

(Are) you coming? Parent Question Types to their Children in the Earliest Stages of Grammatical

Development

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Senior Honors Thesis

Completed in partial fulfillment of the requirements for graduating with

James Scholar Honors in Speech and Hearing Science

from the College of Applied Health Science of the University of Illinois at Urbana-Champaign,

2011

### Abstract

In previous studies, parents' use of yes/no questions has been shown to facilitate children's grammatical development. However, parents' language input and its relationship to children's grammatical development is not well understood. By describing properties of parents' grammatical input, it may be possible to understand what type of data is most facilitative. Differences in parents' questions may be related to a tendency to use a more formal register (e.g., are you coming?) or a more casual, reduced style of speaking to their young children (e.g., you coming?) (Fitzgerald, 2010). Importantly, this reduced style is still grammatical, but may not be as beneficial for children's acquisition of grammar. The purpose of this study was to describe the different types of questions that parents ask their children at 21-months of age. Twenty parents and their children participated in free play interactions. Language samples were collected, transcribed, and coded using the Systematical Analysis of Language Transcripts software (SALT; Miller & Chapman, 2000). A question coding system was developed to identify all parent questions that contained a verb. Verb forms were also coded to describe if overt or ambiguous evidence for tense was provided in the questions (Legate & Yang, 2007). By using these two coding systems in combination, the grammatical properties of parent questions could be described. Results showed that 99% of the parent questions were grammatical. Of the grammatical questions, 27% of the questions were yes/no with subject-auxiliary inversion and 12% were yes/no with omissions. Differences in the rate of omission were examined as a function of grammatical subject type. The potential effect of parents' use of the more formal register and the reduced question style for children's grammatical development are discussed.

## Introduction

The study of language input and its relationship to child language development is an area that has and is currently being studied, but not completely understood. There are many differences in properties of caregivers' input to young children (Huttenlocher, Vasilyeva, Waterfall, Vevea, & Hedges, 2007). Studies have been relatively successful at describing the relationships between parent input and children's vocabulary development (Hoff & Naigles, 2002). In contrast, the relationships between parent input and children's grammatical development is less well understood. Although differences in parent input may help to explain the variation of children's rates of grammatical development, it has been challenging to identify precisely what grammatical properties of parent input should be measured. Differences in parents' grammatical input may be related to the unstated purpose of the interaction, such as eliciting a conversation or directing behavior (cf. Hoff, 2006). Other differences in parent input may be related to their tendency to use a more formal, fully-grammatical register or informal, casual register in their interactions with their young children (Fitzgerald, 2010). The variation in formal versus informal registers will be of primary interest to this study as it plays out in the type of language input parents use when talking with their young children. By describing different styles of input parents are providing to their children, it can be made more apparent just what type of data is being made available to children that may or may not facilitate grammatical development.

This literature review of the relationship between input and language development is divided into three sections. First, evidence for the relationship between input and language development will be reviewed (Hoff, 2006; Hoff & Naigles, 2002; Valian, 1999; Vasilyeva, Waterfall, & Huttenlocher, 2008). The second section will focus on the literature showing that parent questions may facilitate children's grammatical development (Furrow, Nelson, & Benedict, 1978; Gletman, Newport, & Gleitman 1984; Newport, Gleitman, & Gletman, 1977; Richards, 1990). In the third section, considerations for modifying input to accelerate grammatical development will be addressed (Fey & Loeb, 2002). Of

particular interest to the current study will be the characterization of parent input with regard to the relative proportion of questions in the parent input, and the form of those questions that may provide relevant data for children learning grammar.

### **Input Contributes to Language Development**

The relationship between parental input and child language development was described in the literature by Hoff and Naigles (2002). They examined the social pragmatic aspects of conversation and also the data provided in the input. The data providing features included total number of utterances produced, the total number of words, the number of word types, and mean length of utterance (MLU). The outcome variable was vocabulary development. The social contribution was not found to predict vocabulary development very well on its own. Rather, the social aspect was characterized as what provides the interactions that allow children to obtain the data in the input needed to learn vocabulary. The authors concluded that children use the data then, along with their own computational mechanisms to develop language.

In an earlier review, Valian (1999) presented a less optimistic view of the success of input studies in accounting for children's grammatical development. She noted that most input studies start with 2 year-olds with an MLU of 1.50 at Time 1. Time 2 is anywhere from 2 to 9 months later. Investigators measure a variety of characteristics of the child's and parent's speech at both times. Valian (1999) concluded that there are no features of parent's speech that can predict language development between Time 1 and Time 2, and that most studies' results happen by chance since correlations have not been significant or replicable across studies. Valian (1999) specifically noted that correlations between parental questions and children's development of auxiliaries have no legitimate explanation. The author concluded by stating that there is no evidence that any syntactic input variables affect child language measures directly. However, the author stated input has some effect on

language development because the learner is able to analyze the input, but it has not yet been discovered how to examine the interaction between the learner and input.

Vasilyeva et al. (2008) investigated the differences in syntactic development of children with diverse socioeconomic backgrounds. Participants included 45 children who were divided into three groups according to the educational level of the primary caregiver. Group 1 had caregivers with a high school diploma, Group 2 had parents with a four year college degree, and Group 3 had parents with postgraduate degrees. The children were sampled between 22 and 42 months and had 6 visits in which 90 min of child-caregiver interaction were recorded. A set of production measures was used to examine the variability in children's syntax and changes over time. Child utterances were coded as simple if they contained a single verb phrase and complex if they had more than one verb phrase. The proportion of children producing simple sentences did not differ across parent education groups. Also, the number of grammatically complete simple sentences did not vary among groups. Children producing complex sentences earlier, on the other hand, were mostly from the two higher educated groups. Children among the higher education groups not only produced complex sentences earlier, but also had a higher frequency and more diverse types of sentences. The number of grammatically complete complex sentences did not vary among educational groups. The authors concluded that although there was variation among frequency and diversity of sentences in the educational groups, as long as children received a certain amount of input, they will master obligatory elements of sentences and the other variations may or may not be advantageous for grammatical development.

