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Research Article

Are Some Parents' Interaction Styles Associated With Richer Grammatical Input?

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Purpose: Evidence for tense marking in child-directed speech varies both across languages (Guasti, 2002; Legate & Yang, 2007) and across speakers of a single language (Hadley, Rispoli, Fitzgerald, & Bahnsen, 2011). The purpose of this study was to understand how parent interaction styles and register use overlap with the tense-marking properties of child-directed speech. This study investigated how parent interaction style, measured by utterance function, and parent register use when asking questions interacted with verb forms in child-directed input to identify interaction styles associated with the richest grammatical input.
Method: Participants were 15 parent–toddler dyads. The communicative function of parent utterances and the form of their questions were coded from language samples of parent–child play when children were 21 months of age. Verbs were coded for linguistic form (e.g., imperative, modal, copula).
Results: Directives and reduced questions were both negatively related to input informativeness (i.e., the proportion of unambiguous evidence for tense). Other-focused descriptives were positively related to input informativeness.
Conclusion: Predictable overlap existed between the characteristics of parents' interaction styles and register use and their input informativeness. An other-focused descriptive style most strongly related to richer evidence for the +Tense grammar of English.

Key Words: grammar, morphosyntax, input, tense

The acquisition of tense and agreement, or *finiteness,* is a well-established area of weakness for children with language impairments (Oetting & Hadley, 2009). As interventionists, we must consider how child-directed input provides evidence for the obligatory nature of finiteness marking in a language. Finiteness refers to the set of grammatical features of tense and agreement that are applied to a clause (e.g., *He walks*; *He walked*). In English, finiteness is marked not only across verb inflections but also on auxiliary verbs (e.g., *He is walking*) or on the copula (*He is hungry*) in the absence of verb suffixation. Children must learn the complex conditions for marking finiteness across a diverse variety of sentence contexts (cf. *This nose is little. The nose fits; Does this nose fit? It doesn't fit*).

Comparison of grammatical development across multiple languages reveals cross-linguistic differences in children's acquisition of tense and agreement (cf. Guasti, 2002). These differences have been primarily attributed to language typology, or the way verb forms are inflected. Accordingly, some languages provide more evidence to children regarding whether and when tense should be marked. As 2-year-olds begin to produce sentences, tense is marked "optionally," with children producing sentences such as *Mommy eat* (Wexler, 1994). This period of optional marking appears in many languages, with cross-linguistic variation in the amount of time it takes children learning different languages to master finiteness. Children learning Spanish or Italian acquire the morphosyntactic rules of their languages at younger ages than children learning German or English do (Guasti, 2002), indicating that differences in language typology contribute to differences in children's rates of grammatical development. In English, not only do children show great individual variation, but as a group, English-learning children's stage of optional marking is especially protracted, with productions of telegraphic sentences (e.g., *Pooh eat honey*) often co-existing with adult-like sentences marked for tense and agreement (e.g., *He likes juice*) until age 4 (Wexler, 1994).

Previous explanations of the variability in rates of grammatical development among languages and individuals have focused on properties of the language to be learned and on biological maturation (Rice, Wexler, & Hershberger, 1998; Wexler, 2003). However, a new theoretical framework, *Variational Learning* (VL; Yang, 2002, 2004), has provided a new way to examine the differences in grammatical properties of parent input that might also explain some of the variation between languages and individuals. This study is the latest in a line of research that expands on

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the knowledge of cross-linguistic differences to investigate sources of variability in individual English-speaking parent–child dyads as a way to inform language intervention strategies. Cross-speaker variability is explored for Mainstream American English, for which the discussion presented here is relevant.

In a previous study, we found that differences in the grammatical properties of parents' input predicted children's rates of grammatical development (Hadley, Rispoli, Fitzgerald, & Bahnsen, 2011). In this study, we examined the overlap between parents' conversational styles and the grammatical properties of their input. We recognize the role that conversational interaction style plays in delivering the "data-providing features" of grammatical input to the learner (cf. Hoff, 2006). Specifically, the input data that children receive are influenced by the quantity and quality of their conversational interactions as well as the typology of the target language. With a better understanding of the overlap between conversational style and linguistic form, conversationally based interventions may be more effectively designed to provide evidence for finiteness marking. We first explain how VL can be used to examine the input that children hear before describing how some conversational styles may provide more or less informative input.

VL and Input Informativeness

VL offers an explanation for gradualness in grammatical acquisition. Learning a language's finiteness system is characterized as a competition between –Tense and +Tense grammars. English, Spanish, and Italian are examples of languages with +Tense grammars because the relationship between speech time and event time is marked directly on verbs or auxiliaries. Mandarin is a language with a –Tense grammar because verbs are not inflected to mark this relationship. According to VL, children are sensitive to the grammatical forms that mark tense in the parent input they hear, attempting to process the input with the competing –Tense and +Tense grammars. The task for a child learning English is to learn a +Tense grammar, whereas a child learning Mandarin must learn a –Tense grammar. A child must make sense of how forms in the adult input relate to the target grammar. VL states that when children hear verb forms that contrast with nonfinite forms, the verb forms "reward"[1] a +Tense grammar because children receive unambiguous evidence about tense marking in a +Tense language. However, if a child learning English hears a sentence with a verb form that is identical to a nonfinite form, that verb form "punishes" a +Tense grammar (cf. Legate & Yang, 2007, pp. 318–321). For example, if a child learning English hears a sentence that rewards a +Tense grammar, such as "*The nose fits there,*" the child moves toward learning the +Tense grammar, but if the sentence includes a zero-marked verb form, as in *I want the ball,* the child moves toward learning the –Tense grammar. From this perspective, if an English-learning child experiences a majority of sentences with unmarked verb forms, this would slow the child's morphosyntactic development because this grammar is incompatible with the target language to be acquired.

Legate and Yang (2007) proposed that the proportion of unambiguous evidence for tense out of all verb forms would predict cross-linguistic differences in the age of finiteness mastery across languages. To test their prediction, Legate and Yang compared verbs in English-, French-, and Spanish-speaking parents' child-directed speech, collapsing multiple speakers and child ages within each language. They found that English parents unambiguously marked tense on only 52.9% of their verbs, considerably less than French (69.8%) or Spanish (80.1%) parents did, and that the proportion of unambiguous evidence for each language was inversely related to the average age that children mastered finiteness in each language. In other words, children learning languages with more ambiguous input took longer to master finiteness marking.

