golinkoff, R. M.**, & **Hirsh-Pasek, K.** (2021a). Where language meets attention: How contingent interactions promote learning. *Developmental Review*, **60**, 100961.

Masek, L. R., **Ramirez, A. G.**, **McMillan, B. T.**, **Hirsh-Pasek, K.**, & **Golinkoff, R. M.** (2021b). Beyond counting words: A paradigm shift for the study of language acquisition. *Child Development Perspectives*, **15**, 274–280.

McDuffie, A., & **Yoder, P.** (2010). Types of parent verbal responsiveness that predict language in young children with autism spectrum disorder. *Journal of Speech, Language, and Hearing Research*, **53**(4), 1026–1039.

Miller, J., & **Chapman, R.** (2000). SALT: Systematic analysis of language transcripts. [Computer software] University of Wisconsin.

Nelson, K. E., **Denninger, M. M.**, **Bonvillian, J. D.**, **Kaplan, B. J.**, & **Baker, N. D.** (1984). Maternal input adjustments and non-adjustments as related to children's linguistic advances and to language acquisition theories. *The development of oral and written language in social contexts*, **13**, 31–56.

Omaki, A., & **Lidz, J.** (2015). Linking parser development to acquisition of syntactic knowledge. *Language Acquisition*, **22**(2), 158–192

Rispoli, M., & **Hadley, P.** (2011). Toward a theory of gradual morphosyntactic learning. *Experience, variation, and generalization: Learning a first language*, 15–33.

Rispoli, M., & **Hadley, P.** (2013). *The growth of tense and agreement: final report.* National Science Foundation.

Rispoli, M., **Hadley, P.**, & **Simmons, H.** (2018). Simple sentences aren't all the same: variation in input and acquisition. In *Proceedings of the 42nd annual Boston University Conference on Language Development* (pp. 673–686). Cascadilla Press.

Roberts, M. Y., & **Kaiser, A. P.** (2015). Early intervention for toddlers with language delays: A randomized controlled trial. *Pediatrics*, **135**(4), 686–693.

Romano, M., **Kaiser, A.**, **Lounds-Taylor, J.**, & **Woods, J.** (2019). Rates of prelinguistic communication and early symbol use in young children with down syndrome: using a progress-monitoring tool to model growth. *American Journal of Speech-Language Pathology,* 1–14.

Romeo, R. R., **Leonard, J. A.**, **Robinson, S. T.**, **West, M. R.**, **Mackey, A. P.**, **Rowe, M. L.**, & **Gabrieli, J. D.** (2018). Beyond the 30-million-word gap: Children's conversational exposure is associated with language-related brain function. *Psychological science*, **29**(5), 700–710.

Rowe, M. L. (2012). A longitudinal investigation of the role of quantity and quality of child directed speech vocabulary development. *Child Development*, **83**(5), 1762–1774.

Rowe, M. L., & **Snow, C. E.** (2020). Analyzing input quality along three dimensions: interactive, linguistic, and conceptual. *Journal of Child Language*, **1**(1) 5–21.

Silvey, C., **Demir-Lira, Ö. E.**, **Goldin-Meadow, S.**, & **Raudenbush, S. W.** (2021). Effects of time varying parent input on children's language outcomes differ for vocabulary and syntax. *Psychological science*, **32** (4), 536–548.

Sprent, P., & **Smeeton, N.** (2001). *Applied nonparametric statistical methods*. Boca Raton, FL: Chapman & Hall/CRC.

Tamis-LeMonda, C. S., & **Bornstein, M. H.** (2002). Maternal responsiveness and early language acquisition. *Advances in Child Development and Behavior*, **29**, 89–127.

Tamis-LeMonda, C. S., **Bornstein, M. H.**, & **Baumwell, L.** (2001). Maternal Responsiveness and Children's Achievement of Language Milestones. *Child Development*, **72**(3), 748–767.

Tamis-LeMonda, C. S., **Bornstein, M. H.**, **Kahana-Kalman, R.**, **Baumwell, L.**, & **Cyphers, L.** (1998). Predicting variation in the timing of language milestones in the second year: An events history approach. *Journal of Child Language*, **25**(3), 675–700.

Tamis-LeMonda, C. S., **Kuchirko, Y.**, & **Song, L.** (2014). Why is infant language learning facilitated by parental responsiveness? *Current Directions in Psychological Science*, **23**(2), 121–126.

Tamis-LeMonda, C. S., **Kuchirko, Y.**, & **Suh, D. D.** (2018). Taking center stage: infants' active role in language learning. In M. M. Saylor, P. A. Ganea (Eds.), *Active Learning from Infancy to Childhood* (39–53). Springer International Publishing AG.