Hoff (2006) further described the relationship between input and the acquisition of language in her review of the literature. There are differences in the environmental support that children receive, which help to explain differences in language development. Differences in parent language variability was said to be correlated with variability in child language development. For example, maternal responsiveness to their children's behaviors and expansions of children's utterances have been shown

to be a positive predictor of language development (Newport, Gleitman, & Gleitman, 1977). In addition, conversation eliciting questions have been shown to positively predict children's grammatical development (Hoff Ginsberg, 1985, 1986). Specifically, the age at which the child begins to use auxiliary verbs depends on the frequency of the mother's use of question forms which make the auxiliary salient for the child (Hoff-Ginsberg, 1998). Based on her review of the literature, Hoff (2006) concluded that the acquisition of human language depends on these communicative interactions where the input is provided, along with innate mental processes that the child brings to learn language.

### **The relationship between questions and language development**

The debate over properties of maternal speech that contribute to children's language development dates back 30 years (Valian, 1999). The effects of different maternal speech styles were studied by Newport et al. (1977). These authors proposed that learning language is a result of narrowly specified environmental features, along with dispositions that the child notices in the environment and is prepared to learn. This is also Hoff's description of language development (Hoff, 2006; Hoff & Naigles 2002). The child has some mechanism that supports language learning, and is biased to organize and also restrict incoming linguistic data. The aspects of the maternal syntax that fit into the child's listening biases are learned more readily. One hypothesis that was explored is that children are biased to pay attention to the beginning of utterances. When the auxiliary is more salient and stressed in inverted yes/no questions, the child is able to learn the auxiliary verbs more easily.

The purpose of Newport et al.'s study (1977) was to examine the effects of the mother's speech on their children's language development. There were 14 mothers with daughters who ranged in age from 12 to 27 months. The children's mean length utterance (MLU) ranged from 1.00 to 3.46. To control for the differences in the children's different levels of language development at the beginning of the study, they partialled out the children's age and language level statistically. The types of maternal questions that were investigated were yes/no and wh- questions and the frequency in which they were

used. The example of a yes/no question given was, "Can you sing a song?" which portrayed that modals were included in their yes/no variable. Results showed that the frequency of yes/no questions was shown to be positively correlated with auxiliary gains. The yes/no variable was referred to as the inverted auxiliary in the results. Overall, the study concluded that the child has language learning biases and processing strategies and that the input from the mother facilitates language learning. There were limitations with the data collection and coding procedures, especially lack of clarity of the yes/no variable. Also limited was the number of subjects in the study.

Furrow, Nelson and Benedict (1979) raised criticisms in response to the Newport et al. (1977) study. Their study began by stating that the role of the environment on language development has been controversial for some time. The purpose of their study was to examine correlations between mothers' speech and language development of same age children who were all at the one word stage when the first sample took place. Seven children and their mothers were included in the study. Language samples were taken at ages of 1;6 and 2;3. Six of the 7 children had an MLU of 1.00 at the time of the first sample. Correlation coefficients were used to analyze 100 utterances of the mothers at both times and 100 utterances of the children at Time 2. The mothers' data was analyzed for frequency of many semantic and syntactic categories. Child language measures included MLU, verbs per utterance, noun phrases per utterance, and auxiliaries per verb phrase. Results showed that the greater number of words, pronouns, contractions, or copulas per utterance used by the mother, the less advanced her child was, which differed from Newport et al.'s results (1977). Yes/no questions were associated with greater language development. The data on the development of the auxiliary is consistent with Newport et al.'s (1977) hypothesis that aspects of child's speech can be facilitated by supporting a child's processing biases, in this case being prone to listen the beginning of sentences. Those yes/no's that were not simple inversions were especially correlated with language development, and may have facilitated the discrimination between the two types, subject auxiliary inversions and

intonation yes/no's. Furrow et al. (1978) concluded that simple linguistic input facilitates language development in children and complex input hinders development, which contrasts with Newport et al. (1977). Furrow et al. (1978) criticized Newport et al.'s (1977) procedure by stating that the age range that the study was conducted over was too broad and therefore, specific factors of motherese that affect the learning of the language might have changed in this period. Furrow et al. (1978) stated that they found more effects of maternal simplification on child language development than Newport et al. (1977) because Newport et al. failed to examine effects within a narrow developmental range.

To address the criticisms of Furrow et al. (1978), Gleitman, Newport, and Gleitman (1984) reanalyzed their own data, dividing their original participants into subgroups with ages that were very close. The study now had two groups of six subjects. There was an 18 to 21 month group and 24 to 27 month group. They used partial correlations when analyzing the data. Yes/no questions and Wh-questions were studied. Results from this study also showed a significant relationship between yes/no questions and child language development. A correlation was found between the inverted yes/no questions and the children's auxiliary growth only in the 24 to 27 month group. The results of the study once again suggested that mothers who provided complex sentences such as auxiliary inverted yes/no questions, rather than only simple sentences, have children who learn grammar more quickly, especially auxiliaries. Limitations of the study included lack of clarification of their yes/no variable, which was referred to as the auxiliary inversions in the results. Through a personal communication with Newport, Richards (1990) confirmed that the yes/no variable included inversions, intonation only, and non-inverted yes/no questions, but excluded tags.

Another study that examined adult input and children's language development displayed different results for questions (Barnes, Gutfreund, Satterly, & Well, 1983). Barnes et al. used data collected in the Bristol longitudinal study of language development, which had 128 children whose measurements were taken every 3 months for 2 ½ years. The chosen sample had 16 boys and 16 girls.



They were matched for age and MLU at Time 1. The MLUs were close to 1.50, but ranged from 1.00 to 2.21. The average age was 2, but ranged from 18 to 24 months. The study investigated both subject auxiliary inversions and intonation only questions, but did not code the variables clearly. Questions were not significantly correlated with any of the child gain scores. Subject auxiliary inversions were correlated with general semantic and syntactic development, but not specifically the development of the auxiliary. Intonation only yes/no questions were the only type of questions correlated with auxiliary meanings. It is important to note that meanings are not the same as grammatical auxiliary forms. This finding is also contradictory to the Auxiliary Clarification Hypothesis. Since the auxiliary is not provided in the initial position in intonation only yes/no questions, it would not be expected to be correlated with gains in development.