Using Legate and Yang's (2007) findings as a starting point, Hadley et al. (2011) investigated the onset of finiteness within a single language, English, at the level of individual parent–child dyads. The authors coded 15 parents' child-directed input to their 21-month-old toddlers for the ambiguous –Tense and unambiguous +Tense forms following Legate and Yang. –Tense forms included *no change irregular past tense, modals,*[2] *present tense* (all but third person singular, copula, and nonmodal auxiliaries), and *bare stem verbs*. +Tense forms included *past tense* (regular and distinctly marked irregular); *third person singular present tense* (regular and irregular); and *copulas* and *auxiliaries* BE, DO, and HAVE. To be more specific about what forms parents were using when they provided ambiguous input, Hadley et al. added additional subcategory codes for –Tense verb forms. The coding scheme used in Hadley et al. can be found in Appendix A.

Once all of the child-directed parent verb forms were coded, Hadley et al. (2011) calculated Legate and Yang's (2007) variable—the proportion of positive, unambiguous evidence out of all verb forms—referring to it as *input informativeness for tense.* Hadley et al. found that the average input informativeness of English-speaking parents was 50.6%, a value very similar to Legate and Yang's finding. Hadley et al. also documented the variation between parents, revealing a range in parents' input informativeness from 33% to 69%. Most importantly, the differences among parents explained significant individual variation in the children's rate of morphosyntactic growth from 21 to 30 months of age. Based on this finding, we became interested in understanding the sources of variation in English-speaking parents' input informativeness. This information is needed before strategies can be developed to increase parents' input informativeness as part of family-focused interventions.

[1]The "reward" and "punish" terminology are taken directly from Yang's (2002) VL framework.

[2]Because modals do not change form to agree with varying subjects (e.g., *I can go, He can go, They can go*), Legate and Yang (2007) considered these sentences to provide evidence that verbs are not marked for tense in English.

From a clinical perspective, the VL framework provided us with an important new way to conceptualize what makes grammatical properties of input optimal for a learner. VL led us to think not just about the presence of positive evidence for tense in the input, but to seriously consider it in the context of competition with unmarked forms (i.e., ambiguous evidence for tense marking) that might slow children's acquisition of finiteness.

The current study was motivated by the findings of Hadley et al. (2011), our knowledge of the verb forms used by parents in that study, and our clinical observations of differences in parent–toddler interaction style. We recognized that parents who seemed to "direct" conversational interactions with their young children (e.g., shifting the child's attention; *Watch this*) used many imperative verb forms. Imperatives were the most frequent –Tense form reported in Hadley et al. We also reflected on our own conversational practices as clinicians. We recognized that the alternative, a more indirect style of offering play suggestions, was associated with the use of modals and *let's* constructions, which are also –Tense verb forms (e.g., *Would you like a turn*?, *Let's try this one.*). We also began to re-evaluate the language facilitation strategies of self-talk and parallel talk from this new perspective. It became clear that using these strategies could lead to frequent productions of *I* and *You* subjects with ambiguous verb forms (e.g., *I need more; You see the blue one.*). Finally, from our prior experiences coding input informativeness, we recognized that some parents were less informative than others because they often reduced their questions, omitting auxiliary markers of tense and agreement (e.g., *You coming?* vs. *Are you coming?*). Although the loss of the copula/auxiliary in yes/no questions is conversationally acceptable, such reduction presents ambiguous evidence for tense to the learner. If certain interaction styles are associated with more or less informative input, then intervention could target adults' conversational style as a practical way of increasing the grammatical richness for tense in the language input that is provided to children.

Parent Interaction Styles and Language Input

Some variation in parent conversational interaction styles may result from different purposes for interacting (Hoff, 2006). For example, although some parents interact primarily for the purpose of directing children's behavior during social interaction, other parents are more interested in eliciting conversation from their children. In a recent review of the literature on the social bases of language development, Hoff (2006) reported that directive interaction styles have been associated with poorer outcomes in children's grammatical development, whereas conversation-eliciting styles have been shown to benefit children's grammatical development; however, Hoff was careful to point out that these findings could be attributed as much to the grammatical structures used as to the implicit purpose of the interaction. To explore how conversational style overlaps with grammatical properties of language input, we examined four parent interaction styles characterized by utterances with the following four functions: direct directive, indirect directive, interpersonal-focused descriptive, and other-focused descriptive.

Function of parent utterances. One function of parent utterances is to direct the child's attention or behavior. This function can be accomplished with direct language forms. Such directives have many purposes, including encouraging behavior (e.g., *Try again*) or interrupting an action (e.g., *Come here*; Pine, 1992; cf. Flynn & Masur, 2007). Although some parents are more encouraging whereas others redirect the child to what the parent finds interesting, one general characteristic of a directive style is the frequent use of imperatives. Most imperatives (e.g., *Come here*) reward a –Tense grammar because they are not overtly marked for finiteness. However, *don't* imperatives (e.g., *Don't touch it*) reward a +Tense grammar because tense is marked on the auxiliary DO (Legate & Yang, 2007). We predicted that direct directives would be negatively related to input informativeness because utterances with this function were expected to include primarily –Tense verbs.

Alternatively, parents can use indirect language forms to direct the child's attention or behavior. When the parent leads a child in an activity, he or she might say *Let's play over here* or *Should we get more toys out?* This indirect style is characterized by regular use of modals, including *may, might, would, will, should, shall, can,* and *could*. In describing functions of maternal utterances, Hoff-Ginsberg (1986) called such statements "indirect directives" (p. 156). Parents using an indirect style may ask many questions beginning with modals. VL predicts that children who hear sentences with modals will take longer to learn a +Tense grammar. Because the indirect directive style can consist of many types of verb forms, it is not predicted to relate to input informativeness.