Tomasello, M., & **Farrar, M. J.** (1986). Joint attention and early language. *Child Development*, **57**(6), 1454.

Weitzman, E., **Girolametto, L.**, & **Drake, L.** (2017). Hanen Programs for Parents. In R. McCauley, M. Fey, & R. Gilliam (Eds.), *Treatment of language disorders in children* (2nd ed.). Baltimore, MD: Brookes.

APPENDIX A
RESPONSIVE CODING SCHEME

CODE	OPERATIONAL DEFINITION	EXAMPLE
Unrelated [UR]	An adult turn that does not relate to the child's object of attention. This would include the parent discussing a play set in the room that the child's attention is not focused on. Do NOT use this code if the parent introduces a new toy into the play, such as putting a new animal in the farm, or giving a baby a new bottle. Note. This code is for broad shifts in attention. The parent was not penalized if their utterance was related to the play, but the child's eye gaze is elsewhere, or if the child's attention briefly shifts away, but they come right back to the play.	C {points to tower}. M this kitchen is cool [UR].
Well-Timed [WT]	An adult turn that is either a) within 3-sec of the child's previous turn or b) after waiting at least 3-sec between their previous turn (excluding [BB] exceptions, see below). Between speaker pauses are marked by a colon (:01), within-speaker pauses are marked by a semi-colon (;04).	C xxx. M you want the ball [WT]. M that looks fun. ; *:04 sec pause* M you want the train [WT]?
Back-to-Back [BB]	A consecutive adult turn less than or equal to 3-sec after the other. There are 4 exceptions. [BB] was not coded when: 1. The adult *imitates* a single word or phrase the child says, and then puts that word or phrase into a sentence 2. The adult uses a single word, phrase, or sentence in Utterance 1, and puts the word or phrase into a sentence (i.e., sentence expansion) 3. The adult uses Utterance 1 and 2 to illustrate a contrasting syntactic structure such as: a. contrasts the subject NP or VP of Utterance 1 in Utterance 2 b. contrasts the object NP label of Utterance 1 in Utterance 2 4. The adult utterance follows a turn for attention/ engagement.	M it's your turn to ride the train [WT]. M make sure to be careful [BB]. C ice cream. M ice cream [WT]. M you want some ice cream [WT]. M ball. M the ball is red [WT]. M this cup is wet [WT]. M this cup is dry [WT]. M Look, Cname [WT]. M that ball is red [WT].

https://doi.org/10.1017/S0305000922000459 Published online by Cambridge University Press

CODE	OPERATIONAL DEFINITION	EXAMPLE
Overlap [OVERLAP]	An adult turn that overlaps with a child utterance. This is marked in the transcript by <>.	C <the cookies>. M <cookies are> good [OVERLAP].
Temporally non-contingent [TNC]	An adult turn that comes more than 3 seconds (3.01 + seconds) after the previous child's turn that **directly responds** to the child's communicative turn.	C what that? : *:05 sec pause* M that's a ball [TNC].
Missed Opportunity [MO]	When the parent did not respond to the child's communicative turn within 3-sec. A new parent turn after a 3-sec **not** in response to the child is well-timed (see above). Empty brackets {} are used to denote a missed turn in the transcript.	C {points to ball} M {} [MO]. *; :05 sec pause* M I'm going here [WT].

Note. {gesture} refers to a non-verbal turn, xxx refers to unintelligible speech

APPENDIX B
LINGUISTIC CODING SCHEME

CODE	OPERATIONAL DEFINITION	EXAMPLE
Simple Active Declarative Sentence [ADS:V]	Sentences that meet the following criteria and contain only (1) lexical verb. **An active declarative sentence contains:** 1. a subject noun phrase before the main verb or auxiliary 2. The verb phrase is in active voice. 3. the sentence is a statement, not a command or structural question (an intonation only question, that structurally is an ADS is permissible) 4. The sentence cannot be complex (see below)	M the ball is rolling [ADS:V]. M I saw the bear [ADS:V]. M you want a cookie [ADS:V]?
Active Declarative Sentence [ADS:COP]	An ADS containing a subject, overt copula, and adjective or prepositional phrase.	M the house is so big [ADS:COP]! M it's in [ADS:COP].
	Excluded ADS: Grammatical Complexity	
Compound Sentence [L:CP]	An ADS containing a compound noun phrase or a compound verb phrase, or two sentences combined using the conjunctions *and,but, or.*	M we are singing and dancing [L:CP]. M the dog and the cat are playing together [L:CP] M that looks really hard but keep trying [L:CP].
Complex Sentence [L:CX]	An ADS that contains two verbs excluding compound verb phrases.	M you wanna go to the kitchen [L:CX]?