In light of the replicated findings between adult use of inverted yes/no questions, and children's auxiliary gains, Richards (1990) formulated the Auxiliary Clarification Hypothesis, which states that when the auxiliary is stressed and salient in the beginning of the sentence, children are able to acquire the auxiliary verbs more readily. To test his hypothesis, Richards (1990) then conducted a reanalysis of the data collected by Barnes et al. (1983). The input for the 32 subjects was recoded. The questions were coded inverted yes/no's, non-inverted yes/no's (e.g. you don't want anything to eat?), and intonation only yes/no's which omitted the auxiliary or copula (e.g. you want to see the cat?). Also, tags were coded separately. Correlations between yes/no questions and auxiliary gains were computed using residual gain scores, or the difference between predicted scores at Time 2 and actual scores at Time 2. The new results revealed a relationship between the frequency of adult yes/no inversions and auxiliary gain scores. This replicated the previous findings of Newport et al. (1977) and Gleitman et al. (1984), which suggested that the salience of the auxiliary in inversions produced auxiliary gain scores. Richards (1990) proposed that one possible explanation for the original correlation between intonation only questions and auxiliary development could have resulted from the tags being counted in the inversion

category originally before they were recoded as a separate category. Tags are less salient than inversions, and could have skewed the results that were originally found.

The relationship between adult yes/no questions and child auxiliary development is one of the few replicable results in the input/grammatical development literature. Variational learning (Legate & Yang, 2007) is a new way to conceptualize the data providing features of input relevant to grammatical learning as a competition between parametric values in a language. One way to understand the positive influence of yes/no inversions is that they provide salient and abundant evidence for tense marking in English. On the other hand, most intonation only yes/no questions provide ambiguous evidence about tense marking in English. It seems possible that stylistic variation in parents' use of inverted yes/no questions versus intonation only yes/no questions may explain some of the variation in children's rate of development of language.

In a recent study Hadley, Rispoli, Fitzgerald, and Bahnsen (2011) examined the contribution of parent input to children's development of tense within the variational learning framework. The study had 7 girls and 8 boys with tense productivity scores of 0 at 21 months. Sessions of naturalistic play were recorded and transcribed at 21, 24, 27, and 30 months. One sample at each month was randomly selected to measure the child's morphosyntactic growth. The parent input was taken from the 21 month session that was not used to characterize the child's language. The utterances were coded as to whether or not they marked tense overtly using a plus and minus tense coding system. Following Legate and Yang (2007), input informativeness was operationalized as the proportion of unambiguous evidence for tense out of all verb forms. Parent input informativeness was the single best predictor of children's morphosyntactic growth from 21 to 30 months of age. Of relevance to the current study is the fact that input informativeness is most certainly influenced by the extent to which parents vary in their use of inverted yes/no questions which are unambiguous for tense marking versus their use of intonation only questions which are ambiguous for tense marking. Although both are 'grammatical,'

these two alternatives provide competing evidence for the young child learning the grammar of English, with inverted yes/no questions (e.g., are you coming?) rewarding a +Tense parameter value and most intonation only questions (e.g., you coming?) rewarding a –Tense parameter value.

### **Modification of Input to facilitate language development**

The relationship between adult language input and children’s grammatical development can also be established experimentally. That is, interventions can be designed to modify input in specific ways, and the effects of these input modifications on children’s language development can be evaluated. Some interventions may be implemented by clinicians and experimenters using a controlled number of sessions or presentations of language structures, whereas other may involve strategies taught to parents. In either case, the contribution of variation in the parents’ input to their language learning child may influence children’s rate of grammatical development and should be considered.

One study tested the Auxiliary Clarification Hypothesis in their exploration of the effect of modifying input in order to facilitate the development of auxiliary verbs for children developing typically and those with specific language impairment (SLI) (Fey & Loeb, 2002). Fey and Loeb investigated three questions. They wanted to examine whether the use of “is” and “will” in auxiliary fronted recasts would facilitate the acquisition of these forms among children not yet using them. They also explored whether children with SLI would benefit from inverted yes/no questions to the same extent as typically developing children. The last question they investigated was if the exposure of “is” and “will” in the auxiliary fronted position would facilitate the acquisition of other BE forms among both children with SLI and typical children. The study used 16 children with SLI who were 3 years old and 18 children with typical language skills (TL) who were 2 years old. The children had MLUs of 1.5 to 1.75 and were not yet producing any auxiliary forms at the beginning of the study. Each child was seen for 20 sessions over 8 weeks that were 30 min each. One group, called the enrichment group, received 15 inverted yes/no questions containing the targeted auxiliaries “is” and “will” in their sessions. The other group, called the

play group, was not provided with targeted forms in their 30 min play sessions. Probe sessions were conducted every 2 weeks where a research assistant (RA) attempted to evoke “is” and “will” use from the children.

Results showed that the “is” and “will” enrichment did not facilitate production of these auxiliaries. There was also no difference in the acquisition criteria for “is” and “will” between the TL and SLI groups. The use of yes/no questions with “is” and “will” also did not facilitate the development of auxiliary BE forms in the child’s language use. The TL group did show an advantage over the SLI group in the acquisition of non-targeted forms of BE though. The results were inconsistent with the Auxiliary Clarification Hypothesis that says inverted yes/no questions with the auxiliary in the fronted, salient position are facilitative to children’s acquisition of auxiliary verbs.