In contrast, the purpose of some parent utterances may be to describe the child's and the parent's own actions, states, or attributes or the actions, states, or attributes of some other referent. We termed descriptive utterances about the speaker (parent) and listener (child) as "interpersonal-focused descriptives" and descriptive utterances about other referents in the environment as "other-focused descriptives." Based on what we knew about English typology, we suspected that parent input that focused primarily on the speaker/listener would not be as informative as descriptive discourse that focused on other referents. Interpersonal-focused descriptive utterances are +Tense when they are focused on actions (e.g., *You're blowing bubbles, I'm taking a turn*) but are often –Tense when they use state verbs or describe habitual activities (e.g., *You want another one? You need more, I like the blue one*). When parents use *I* as a subject, they are usually describing a mental state and not an action, so the utterance is more likely to reward a –Tense grammar (Smiley, Chang, & Allhoff, 2011). Interpersonal-focused descriptives with *you* as a subject are so common because parents of 21-month-olds often focus on meeting the needs of the child, which leads to the use of state verbs. Our notion of the interpersonal-focused descriptive utterance function is similar to the existing self-talk and parallel talk strategies used by speech-language pathologists (SLPs;

Girolametto & Weitzman, 2006). The use of interpersonal types of descriptive statements in intervention might have the consequence of providing verb forms that are ambiguous for tense. However, because interpersonal-focused descriptives can include either –Tense or +Tense forms, they are not expected to have a strong positive or negative relationship with input informativeness.

We were primarily interested in the extent to which parents described an action, state, or attribute of a toy or object because we realized that other-focused conversation would have more unambiguous +Tense forms when it focuses on individual objects, toys, or people. Singular grammatical subjects lead to the use of verb forms from the third person singular cell of the English verb paradigm (e.g., *Big Bird is flying the plane, He wants to play, Does he want to play?)*. In Mainstream American English, verbs in this cell are always overtly marked for tense except when used with modals (Rispoli, Hadley, & Holt, 2012). Unlike utterances with first and second person subjects, other-focused utterances with third person singular subjects will be +Tense even when they include state verbs (e.g., *He wants juice*). Therefore, we hypothesized that other-focused descriptives would be positively related to input informativeness.

Register use when asking questions. Different conversational registers may also interact with input informativeness. Biber (1994) explained that "linguistic features" such as reduced or deleted forms can differentiate registers (p. 35). We expected that the degree of formality that parents use when asking their toddlers questions would influence parent use of finiteness marking in yes/no questions because the degree of formality often determines whether linguistic forms are omitted or included when both options are allowable in the adult grammar. Hadley et al. (2011) found that some parents frequently drop the finiteness marker (i.e., auxiliary DO or BE, or copula BE) when asking questions, leading to a reduced question form, but this tendency was not compared directly to parents' use of full question forms. When the finiteness marker is dropped, the resulting input sentence is ambiguous for tense marking (e.g., *You want more?*; –Tense). On the other hand, when a more formal register is used and the finiteness marker is included, the input sentence is unambiguous for tense marking (e.g., *Do you want more?*; +Tense). Importantly, the absence of overt tense marking in these questions is directly related to the register used and is not a direct consequence of a typological constraint of English. Thus, we predicted more informal language use when asking questions to include more –Tense verb forms, resulting in a negative relationship with input informativeness.

The purpose of this study was to characterize the relationship between parent interaction style and register use, with the data providing features of grammatical input. With a clearer understanding of these relationships, clinicians may be better able to provide more abundant, informative data during conversational interactions with children. The following research questions were addressed:

- How do parents vary in interaction style as measured by utterance function?
- How do parents vary in register use as measured by question form?
- How do parents' utterances vary in their use of –Tense and +Tense verb forms?
- How do parents' interaction styles and register use relate to input informativeness?

Method

Participants

The participants for the current study were the same 15 parent–child dyads who met the selection criteria of Hadley et al. (2011). Families were recruited from DeKalb County, IL, for a study of children's sentence production. As part of participant screening, parents were asked about their children's health history and development. All of the children were healthy, with no histories of neurological diagnoses, insertion of pressure-equalizing tubes, or onset of walking or talking after 15 months reported. None of the children included in the current analyses was using tense morphemes productively at 21 months of age when the samples were collected, and all of the children had typical language development as documented by mean length of utterance in morphemes (Miller & Chapman, 1981) and expressive vocabulary on the MacArthur-Bates Communicative Development Inventories (Fenson, Marchman, Thal, Dale, Reznick, & Bates, 2007) at 30 months of age. The parent–child dyads consisted of seven girls and eight boys and 13 mothers and two fathers. All of the parents were native English speakers. Parents' socioeconomic status and race/ethnicity were not obtained as part of the original study of children's sentence production.

Procedure

Children and their primary caregivers participated in naturalistic free-play using a standard set of toys in a laboratory playroom. A research assistant (RA) observed from the corner of the room to take contextual notes but did not interact with the children. Available toys included construction activities such as Mr. Potato Head and puzzles, a tea set, Sesame Street and Fisher-Price figures, and a single book. The parents were instructed to talk and play with their children as they would at home. Conversational samples were audio-recorded and transcribed by trained RAs. Data for the current study were reanalyzed from the same 30-min parent–toddler conversational language samples used in Hadley et al. (2011).

Only spontaneous, complete, and intelligible child-directed utterances were used. Parents' mean intelligibility was 96.5%, and on average, 99.7% of the parent utterances were complete. Parent utterances from nonspontaneous reading of books and singing of routine songs were excluded from analysis because these utterances are not reflective of the parents' individual conversational styles. Four of the 15 dyads chose to read the book, and the excluded

nonspontaneous book reading made up only 1% to 2% of the intelligible parent utterances in these four samples. Additionally, utterances directed to the RA were not included insofar as these utterances made up a negligible portion of all utterances in the language samples.

Parent Input Coding

The spontaneous language transcripts were converted into the CHAT transcription format, the transcription format of the CHILDES Project (MacWhinney, 2000). Parent utterances were coded for conversational interaction style, the register used for questions, and –Tense and +Tense verb subcategories. After codes were added to each sample, computerized searches were used to extract all utterances by individual code as well as all utterances without any code and correct the coding of utterances with incorrect or omitted codes. Each utterance list was examined, providing an opportunity to correct the coding of utterances with incorrect or omitted codes.

Function of parent utterances. For each utterance, a decision was first made about whether the dominant function of the utterance was consistent with any of the four function-based styles (i.e., direct directive, indirect directive, interpersonal-focused descriptive, other-focused descriptive; see Appendix B). The function-based interaction styles were based on whether the utterances directed the child's attention or behavior or they described the state/action of the speaker/listener or of something/someone else. Each utterance could receive only one style code (i.e., an utterance could not be coded as both an indirect directive and an interpersonal descriptive).