https://doi.org/10.1017/S0305000922000459 Published online by Cambridge University Press

CODE	OPERATIONAL DEFINITION	EXAMPLE
	This could include any combination of a copula and lexical verb, including sentences with infinitival *to* constructions, serial verbs, non-finite clausal complements, finite clausal complements, and relative clauses.	M I think he wants a prize [L:CX]. M that's the girl who ate the pizza [L:CX].
	Excluded ADS: Grammatical Variation	
Reduced Structure [RS]	An ADS with reduced variation of sentence structure that is conversationally acceptable in the local dialect.	M you getting apples [RS]? M you hungry [RS]?
Ungrammatical [L:UG]	An ADS that contains ungrammatical sentence structure, such as omitting an obligatory context necessary in the adult grammar.	M he want sleep [L:UG]. M ball is rolling [L:UG]. M you want build the tower [L:UG]?
Mismatch [L:MM]	A well-formed ADS that does not match the situation. This could include: 1. Parent refers to him/herself as 'Mommy' or 'Daddy' or to the child by CName when they mean "you" 2. The verb form (tense/aspect) does not align with the event	M Mommy wants the blue cup [L:MM]. M CName likes it [L:MM]. C {puts cup to mouth}. M you're eating [L:MM]. {a ball rolled down a slide}. M the ball is rolling [L:MM].
	Excluded ADS: Not Referentially Transparent	
No Referent [NR]	The subject of an ADS does not have a concrete referent. This includes: 1. Gerunds used as subjects (e.g., *cooking is fun, sleeping is boring)* 2. Existential subjects where the subject does not refer to a concrete object (e.g., *it's raining, it's my turn to ride the bike*) 3. Non-concrete subjects, that that typically refer to behaviors *(e.g., that's ok, that's not nice*)	M cooking is fun [NR]. M it's raining [NR]. M that's ok [NR].
Decontextualized [DC]	The ADS refers to an object or event that is not present in the play environment (i.e., not here and now). This includes the parent talking about a person or object not in the room, or referring to a past event.	M we have a puzzle like this at home [DC]. M you played with this at Grandma's, remember [DC]?
	Labels	
Label [L:LAB]	A sentence that labels an object. It contains: 1. A pronominal subject 2. Copula 'is' 3. noun to identify an object	M that's a ball [L:LAB]. M it's a chicken [L:LAB].

https://doi.org/10.1017/S0305000922000459 Published online by Cambridge University Press

CODE	OPERATIONAL DEFINITION	EXAMPLE
NP Label [L:LABNP]	A noun phrase to label an object NOT in a sentence. This could be: 1. Single word 2. Modifier+noun 3. Article+modifier +noun	M ketchup [L:LABNP]. M the blue cup [L:LABNP]. M some milk [L:LABNP]?
Label [L:LABX]	A sentence that labels an object. It contains: 1. Pronominal subject 2. Copula 'is' or 'are' 3. NP 4. An additional phrase modifying the NP	M that's a lid for a pot. M that's a stroller with a baby. M that's a chair for me.
	Other Sentence Types	
Yes/No question [L:YN]	A question with a fronted auxiliary verb such as 'is' or 'do' that is typically answered with a 'yes' or 'no'.	M do you want the puzzle [L:YN]? M is the baby sleeping [L:YN]?
WH-Questions [L:WH]	A question with who what, when, where, how, why.	M what are you doing [L:WH]? M who ate the cookie [L:WH]?
Imperative [L:IMP]	A sentence that functions as a command. It has no subject, an uninflected verb, and the optional presence of an addressee term.	M put the baby to bed [L:IMP]. M don't drink that juice [L:IMP]. M Cname, come here, please [L:IMP].
	Other	
Other [L:OTH]	Miscellaneous utterance types. It includes: 1. Sentences that have locative movement 2. Single words 3. Fragments 4. Social greetings/expressions 5. Elided VP or CP 6. Reduced subject sentences	M here it comes [L:OTH]. M hungry [L:OTH]. M in the barn [L:OTH]. M great job [L:OTH]. M I don't know [L:OTH]. M wanna play [L:OTH]?

Cite this article: Preza, T., & Hadley, P.A. (2024). Parent Responsivity, Language Input, and the Development of Simple Sentences. *Journal of Child Language* **51,** 91–117, https://doi.org/10.1017/S0305000922000459