The authors concluded that the children in this study were not ready to benefit from the inverted yes/no questions provided in the data. Also, the study only lasted two months, which may have been a possible limitation. It was noted that after the 2 month period, most of the children, even those without the enrichment, produced at least one form of BE correctly. This showed that the children were reaching the developmental point to begin using auxiliaries 2 months after the study began. Another limitation is that the study did not consider the children’s prior abilities in earlier developing tense morphemes at the beginning of the study and did not address the fact that many tense markers develop before the auxiliary . Therefore, the auxiliary might not be expected to be appear before tense morphemes that typically appear earlier in the sequence of development (Rispoli, Hadley, & Holt, 2011). Fey and Loeb (2002) did not address the issue of whether inverted yes/no questions may facilitate the development and use of auxiliaries after their initial acquisition. In addition, the authors did not explore the normal input being provided to the children in their home environment, and the proportion of that input that did or did not include grammatical data providing features. Overall,

modifying the input to facilitate language development in both delayed and typically developing children was not successful in this study.

Of relevance to the current study are not only the data providing features of auxiliaries in questions, but also the competing evidence for intonation only questions in the input. Although grammatical in English, only the instances of inverted copula and auxiliaries BE, DO, and HAVE provide overt evidence for tense in the Legate and Yang (2007) framework. Within their variational learning framework, it is also important to note that inverted questions with modals would not contribute overt evidence for the acquisition of tense marking, even though they show similar syntactic properties with copula and auxiliaries BE, DO, and HAVE.

The use of intonation only versus inverted questions is also relevant to the debate about how to provide input to children in the earliest stages of language learning (van Kleeck, Schwarz, Fey, Kaiser, Miller, & Weitzman, 2010). In the intervention literature, there is debate regarding how to facilitate children's early language development. The debate is focused on whether input should highlight specific semantic and/or grammatical relations (e.g. agent + action, subject + verb), a relatively short-term objective, while remaining mindful about the implications of these modifications on the long term objective of well-formed grammatical sentences. Some adult utterances that highlight simple semantic/grammatical relations are said to be telegraphic input when adults remove obligatory grammatical markers and bound morphemes to the point of being ungrammatical (van Kleeck et al., 2010). For example, "mommy feeding baby" or "baby drinking" would be considered telegraphic input. Telegraphic input is argued by some to be useful for helping children map two-word combinations, which would be a short term objective rather than one which is concerned with the subsequent development of tense morphemes. Input can also be presented grammatically, either in a full or simplified form to children. Grammatical input would be beneficial for helping the child acquire long term morphosyntactic structures. It is possible to simplify input and highlight basic

semantic/grammatical relations while still providing grammatical input. For example, the question “You want some?” is simplified, but it is still a grammatical utterance.

Ann Kaiser, a professor at Vanderbilt University, has the opinion that telegraphic input should be used for the short term purpose of mapping early semantic relationships (van Kleeck et al., 2010). Therefore, her view is not concerned with providing features that facilitate the acquirement of the long term grammar. She believes that the reduction in complexity allows appropriate simplified input for children in the early stages of language learning for language impaired children. She recommended using telegraphic input in interactions to teach vocabulary and two word semantic relationships, and allowing the child’s progress to guide the use of telegraphic input, balancing adult input so that the overall MLU is within the child’s range. She also noted that telegraphic input may not be necessary or only useful for a short period of time for typically developing children.

Marc Fey, a professor at the University of Kansas Medical Center, argued against the use of telegraphic input (van Kleeck et al., 2010). He explained that telegraphic input rids the utterances of syntactic and morphological detail that children have difficulties acquiring. These are problematic features to learn for children with language impairments. Therefore, fully grammatical input should be provided in order for the children to have opportunities to acquire important morphosyntactic structures. This view would support the long term goal of learning the complete grammar. Fey also noted that the optional use of morphosyntactic features in telegraphic input, such as omitting the obligatory third person singular in the utterance “mommy make pizza” make them more difficult for the child to learn. This fits into the variational learning framework, which views the presentation of overt and ambiguous evidence for tense as a competition for the child to acquire the tense. A child being provided with both overt and ambiguous evidence may take longer to learn the target grammar. His last point was that children use syntactic cues to process and learn grammatical constructions well before they produce them and therefore need to have them provided in order to acquire them. He

recommended using grammatically and prosodically complete utterances that follow the child's attention. Utterances that are lexically simple, but grammatically well formed, should be characteristic of input provided to typically developing children.

Parents often use simplified, reduced input when asking their children questions. Parents may differ in their style of interaction with their children by either using a more formal register or a more casual reduced style of speaking (Fitzgerald, 2010). This may be related to whether parents ask more full inverted questions (e.g., are you coming?) or reduced question types (e.g. you coming?) that omit the auxiliary or copula. Fitzgerald (2010) found that on average, 45% of parent questions that could have been reduced by omitting the auxiliary or copula were reduced. It is important to note that these reduced forms are grammatical and a common part of interaction between parents and children, but they do not provide the auxiliary or copula in the inverted position, which has been shown to facilitate children's development of auxiliaries. These forms are also ambiguous for tense according to the variational learning framework (Legate & Yang, 2007; Hadley et al., 2011).

One resolution to the desire to simplify input without rendering it ungrammatical is to use simplified, but well-formed grammatical input. Reduced intonation only questions would be one such type of simplified, but grammatical input. Yet, the optional use of copulas and auxiliaries in these two alternative forms of the same question may lengthen the time it takes to acquire tense marking. The purpose of this study is to describe the types of questions parent use in their conversations with their young children in the earliest stages of grammatical development. Of particular interest will be their relative use of three types of questions: (a) telegraphic questions, (b) reduced but grammatical intonation only questions, or (c) questions with overt use of copulas and auxiliaries. The research questions are:

1. What is the percentage of parent questions that are grammatical?

2. What percentage of grammatical parent questions are inverted yes/no questions (overt form), or reduced intonation only yes/no questions (ambiguous for tense).
3. Does the proportion of reduced questions (ambiguous for tense) vary as a function of the person/number of the grammatical subjects?

#### Method

##### *Database*

Data for the current study were obtained from an existing longitudinal database (Rispoli & Hadley, 2008). The overarching purpose of the longitudinal study is to document the growth of tense and agreement between 21 and 36 months of age and the contribution of parent input to that growth. To date, a total 58 families have contributed to the database.