Utterances that directed a child's attention or behavior received either a "direct" code or an "indirect" code based on the manner of the parent's direction. The primary types of utterances coded as direct directive explicitly stated the desired action and took the form of imperatives that commanded or prohibited behavior (e.g., *Come here*; *Don't touch*) and *you can't* statements that served to terminate the child's action (e.g., *You can't go in there*). As all utterances could only receive one style code, utterances beginning with imperatives received only a directive code even when they included embedded clauses. For example, *Look what he does* received only a direct directive code and not an additional code for the embedded clause, as the primary function of the utterance was to direct attention.

Indirect directives differed from direct directives because they suggested a change in attention or behavior without explicitly telling the child what to do. The primary types of utterances coded as indirect directives took the form of questions with an inverted modal and first/second person subject in which the parent attempted to guide the child's attention or behavior with a question or suggestion (e.g., *Should we play over here?*). Imperatives, utterances without verb forms, and some questions were coded as indirect directives, as described in Appendix B.

Utterances that described actions, states, or attributes received either an "interpersonal-focused descriptive" function code or an "other-focused descriptive" function code based on the subject that was being described. To be coded as interpersonal-focused descriptive, a sentence must have had either a first/second person subject in the main or an embedded clause (e.g., *I had too much*). Questions received function codes if they also met the definition of one of the styles. For example, *What do you want to play with?* described the child's state. However, test questions and *wh*-questions seeking labels did not receive an interpersonal-focused descriptive code because neither the parent nor the child was being described (Furrow, Nelson, & Benedict, 1979; Hoff-Ginsberg, 1986; Newport, Gleitman, & Gleitman, 1977).

Utterances were coded as other-focused descriptive when the parent described the actions, states, or attributes of a third person subject such as a toy or the observing RA (e.g., *Big Bird's on the airplane*). Other-focused descriptive utterances needed to include a subject and predicate, and the subject and any objects must have been present in the immediate environment. Labeling utterances as in *There's Roo* were included as descriptives because they described a locative state. Questions seeking labels or any "test question" (e.g., *What's this called? Where's the bear?* or *What's in there?*) did not receive a descriptive code because unlike intonation-only questions and other types of *wh*-questions, they did not provide a description of anything in the environment.

Utterances that neither directed nor described did not receive a function code. For example, nonreferential expressions (e.g., *That's right, That's why, There you go*) do not describe an action, attribute, or state. These utterances received no code because no concrete referent was described.

Form of parent questions. For each question, the first determination made was whether it was a grammatically reducible yes/no question. Grammatically reducible questions were defined as questions for which either the full or reduced form would be considered appropriate if it was used by an adult in conversation. Yes/no questions with auxiliaries DO/BE or copula BE were considered reducible because these questions are conversationally acceptable with and without the finiteness marker (e.g., *Are you hungry? You hungry?*). Yes/no questions formed by inverting a modal were not defined as reducible because the modal cannot be omitted without loss of meaning (e.g., *You try?*). *Wh*-questions, tag questions, and intonation-only questions with overt tense marking on the verb (e.g., *It fits?*) were not considered reducible. If the question was reducible, it was coded as full if the inverted auxiliary or copula was present and as reduced if it was omitted. In addition to the single utterance style code based on function, a question could receive a register code. For example, *You wanna play?* received a reduced code for its form and an interpersonal-focused descriptive style code because of its function.

Parent verb forms. Verb forms in all of the samples were previously coded for calculation of input informativeness following Legate and Yang's (2007) coding scheme for English verbs. All verb forms in the parents' child-directed, spontaneous, complete, and intelligible utterances were already coded as –Tense or +Tense (Hadley et al., 2011; see Appendix A).

Measures

The first set of variables reflected the parent interaction style. Each of the four styles was a separate variable because the types of styles cannot be added together, unlike verb forms that contribute to –Tense and +Tense can (e.g., all modals plus all imperatives, etc.). The total number of each function-based code was computed and was then divided by the total number of utterances in the 30-min sample. Thus, each parent's sample was characterized by a percentage of utterances that were direct directive, indirect directive, interpersonal-focused descriptive, and other-focused descriptive.

The second variable was register use. The total number of reducible questions was computed. Then, the percentage of reduced questions was determined by dividing the number of questions with an absent copula or auxiliary by all reducible questions.

The final set of variables was based on the prior coding for input informativeness in Hadley et al. (2011). Specifically, the current study used the frequency of each type of –Tense and +Tense verb forms. In addition, input informativeness, or the percentage of all +Tense verb forms out of all total verb forms, from Hadley et al., was used in the current analyses.

Reliability

Five minutes of all parent samples were retranscribed for determining independent transcription reliability. Acceptable agreement of parent verb form transcription through independent transcription was set at 80% (M = .85, SD = .16). Consensus procedures were used for three samples when reliability >80% was not achieved (Hadley et al., 2011).

To determine intercoder reliability for function codes, additional coders were trained to complete independent coding passes on all utterances produced by parents in three randomly selected samples. Codes assigned by the first author and independent coders were compared, resulting in Cohen's κ of .920, .957, and .963. These kappas exceeded .80, which is the level of agreement that is conventionally considered to be acceptable (Sprent & Smeeton, 2001). The accuracy of coding is likely to be higher than the kappas suggest because in the cases of disagreements, the first author, whose codes were used in the analysis, was correct 87% of the time.

For reliability of –Tense and +Tense verb forms, the first author performed independent reliability on three different randomly selected 30-min transcripts. The Cohen's κ for +Tense forms for each of the three samples was 1.000. The Cohen's κ for –Tense forms were 0.960, 0.878, and 0.960. These kappas exceeded .80. Additionally, all disagreements for –Tense verb forms occurred within the –Tense subcategories (e.g., –Tense ambiguous vs. –Tense bare). Thus, these errors did not affect the computation of input informativeness, which is the variable of primary interest (i.e., input informativeness = +Tense verb forms divided by all –Tense and +Tense verb forms).

Analyses

For each parent, frequencies were obtained for each of the four styles; for full, reduced, and total reducible questions; and for each verb form contributing to the +Tense and –Tense categories. Spearman rho correlations were run for the four styles with input informativeness and for register use with input informativeness, for a total of five correlational analyses.