Participants were recruited from 16 to 20 month olds living in Champaign County, Illinois. Information about the study was made available to parents by the newspaper, flyers given to daycares, community facilities, and campus listservs. Interested parents contacted the lab by phone or email and were given a brief phone interview in order to establish that the child was developing typically. Families were invited to participate if the child was developing typically, was learning English as the first and only language, and was 21 months of age or younger at the time of the phone interview. Families were not invited to participate in the study if the parents reported that: (a) the child had neurological or sensory impairments, (b) repeated bouts of otitis media resulting in the insertion of pressure equalization tubes, (c) delayed onset of walking or talking (after 15 months) as reported by the parents, (d) or exposure to language other than English in the home. Also, families were not invited to participate if the child was using non-standard dialects of English or other languages in the home. For their participation, families received \$25 per measurement point, a total of \$140 from the 21 to 36 month period of the child. Children also received birthday gifts on their 2<sup>nd</sup> and 3<sup>rd</sup> birthdays.



Information was gathered regarding the children's general developmental abilities at 21 and 24 months of age using the *Ages and Stages Questionnaire* (ASQ; Bricker & Squires, 1999). Of the 58 potential toddler participants, 30 passed the screening in all developmental domains at 21 months and 24 months of age (i.e., communication, gross motor, fine motor, personal-social, and problem-solving). Information on the children's expressive vocabulary was also available from the *MacArthur Communicative Development Inventories* (Fenson et al., 2003). The majority of children fell between the 15<sup>th</sup> and 85<sup>th</sup> percentiles, with 2 children falling below the 15<sup>th</sup> percentile, 15 in the low average range, 15 in the high average range, and 3 above the 85<sup>th</sup> percentile.

For the current study, the spontaneous language samples from the 21-month measurement point were used. Audio and video recordings from two 30-min language samples were available in the database. The data was collected in a lab that was designed as a play room filled with age appropriate toys for the children. The parents and their children were told to interact like they would at home while playing. Children were asked to wear a vest that held a wireless microphone, although some children refused. The first half hour of the session allowed for the parent and child to play together. During the second half hour, an examiner came in and guided the conversation with the child in order to create more opportunities for uses of the tense and agreement morphemes of interest to the primary study.

### *Participants*

The participants for the current study included parents of 21 month old children who were from the existing longitudinal database. Twenty parents of 21 month old children were selected with a random number generator as participants from the larger database. Parents were selected based on children's developmental levels. For parents to be selected, children were required to (a) pass the ASQ developmental screening in all domains at 21 months, (b) have expressive vocabulary scores within the narrow range of average (10<sup>th</sup> to 90<sup>th</sup>), and (c) demonstrate an MLU in words of 2.00 or less. Thus, all

children were in the earliest period of grammatical development (i.e. Brown's Stage I). The criteria for the selection of children were set in place in order to ensure that they were typically developing.

The parents of the twenty children were all mothers who ranged in age from 23 to 49. The mean age was approximately 30 years ( $M = 30.65$ ;  $SD = 5.67$ ). Nineteen of the mothers were white and 1 was African American. Most of the mothers ( $n = 13$ ) had a bachelor's degree, 5 had an advanced degree, 1 had an associate's degree, and 1 completed high school. None of the mothers had a history of any speech, language, or learning disability.

### *Procedure*

Each 21 month language sample was transcribed completely by using the conventions for the Systematic Analysis of Language Transcripts (SALT; Miller & Chapman, 2000). Trained transcribers completed initial transcription in two passes. One transcriber focused on child utterances, while another transcriber completed adult utterances. Occasionally, the same transcriber completed transcription for both the child and adult in two separate passes. Transcribers also watched DVDs of the session to add descriptions of the play for the 21 month old samples. A final consensus pass was completed by a third transcriber. If there were discrepancies between what the original transcriber and the transcriber completing consensus heard, the transcriber completing the consensus pass was able to change an open class word with video confirmation if it did not affect tense and agreement marking of the utterance. The transcriber who completed consensus was not allowed to change a tense morpheme or the punctuation at the end of an utterance without having the original transcriber or a third listener confirm the utterance. For this study, the 30 min parent-child dyads of the sessions were considered. Only complete and intelligible parent questions were considered for the current study.

### *Question Coding*

All complete and intelligible mother questions were coded in the transcripts. A code list consisting of five codes was created using SALT (Miller & Chapman, 2000). A code was given to each complete and intelligible question that contained a copula or lexical verb. This excluded clarification questions such as “The dog?” or “No?” as well as -wh questions that did not have a verb (e.g., what about that?). Questions were coded as subject auxiliary inversion [SAI], WH [WH], intonation only [IO], verb only [VO], and tag questions [TAG] (See Appendix A). The SAI code was given to questions in which an auxiliary or copula was inverted at the beginning of the sentence such as the question “Are you coming?” An example of a question coded as WH would be “Where are the plates?” An example of a question coded as IO would be “You coming?” where there is no subject auxiliary inversion in the question. The VO code was used for questions such as “Want to eat?” where the subject was also omitted. TAG codes were assigned when the main proposition was a statement and the tag question had auxiliary or copula inversion such as “That’s a tractor too, isn’t it?” If the main proposition in a tag question was a WH question rather than a statement and the tag was “huh” or “right”, the question received a [WH] code. An example would be “Where are the blocks, huh?” Tag questions with the proposition as a statement and “right?” or “ok?” as the tag were not coded.

To gain information about tense marking in the questions, verb forms were also coded according to categories identified by Hadley et al. (2011) to describe if overt or ambiguous evidence for tense was provided (see Appendix B). All questions that marked tense were given a +Tense code. These included auxiliary BE, DO, HAVE, 3s, -ed, and copula. All questions that did not mark tense overtly were given a –Tense code. These included questions with modals or those that were telegraphic or ambiguous for tense. When the omitted form seemed to be a modal, the question was given a telegraphic code. An example would be “Mommy help?” where the omission was probably the modal “can.”