Results

Variation in Conversational Interaction Style

The first question examined differences in parents' use of language to direct their children's behavior and attention and to describe objects and events in the play situation. We use the term *function* when reporting the frequencies of each of the utterance codes, and we refer to these variables as *interaction styles* when they are reported as a percentage of total utterances. Parent utterances receiving a function code were summed and divided by the total number of utterances to determine the proportion of input meeting these operational definitions. As seen in Table 1, function codes were applied to approximately half of the parents' utterances (R = 40%–68%). Parent utterances that were not captured by the function codes were primarily exclamations, single words, fragments (e.g., *Cool, Ok,* or *That bear*), and test questions (e.g., *What color is this?*).

Table 1 also shows the most frequently used utterance functions. Other-focused descriptives were used most (M = 60.87, SD = 30.43), followed by interpersonal-focused descriptives (M = 49.27, SD = 15.38), direct directives (M = 45.13, SD = 20.72), and indirect directives (M = 23.07, SD = 11.79). On average, other-focused and interpersonal-focused descriptives made up 18.32% and 15.11% of all parent utterances. These were followed by direct directives (M = 13.7%) and indirect directives (M = 6.82%).

To determine if any functions were used more as parents talked more, Spearman rho correlations were used to characterize the relationships between the frequency of each utterance function and the number of utterances. Correlations were considered moderate if r = .40 to .59, strong if r = 0.60 to 0.79, and very strong if r = 0.80 to 1.00 (Evans, 1996). The relationship between indirect directives and number of utterances was moderate (r_s = 0.546, p = .035), and the use of direct directives was unrelated to the number of utterances. The relationships between the frequencies of both interpersonal-focused descriptives and other-focused descriptives with number of utterances approached significance (r_s = 0.477, p = .073 and r_s = 0.504, p = .055, respectively). Thus, only indirect directives were significantly positively related to the total number of utterances that the parents produced.

Variation in Register of Questions

The second question asked how parents' utterances vary in register use as measured by the form of reducible questions asked. The mean number of reducible questions asked was 35.5 (R = 13–61). This number included only questions that remained grammatical after the tense-carrying morpheme was deleted. On average, nearly half of the reducible questions were reduced (M = 45%); however, there was an

Table 1. Frequencies of parents' function-based interaction styles.

Participant	Total utterances	Direct directives	Indirect directives	Interpersonal-focused descriptives	Other-focused descriptives	% utterances coded
F05	454	42	48	64	94	54.6
F08	224	7	8	27	70	50.0
F13	349	53	33	65	59	60.2
F16	316	50	12	51	33	46.2
F17	372	66	14	51	67	53.2
F18	403	65	14	44	39	40.2
F19	339	34	39	85	70	67.3
M01	263	48	16	29	20	43.0
M04	309	19	23	55	45	46.0
M06	285	73	22	58	31	64.6
M08	248	34	16	31	62	57.7
M11	273	62	14	40	38	56.4
M13	373	32	27	41	86	49.9
M16	287	19	21	53	58	52.6
M17	441	73	39	45	141	67.6
Minimum	224	7	8	27	20	40.2
Maximum	454	73	48	85	141	67.6
Mean	329.07	45.13	23.07	49.27	60.87	54.0
SD	69.32	20.72	11.79	15.38	30.43	9.0

enormous range for this aspect of register use (R = 15%–91%, see Table 2). Parents ranged from six to 42 uses of reduced questions, with all but one parent reducing ≤23 questions. One of the 15 parents, M01, was an outlier[3] for both frequency and proportion of reduced questions. This parent asked 42 reduced questions and four full questions, reducing 91.00% of the time. In contrast, the remaining 14 parents on average reduced 41.55% of the time, asking ~14 reduced questions and 21 full questions. There was no correlation between the number of reducible questions and the proportion of a parent's utterances that were questions, indicating that variability in reduction is present regardless of how likely a parent is to ask questions.

Variation in Uses of –Tense and +Tense Verb Forms

The third question addressed how much variability existed among parents in their use of –Tense and +Tense verb forms, total verb forms, and input informativeness (i.e., the proportion of positive, unambiguous evidence for tense marking), which was calculated by dividing +Tense verbs by all verbs (see Table 3). Parents' mean number of coded verb forms was 249.40 verbs. Their use of –Tense verb forms ranged from 56 to 202 (M = 121.87, SD = 35.631); their use of +Tense verb forms ranged from 57 to 210 (M =127.53, SD = 45.415). Mean input informativeness was 50.6% (SD = .105, R = 33.1%–69.8%).

Table 4 reports the breakdown of –Tense and +Tense verb forms by subcategory. Each form was considered as a proportion of the total number of verbs to determine if any form increased as parents used more verb forms. Of the four most frequent –Tense forms, modals and first/second person forms were positively correlated with the total number of verb forms (r = .631, p = .012 and r = .660, p = .007, respectively), whereas imperatives and ambiguous forms were unrelated to the total number of verb forms.

Of the +Tense forms, only the relationship between copula frequency and total number of verbs used was very strong, at r_s = 0.865 (p = .001). The more total verbs that parents produced, the more they used copula forms. The relationships between both auxiliary DO and auxiliary BE to total verb forms were moderately strong (r_s = .630, p = 0.012)

Table 2. Number of reducible questions asked by all parents.

Participant	Full questions[a]	Reduced questions[b]	Total reducible questions[c]	% reduced
F05	24	18	42	43
F08	22	6	28	21
F13	30	20	50	40
F16	19	23	42	55
F17	22	14	36	39
F18	11	18	29	62
F19	34	6	40	15
M01	4	42	46	91
M04	26	8	34	24
M06	11	15	26	58
M08	11	19	30	63
M11	7	6	13	46
M13	43	18	61	30
M16	24	15	39	38
M17	14	13	27	48
Minimum	4	6	13	15
Maximum	43	42	61	91
Mean	20.13	16.07	36.20	44.87
SD	10.71	9.03	11.59	19.39

[a]Full questions include questions with an auxiliary or copula present; [b]reduced questions include ambiguous, auxiliary, copula, and telegraphic reductions; [c]total reducible questions includes all full and reduced questions.

[3]The use of Spearman rho rank-ordered correlations protects against the effects of outliers in small samples, so this parent was included in the analyses.

Table 3. Frequencies of –Tense and +Tense verb forms.

Participant	–Tense verb forms	+Tense verb forms	Total coded verb forms	Input informativeness %
F05	160	210	370	56.8
F08	56	108	164	65.9
F13	140	134	274	48.9
F16	128	80	208	38.5
F17	127	141	268	52.6
F18	143	86	229	37.6
F19	134	169	303	55.8
M01	115	57	172	33.1
M04	75	173	248	69.8
M06	141	105	246	42.7
M08	88	112	200	56.0
M11	114	81	195	41.5
M13	104	154	258	59.7
M16	101	107	208	51.4
M17	202	196	398	49.2
Minimum	56	57	164	33.1
Maximum	202	210	398	69.8
Mean	121.87	127.53	249.40	50.6
SD	35.63	45.41	67.11	10.5

and moderate ($r_s = .535$, $p = 0.040$), respectively. However, no relationship existed between either total number of verbs and third person singular present tense use or total number of verbs and past tense. This indicates that of these five +Tense verb forms, third person singular and past tense did not increase as a parent produced more verbs.

Interaction Between Parent–Child Interaction Style and Typology

The fourth and most important question asked whether there was any relationship between the direct directives, indirect directives, interpersonal-focused descriptives, other-focused descriptives, or reduced register and input informativeness. The other-focused descriptive style was predicted to be positively related to input informativeness. The direct directive style and the reduced register were both predicted to be negatively related to input informativeness. The indirect directive style and the interpersonal-focused descriptive style were predicted to be unrelated to input informativeness. Because five correlations with input informativeness were planned (i.e., four styles and one register), the Bonferroni-corrected alpha level was set at .01. The relationships between the proportions of each style and

Table 4. Frequencies of –Tense and +Tense subcategories.

	–Tense								+Tense				
Participant	Imp	Modal	Amb	1st/2nd person present	Bare	Let's	Teleg	3rd person plural present	Copula	Auxiliary DO	Auxiliary BE	3rd person singular present	Past tense
F05	46	43	22	21	17	7	2	2	127	59	9	9	6
F08	7	26	11	8	3	0	0	1	37	30	15	18	8
F13	51	29	34	18	4	0	4	0	79	29	17	5	3
F16	48	26	23	15	9	0	6	1	38	22	9	2	6
F17	70	14	19	13	5	1	2	3	60	27	22	13	18
F18	60	19	34	6	15	1	8	0	48	12	12	4	10
F19	37	38	14	33	6	2	0	4	77	36	35	10	7
M01	44	9	44	14	2	1	1	0	39	13	3	2	0
M04	21	14	12	13	10	5	0	0	81	51	17	14	10
M06	70	19	27	13	7	1	2	1	48	24	16	9	7
M08	31	10	26	8	5	3	2	3	62	20	14	8	8
M11	61	7	10	8	14	6	3	5	42	12	16	5	6
M13	33	13	27	19	4	2	1	5	71	36	29	10	8
M16	20	26	19	21	10	2	1	2	48	30	13	8	8
M17	77	56	16	25	16	7	1	4	103	31	21	28	8
Minimum	7	7	10	6	2	0	0	0	37	12	3	2	0
Maximum	77	56	44	33	17	7	8	5	127	59	35	28	18
Mean	45.07	23.27	22.53	15.67	8.47	2.53	2.20	2.07	64.00	28.80	16.53	9.67	7.53
SD	20.44	13.86	9.70	7.35	5.01	2.50	2.27	1.83	26.08	13.31	7.95	6.74	3.85

Note. Imp = imperative, Amb = ambiguous, Teleg = telegraphic.

input informativeness were examined. As predicted, direct directives were strongly negatively related to input informativeness ($r_s = –.782$, $p = .001$), and other-focused descriptives were strongly positively related to input informativeness ($r_s = .721$, $p = .002$). Indirect directives and interpersonal-focused descriptives were unrelated to input informativeness ($r_s = .261$, $p = .348$ and $r_s = .050$, $p = .860$, respectively). A strong negative correlation was also observed for the percentage of reduced questions with input informativeness ($r_s = –.711$, $p = .003$).

Discussion

The current study revealed predictable patterns of overlap between parents' input informativeness and characteristics of their conversational styles and register use. Each style and register's overlap with typology can be viewed through the lens of VL by considering how each style or register was associated with rewarding or punishing the +Tense target grammar for English.

As predicted, the use of direct directives was negatively related to input informativeness because the majority of parents' attempts to direct their children's behavior or attention with a direct directive occurred with imperatives, which punish a +Tense grammar. This finding may explain why previous studies have found that a directive conversational style is associated with less optimal grammatical outcomes (Gleitman, Newport, & Gleitman, 1984; Newport et al., 1977). The direct directive style delivers more verb forms that are ambiguous for learning a +Tense grammar as a proportion of all verb forms. Therefore, a parent whose interaction style can be characterized as direct directive is using fewer other-utterance functions that may provide +Tense forms as a proportion of all utterances. Existing responsive intervention programs instruct parents on ways to follow the child's lead, with the rationale that reducing parents' tendencies toward a directive conversational style capitalizes on the child's existing attentional focus (Girolametto & Weitzman, 2006). Although this study does not provide any evidence that following a child's lead reduces the use of direct directives, it suggests that parents in the "director role" (Weitzman & Greenberg, 2002, p. 19) use proportionately more verb forms that reward a –Tense grammar.

The prediction that indirect directives would be unrelated to input informativeness was supported by the findings. This prediction was made because the style comprises many linguistic forms. As expected, there were many ways to be indirect, and the verb forms varied across –Tense and +Tense categories (e.g., *Can you try it?,* –Tense; *Do you want to try now?,* +Tense).

As predicted, interpersonal-focused descriptives were also unrelated to input informativeness. This is also because verb forms characteristic of this style rewarded both –Tense and +Tense grammars, and the form of the verb was highly dependent on whether the parent was describing a state (e.g., *You need more,* –Tense) or an action (*You're getting more toys,* +Tense). The interpersonal-focused descriptive style is similar to self-talk and parallel talk, which are recommended for and commonly used by SLPs (Girolametto & Weitzman, 2006). The lack of a relationship between interpersonal-focused descriptives and input informativeness indicates that self-talk and parallel talk may not be as well suited for modeling finiteness marking as they are for modeling vocabulary, basic sentence structure, or conversational turn taking.

The most important finding of this study was that the other-focused descriptive function was positively related to input informativeness. This was expected because English typology calls for overt tense marking on verbs agreeing with third person singular subjects. Recall that the third person singular cell in the English verb paradigm is the most likely to be overtly inflected regardless of whether a state or action verb is used (Rispoli et al., 2012). Only other-focused descriptives with third person plural subjects or with modal + verb combinations would be characterized as –Tense in Legate and Yang's (2007) framework. Interestingly, other-focused descriptive was the most commonly used function, but it was unrelated to the number of utterances produced. This indicates that talking more is not associated with proportionally more evidence for tense marking.