To check the question and informativeness codes, we used the explore function of SALT (Miller & Chapman, 2000) to extract the utterances that were given question and informativeness codes. All utterances that should have been coded were checked to ensure they had received a code. Incorrect codes due to human error were corrected during this checking procedure. By pulling the question and informativeness codes out in combination, we reviewed the list of combined codes in the questions to ensure that they were accurately counted in the proper informativeness category. If the codes did not reflect the proper combination due to embedded clauses within the questions, we adjusted the number in the proper question and informativeness categories.

### *Measures*

For the current study, we were specifically interested in the frequency and percentage of different question types that parents asked. We extracted the coded utterances from the transcripts using the explore function on SALT (Miller & Chapman, 2000). By using the explore function, every question that was coded was pulled out of the transcript according to its question and informativeness codes. The total numbers of questions and the percentage of grammatical questions that parents asked were calculated. For this study, we focused on the yes/no SAI questions (overt), the reduced IO questions (ambiguous), and reduced VO questions (ambiguous) in order to determine the percentage of full and reduced question forms. We calculated the percentages of the full SAI questions that marked tense, as well as the reduced intonation only questions where the auxiliary or copula was dropped. We also found the number of reduced verb only (VO) questions, where the auxiliary or copula as well as the subject were dropped. Out of the questions that were able to be reduced (a combination of the SAI, IO, and VO questions), we were interested in the percentage that actually was reduced. To see how the percentage of reduced forms varied as a function of person and number of grammatical subject, we also examined the person/number of the subjects in the questions that were reduced forms. We examined the SAI and IO questions, which had an opportunity for auxiliary or copula reduction, to examine this

question. We calculated percentages of reduced questions with second and third person singular subjects, since they mainly provided opportunity for reduction. This allowed us to determine when parents were more likely to use reduced question forms depending upon the subject type in the question.

### *Reliability*

The consensus pass on the original transcripts were considered the reliability for this study. Independent reliability coding was conducted by a second researcher for question codes, informativeness codes, and the person/number of grammatical subjects for two randomly selected transcripts. The Cohen's kappas were .99 and .94, .93 and 1.00, and .90 and .86 respectively. These kappas exceeded .80, the levels of agreement conventionally considered to be acceptable (Sprent & Smeeton, 2001). Disagreement on coding resulted from omitted codes due to human error.

### Results

Recall that the purpose of this study was to describe the different types of questions that parents asked their children at 21-months of age. Of particular interest was the extent to which parents simplified the grammatical form of the questions produced during conversational interactions with their toddlers, producing either ungrammatical telegraphic input or producing reducing the grammatical form of their questions in ways that are acceptable in conversational interaction. General characteristics of the parent input are described first, followed by analyses designed to address the specific research question.

Table 1 provides descriptive information about the parent utterances. In the 30-min samples an average of 480 (SD = 128) spontaneous, complete and intelligible parent utterances were produced, with a range from 233 to 734. Parents used an average of 291 different words (SD = 52) with a range from 205 to 380. The parents had an average MLU of 4.09 (SD = .50), ranging from 3.00 to 4.97.

The first research question examined what percentage of parent questions was grammatical (see Table 2). To address this question, the total number of questions asked was determined. The range of total questions asked in the 30-min samples was 79 to 282. Parents asked an average of 157 (SD = 53) questions throughout the samples. This corresponds to an average of five questions per minute. The total number of grammatical questions that were asked included SAI, wh-, intonation only, verb only, and tag questions. Telegraphic questions were characterized as ungrammatical input. Parents asked an average of 1 (SD = 2) telegraphic question per 30-min sample. All other question types were characterized as grammatical input. The number of total grammatical questions ranged from 79 to 280 in the 30-min samples (M = 156; SD = 53). On average, parents asked 64 (SD = 30) SAI questions, 51 (SD = 22), wh- questions, 28 (SD = 13) intonation only questions, 13 (SD = 8) verb only questions, and 2 (SD = 2) tag questions in the 30-min samples (see Figure 1). To answer our first research question, we found an average of 99% (SD = 1%) of parent questions to be grammatical.

The second research question examined the percentages of the grammatical parent questions that were inverted yes/no questions reflecting the full grammatical form (e.g., *are you coming?*) and intonation only questions produced with a reduced grammatical form (e.g., *you coming?*). Intonation only questions that could not be “reduced” were not included in this analysis (e.g., *he likes that?*) Recall that the full yes/no questions provided overt tense makers, where the reduced forms provided ambiguous evidence for tense. Table 3 provides the individual data for full and reduced question forms by participant. Out of the grammatical questions that parents asked, an average of 27% (SD = 11%) were full, inverted SAI forms (see Figure 2). The average number of inverted yes/no SAIs asked by parents ranged from 11 to 99 in the 30-min sample. Out of the grammatical questions, an average of 12% (SD = 5%) were reduced IO questions where the auxiliary or copula were omitted. These were ambiguous for tense. The average number of reduced IO questions asked by parents ranged from 7 to 37 in the 30-min samples. The questions with a possibility for reduction of the auxiliary or copula

included the inverted yes/no SAIs and IO questions. Out of these reducible questions, an average of 32% (SD = 17%) were reduced (see Figure 3). In addition, an average of 8 (SD = 5%) of questions (VO's) reduced both the auxiliary and subject (e.g. want more?). If these question types were also included in the percentage reduced out of all reducible questions, parents reduced an average of 42% (SD = 20%) of the grammatical questions.