To increase the proportion of unambiguous evidence for tense marking in parent input, a qualitative change may be required. We propose that a shift in interaction style toward other-focused descriptives could lead to higher input informativeness given the strong positive correlation found in this study. By shifting the conversational focus toward the states, actions, and properties of the toys, people, and objects in the environment and away from a focus on the speaker/listener, sentences with third person subjects should increase and sentences with first and second person subjects are likely to decrease (Walsh, 2010). This type of discourse is common in book reading as descriptions of the characters and pictures in books provide many opportunities for adults to talk about third person referents. Thus, the other-focused descriptive style can also be thought of as bringing a more literate style of language use into adult–child conversational interactions during play.

Finally, the use of a reduced register when asking questions was negatively related to input informativeness. This was also expected because reduced questions result from the omission of tense-carrying copulas and auxiliaries that provide children with ambiguous information about the +Tense English grammar in contrast to full questions that provide children with unambiguous information (e.g., *You ready? vs. Are you ready?*). Reduction of questions was viewed differently than other uninformative input in this study: Reduction was operationalized as being optional and not needing to occur in any context, unlike some utterance functions that punish a +Tense grammar because of English typology (e.g., describing the child's state). Informally, we observed that parents who used third person subjects in their yes/no questions were less likely to drop auxiliaries. Notice that *He want more?* sounds less acceptable than *You want more?* In fact, in a follow-up study, Eichorst (2011) confirmed this observation in a new sample of 20 parents. Eichorst reported that parents only reduced 6% of inverted questions with third person subjects compared to 42% with second

person subjects. Therefore, an other-focused style may also promote the use of full questions with third person subjects that are more resistant to conversationally appropriate omission of copulas and auxiliaries. Thus, a discourse shift toward an other-focused style could increase input informativeness even more substantially for parents who also use a more informal register.

The results of this study shed light on contributors to input informativeness for tense marking. We have demonstrated that three characteristics of parent–child interaction (i.e., direct directive and other-focused descriptive styles and a reduced register) are related to input informativeness in a predictable way. Higher input informativeness can be achieved through using proportionally more other-focused descriptives and fewer direct directives and proportionately fewer yes/no questions with a reduced form.

Limitations

One major limitation of this study is that socioeconomic status and race/ethnicity for the participating families were not collected, limiting the generalizability of the findings. This information is significant for studies of language input because socioeconomic status and culture bear on language use in the home. Such information could explain some of the variation in how parents use interaction styles and registers when they talk to their toddlers. For example, Hart and Risley (1995) reported that directives needed in the course of caring for a toddler (e.g., *Put on your shoes*) occur across different types of families, but in families of lower socioeconomic status, less time is spent on other types of language in addition to these directives.

It is also important to point out that we examined the relationship between parent–child interaction and language input at a surface level. We considered only the "data" that were provided to the children, not the extent to which the parents and children were mutually engaged in the conversational interaction. It is likely that children can better take advantage of some individual learning trials or individual utterances. For example, Hoff (2006) explained that when parents use imperatives to direct their children's attention or behavior, they are changing the conversational focus, which breaks down joint attention. However, sometimes when parents use a directive, they are encouraging the continuation of an ongoing behavior (e.g., *Try again, Keep going*), which means that the conversational focus is shared (Flynn & Masur, 2007; Pine, 1992). Likewise, uptake of parent descriptives probably depends on whether the child is attending to what is being described. In the current study, we viewed conversation as the delivery mechanism of data, but it will also be necessary for future studies to consider the conversational context in which data are delivered (Hoff, 2006; Hoff & Naigles, 2002).

Future Directions

The operational definitions of the study's coding system should also be refined in future studies. In particular, other-focused discourse has many different purposes. Some parents with an other-focused descriptive style produced many utterances to label items in the room (e.g., *That's a boy*), whereas other parents used sentences more descriptively (e.g., *The boy is ready; The boy is going down the slide*). We suspect that input sentences consisting primarily of pronominal subjects with contracted copula forms (e.g., *it's, that's*) are less useful input than predication of lexical noun phrase (NP) subjects to the child learning English. This is because input sentences with pronominal subjects and contracted copulas camouflage constituent structure, whereas sentences with lexical NP subjects are more likely to reveal the constituent boundary between the subject NP and the copula/auxiliary form in the verb phrase (Thompson & Newport, 2007). To test this hypothesis, further refinement of the other-focused descriptive category is warranted.

We must also be cautious in extending the findings from studies of parent input to young typically developing toddlers to clinical work with special populations. Although we have demonstrated that proportionately greater use of other-focused descriptives is associated with greater input informativeness, we have not linked use of an other-focused descriptive style to children's grammatical development. Rather, this study was a preliminary, descriptive investigation that was designed to reveal how parent interaction styles are correlated with verb forms hypothesized to reward or punish a target grammar within the VL framework. In Fey and Finestack's (2009) five-phase model for conducting language intervention research, this study fits the description of a Phase 1 pretrial correlational study. According to Fey and Finestack, findings from such studies are needed before researchers can begin to form hypotheses about what language intervention strategies may be helpful in Phase 2 feasibility studies.

A Phase 2 feasibility and early efficacy study is currently underway to teach parents of typically developing toddlers to modify their input so as to increase their use of other-focused descriptive discourse. We refer to this strategy as *toy talk* in order to differentiate it from labeling and to contrast it with the more interpersonally oriented strategies of self-talk and parallel talk (Walsh, 2010). Only after we have determined whether we can accelerate the growth of grammar for typically developing toddlers by increasing parents' use of toy talk will we be in a position to test its efficacy with older children with language impairment. Given the links we have established between other-focused descriptives and richer grammatical input properties, increasing parents' use of toy talk may be a promising way to increase the "dosage" of +Tense evidence (Warren, Fey & Yoder, 2007). However, we cannot assume that older children with language impairment will respond to adult input that has been modified to be more other focused in the same way that younger typically developing children would.