The final research question addressed how the proportion of questions that were reduced (IO) forms varied as a function of the person/number of the grammatical subjects. The questions included in this analysis included only the SAI questions and intonation only questions, where the auxiliary or copula could have been omitted because an explicit grammatical subject was required for this analysis. Table 4 provides information regarding subject types and the percentage of reduced questions out of the reducible SAI and IO questions. Parents asked an average of 0.6 (SD = 1.2) questions with a first person subject "I" that had an opportunity to be reduced by dropping the auxiliary or copula. The average number of reducible questions with a second person singular subject "you" was 39.8 (SD = 18.1). There was an average of 18.7 (SD = 9.8) reducible questions with a third person singular subject. There was an average of 1.3 (SD = 1.3) reducible questions with a first person plural subject. Lastly, there was an average of 1.4 (SD = 1.9) questions with a third person plural subject that were able to be reduced by dropping the auxiliary or copula. From this data, it was clear that the greatest opportunity to produce a reduced question form came with using a second person singular or third person singular subject, whereas questions with the other types of grammatical subjects were rare. Therefore, further analyses for these grammatical subject types were not completed. Out of the reducible questions with a second person singular subject, an average of 47% (SD = 23%) were reduced. In contrast, only 6% (SD=9%) of the reducible questions with third person singular subjects were reduced (See Figure 4). Clearly, reduction of the auxiliary or copula clearly was more common with the use of a second person singular subject.

## Discussion

The purpose of this study was to describe questions that parents ask their children at 21-months of age. We explored three research questions. The first research question identified the percentage of parent questions that were grammatical. The second research question identified the percentages of full and reduced SAI question forms that were produced by parents. The last research question determined whether reduce SAI questions varied as a function of person/number of grammatical subjects. Based on the findings of Fitzgerald (2010), we expected parents to reduce a relatively high percentage of their questions, and based on our own grammatical intuitions, we expected reduction to occur more frequently with the elsewhere forms of copula/auxiliary BE and auxiliary DO (i.e., are, do; Rispoli et al., 2011) than for the forms marked distinctively for third person singular (i.e., is, does).

We found that almost all parent questions are grammatical ( $M = 99\%$ ;  $SD = 1\%$ ). Our study demonstrated empirically that parents typically are overwhelmingly providing grammatical input to their children. Fey (van Kleeck et al., 2010) argued against the use of telegraphic input explaining that it rids the input of morphosyntactic properties that are especially difficult for children with language impairments to learn. As the results of our first research question show, parents almost always are asking grammatical, not telegraphic, questions. Any impressions that parents are providing telegraphic input to young children were not supported by this study. It is possible that parents do not use telegraphic input unless instructed to do so, but we would not endorse the use of telegraphic input. It would not seem beneficial to teach parents to use telegraphic input with their children when it does not contain morphosyntactic features that are necessary for the long term goal of acquiring a complete grammar, as Fey stated (van Kleeck et al., 2010). Grammatical input, especially input marked unambiguously for tense would also be more informative than telegraphic input, and we would expect more informative input to facilitate children's acquisition of grammar (Hadley et al., 2011).



In previous studies, the use of yes/no questions with subject auxiliary inversion has been shown to facilitate children's grammatical development (cf. Richards, 1990; Newport et al., 1977; Gleitman et al., 1984). Inverted yes/no questions were correlated with children's auxiliary gains in these studies. Richards (1990) attributed these gains to the auxiliary's initial position. In this position, the auxiliary is stressed and salient, and therefore, children are able to learn it more readily. The results of our second research question showed that out of the reducible SAI, IO, and VO questions, an average of 58% were inverted and an average of 42% of grammatical questions were reduced. This demonstrates that parents are not always providing the auxiliary or copula in the inverted position, the critical ingredient of input which has been linked to children's gains in use of auxiliaries. The use of the full SAI questions in parent input may promote the use of tense marking and be facilitative for children's grammatical development, whereas the reduced questions, where the auxiliary or copula is omitted, may actually slow the child's development of tense marking. These reduced question forms are often a common part of conversation between parents and their children. It is important to recognize that although these reduced questions forms are still grammatical, they omit tense markers and may not be as beneficial for children acquiring grammar (Hadley et al., 2011).

Using the variational learning framework to characterize questions forms (Hadley et al., 2011, Legate & Yang, 2007), we also characterized full SAI forms as overtly marking tense and reduced IO and VO questions as ambiguously marking tense. In exploring the third research question, we characterized how the data providing features in questions varied as a function of person/number of grammatical subjects. We found that questions with the subject "you" were reduced (ambiguous for tense) an average of 47% of the time. In contrast, questions with a third person singular subject were only reduced an average of 6% of the time. It is also important to point out that second person questions were the most frequent grammatical subject type of SAI/IO questions with more than twice as many questions as for third person questions. All other grammatical subject types were rare in parent

questions. Therefore, when parents are asking questions, they typically use “you” subjects, and provide ambiguous evidence for tense in these questions about half the time. These reduced forms may not be beneficial for children’s acquisition of tense since they are providing inconsistent evidence of the tense marking system (Hadley et al., 2011). Although questions with third person subjects are less frequent, when parents ask these types of questions, tense is marked unambiguously in nearly all instances. As such, parents who tend to talk more about third person referents may provide potentially more beneficial input for learning the obligatory marking of tense in English as previously discussed.

### *Implications*

Since parents may be underutilizing the potential for full SAI forms to promote their children’s grammatical development, two strategies can be used to promote the use of SAI questions that may in turn promote children’s grammatical development . One possible strategy would be to specifically instruct parents to use more full questions rather than reduced questions. By teaching parents what full (SAI) and reduced question forms (IO or VO) are, they could become educated about these different question types. They also could be made aware of potential benefits of asking their children full questions. As a result, parents may make a more conscious effort to ask more full SAI questions when speaking to their children in the earliest stages of grammatical development.

A second strategy could be used to promote the use of more talk about third person referents. A recent study defined a strategy called “toy talk,” which is a language facilitation technique designed to increase the use of third person subjects and decrease the use of second person subjects in adult language input (Walsh, 2010). Increasing the use of third person subjects by talking about the toys may increase grammatical structures in the input that would promote grammatical development of children. Walsh demonstrated that teaching parents to use more third person subjects also resulted in a decrease in the use of utterances with second person subjects. Although questions were not examined separately, this shift in use of subjects also may apply to the grammatical subjects used in questions.