Future studies in subsequent phases of the five-phase model can also test our hypothesis regarding the benefits of other-focused discourse with other clinical populations, such as young children with hearing loss. Moeller et al.'s (2010) study of young children with late identified hearing loss revealed late onset of finiteness marking, in general,

and late mastery of third person singular *–s,* in particular. In Norbury, Bishop, and Briscoe's (2001) sample of 5- to 10-year-old children with hearing loss, the youngest children struggled with the acquisition of third person singular *–s* and past tense *–ed*. Norbury et al. (2001) concluded that tense marking may be delayed because of a lack of auditory input before hearing aid fitting. The rarity of exposure to these morphemes experienced by children with hearing loss is akin to the input the toddlers in the current study heard, in which parents used *–s* and *–ed* <10 times each in 30 min. If children with hearing loss were engaged in conversation characterized by an other-focused descriptive style, they would be exposed to more uses of a grammatical form that children with hearing loss struggle to acquire. Given improvements in early identification of hearing loss, encouragement of early intervention that provides richer grammatical input could help prevent delays in learning low-frequency tense morphemes.

Conclusion

This study revealed overlap between parent–child interaction style and input informativeness for tense marking in English. Although input informativeness for tense has been linked to differences in the rate at which children acquire finiteness, we do not think it would be practical to teach adults about the language typology of English in order to increase their input informativeness. Therefore, the new information revealed about the overlap between both conversational style and register use with input informativeness may be a valuable indirect way to enhance the richness of the grammatical input that children receive. The overlap revealed in this study has guided us in developing clinical strategies to increase parents' input informativeness. Future work is needed to determine whether children's grammatical growth can be accelerated as parents learn to use more other-focused descriptions in their child-centered interactions.

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Appendix A

Coding Scheme for English Verb Forms (from Hadley et al., 2011)

	–Tense	+Tense
Past tense	No change irregulars (e.g., *hit, put*)	All the rest (e.g., *jumped, ate*)
Present tense	All the rest	Third person singular (e.g., *likes, has*)
Modals	All (e.g., *can, can't, should*)	
Copulas		All (e.g., *is, are, was*)
Auxiliaries		
BE	Ambiguous (e.g., __ *you coming*?; *where* __ *you going?*)	Overt (***are*** *you coming? You'**re** feeding the baby.*)
HAVE	Ambiguous (i.e., *I* __ *gotta go. I* __ *better go.*)	Overt (*He/'**has** gotta go. **Have** you finished?*)
DO	Ambiguous (e.g., __ *you want some*? __*you put it in there*?)	Overt (e.g., ***do*** *you want some*? ***do**n't touch that!*)
Bare stem	Ambiguous (e.g., *want more*?) Imperative/affirmative (***put*** *your shoes on*; ***let**'s put them on.*) Serial verbs (*go **get** your shoes.*) Bare infinitives (*let's **put** them on. You made me **put** them on.*) Single words used to refer to actions (e.g., ***wiggle, eat***) Telegraphic/ungrammatical (*baby **need** a nap.*)	

Appendix B

Definitions of Interaction Styles and Reducible Questions

Function-Based Interaction Styles

1. Direct Directive
   a. Parent attempts to direct the child's attention or behavior with the desired action explicitly stated. Direct directives are produced in the following forms:
      i. Imperative form that provides exact desired action (e.g., *Get the fork. Look.*).
      ii. Don't + imperative form that prohibits a specific action (e.g., *Don't put that in your mouth.*).
      iii. "You can't" statements that serve to terminate the child's action (e.g., *You can't go in there.*). To determine whether a "you can't" statement meets the operational definition of a directive, substitute "are not permitted to" for "can't." If the substitution is possible with no change in meaning, the utterance is a direct directive. If the "can" refers to ability, the utterance is not a direct directive (e.g., *You can't fit in that tiny chair.*).
2. Indirect Directive
   a. Parent indirectly attempts to guide the child's attention or behavior using suggestions or questions.
      i. Imperative form or suggestion that does not provide exact action (e.g., *Not in your mouth. Be careful.* These forms would be direct directives if the parent said, *Take it out of your mouth. Don't trip on toys.*).
      ii. Utterances with "can" are indirect if "can" is replaceable with "be permitted to" and combined with a first or second person subject (e.g., *Can you do it? Can mommy see the book?*).
      iii. Utterances providing desired action using a suggestion (e.g., *Can you get him to stay? Let's look in here. You could play with that ball.* These forms would be direct directives if the parent said, *Make him stay. Look in here. Play with that ball.*).
      iv. Questions used to suggest a behavior to the child rather than to request information (e.g., *Do you want to play over here?*).
3. Interpersonal-Focused Descriptive
   a. Parent describes own behavior or state or the child's behavior or state.
      i. A statement or question with a first or second person subject, including uses of Mommy/Daddy referring to the speaker and the child's name when referring to the child, in the main or an embedded clause (e.g., *I had too much. Mommy wants more*) and questions that include descriptions of a third person subject and a state or action (e.g., *Roo is hungry?*).
      ii. Questions that describe the parent or child's behavior or state (e.g., *What do you want to play with? You're using the spoon to cook?*).
   b. Excluded:
      i. Test questions (e.g., *How old are you?*).
      ii. Utterances beginning with mental state verbs because the function of the utterance is not to describe the mental state (e.g., *I wonder if Big Bird flies* and *You know what this is* are focused on third person referents rather than the parent or child's mental state.). When mental states are used, the embedded clause is coded.
      iii. Utterances with abstract referents or nonreferential expressions (e.g., *You're right, There you go.*).
4. Other-Focused Descriptive
   a. Parent describes actions, states, or attributes of other people or toys and objects in the environment.
      i. Statement or question includes a subject and predicate present in the immediate environment, including labels, which describe locative states (e.g., *There's Roo*.).
   b. Excluded:
      i. Questions seeking label or any test question (e.g., *What's this called, Where's the bear?*).
      ii. Utterances missing either a subject or predicate (e.g., *Looks like her sister*) or utterances in which the subject or predicate is nonreferential or not present (e.g., *It's all about timing, That's why.*).

Reducibility of Questions

1. Reducible questions are formed through subject auxiliary inversion.
   a. Full questions have the inverted auxiliary or copula present (e.g., *Are you finished? Do you want to play?*).
   b. Reduced questions are missing the inverted auxiliary or copula (e.g., *You finished? You wanna play?*).
2. Non-reducible questions are *wh*-questions, tag questions, and intonation only questions, and questions with inverted modals (e.g., *What do you see? Where they all going? It's ready now? It's hot, isn't it? It fits? Can you try?*).
3. Questions can receive up to a single register code and a single style code.