With the use of “toy talk” that is designed to increase the use third person grammatical subjects, parents may be more inclined to use third person subjects when asking questions, where they are more likely to ask full SAI questions. Using more full SAI questions with third person subjects may provide more informative input for their children’s acquisition of grammar. This may also decrease the amount of reduced questions parents ask with the subject “you”, which provide inconsistent evidence of tense marking in English. Using this strategy of talking about the toys may make it easier for parents to ask full questions with third person subjects, without having to consciously think about which question types they are using.

In conclusion, this study has characterized question types that parents ask their children in the earliest stages of grammatical development. Parents differ in their use of full and reduced question forms that they ask their children. Instructing parents on the potential benefits of asking full SAI questions may be a simple way for them to provide more informative input. The use of full questions may promote tense marking and be facilitative for children’s grammatical development.

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### **Acknowledgments**

I would like to give special thanks to Dr. Hadley for sharing her knowledge of research with me  
and for the support and encouragement she provided throughout this project. I would also like to thank  
all of the members of Applied Psycholinguistics Lab who contributed to this project. Also, I want to  
thank my family who has provided me with love and support throughout my education here at the  
University of Illinois. Data collection and transcription was supported by BCS-0822513 from the National  
Science Foundation to Rispoli & Hadley.

*Appendix A*

Question Code	+ Tense	-Tense
SAI: subject auxiliary inversion	Inverted auxiliary or copula: “Are you coming?” “Is he ready?”	Modal: “Can you bring the doll here?”
WH: -wh question	“Where is the baby?”	telegraphic: “Where the baby”?
IO: intonation only question-questions that begin with the subject that may or may not mark tense	“You’re going for a walk?”	-T ambiguous: “You coming?” -T copula: “You ready?”
VO: verb only question-questions that begin with the verb	“Tastes good?”	Subject and auxiliary omitted: “Want more?”
TAG: tag question: The main proposition is a statement and the tag has SAI. Tags such as “right” or “huh” were excluded.	“He is sleepy, isn’t he?”	
No code- questions used for clarification without a verb were not coded		“no”? “the pizza?”

*Note.* Questions were only coded if they contained a copula or lexical verb (auxiliary in instance of tag).

Appendix B

Coding Scheme for English Verb Forms Adapted Legate and Yang (2007)

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

From "Predictors of Morphosyntactic Growth in Typically Developing Toddlers: Contributions of Parent Input and Child Sex," by P. A. Hadley, M. Rispoli, C. Fitzgerald, & A. Bahnsen, 2011, *Journal of Speech, Language, and Hearing Research*, 54, p. 554.



Table 1

*Parent Utterances*

Participant	Average Number of Utterances	Average MLU	Average Number of Different Words
GTP01G	385	4.44	296
GTP03G	470	4.97	380
GTP05G	304	4.38	247
GTP06B	364	4.49	247
GTP09G	400	4.44	288
GTP10G	233	4.06	205
GTP12G	485	4.46	373
GTP20G	483	3.72	254
GTP22B	444	4.06	239
GTP30B	513	4.73	370
GTP33B	666	3.64	296
GTP36B	433	3.69	232
GTP38G	734	4.16	347
GTP40B	707	3	259
GTP42B	494	3.88	273
GTP43B	556	4.11	341
GTP46G	344	4.24	298
GTP50B	544	3.57	338
GTP51G	560	4.5	295
GTP56B	485	3.26	245
Mean	480.2	4.09	291.15
SD	127.99	0.5	51.89

Table 2

*Percentage Grammatical Questions*

Participant	Grammatical Questions					Total	Telegraphic Questions				TotQ	Gram%
	SAI	WH	IO	VO	TAG		WH	IO	VO	Total		
GTP01G	40	54	31	14	1	136	3	0	1	4	140	0.97
GTP03G	85	44	42	21	2	194	0	0	0	0	194	1.00
GTP05G	25	21	19	12	2	79	0	0	0	0	79	1.00
GTP06B	85	67	14	1	2	169	0	0	0	0	169	1.00
GTP09G	98	19	11	9	3	140	0	0	0	0	140	1.00
GTP10G	43	40	8	7	2	100	0	0	0	0	100	1.00
GTP12G	42	46	13	0	2	103	0	0	0	0	103	1.00
GTP20G	80	100	34	5	0	218	0	1	0	1	219	1.00
GTP22B	77	71	20	8	8	184	0	0	0	0	184	1.00
GTP30B	80	64	26	3	8	179	2	0	0	2	181	0.99
GTP33B	38	84	29	33	4	185	0	1	1	2	187	0.99
GTP36B	49	39	21	19	0	127	0	1	0	1	128	0.99
GTP38G	106	71	47	15	1	239	0	1	0	1	240	1.00
GTP40B	76	61	37	21	2	187	2	6	2	10	197	0.95
GTP42B	47	38	29	9	4	127	0	0	0	0	127	1.00
GTP43B	30	37	17	12	0	96	0	0	0	0	96	1.00
GTP46G	62	20	29	15	3	129	0	0	0	0	129	1.00
GTP50B	58	35	31	12	0	135	0	1	0	1	136	0.99
GTP51G	134	73	60	13	2	280	0	2	0	2	282	0.99
GTP56B	16	32	35	22	0	104	1	0	0	1	105	0.99
Mean	63.55	50.80	27.60	12.55	2.30	155.55	0.40	0.65	0.20	1.25	156.80	0.99
SD	30.12	22.38	12.96	8.02	2.32	52.58	0.88	1.39	0.52	2.31	53.26	0.01

*Note.* SAI = subject auxiliary inversion question; WH = -wh question; IO = intonation only question; VO = verb only question; TAG = tag question; TotQ = total questions including SAI, WH, IO, VO, and TAG (both grammatical and telegraphic); Gram% = percentage of grammatical questions out of total questions.

Table 3

*Full and Reduced Question Forms*

Participant	Inverted yes/no		Intonation Only		Verb Only		% of Total Questions				
	+T	-Tamb	-Tcop	Totred	-Tamb	TotalQ	FullSAI	RedIO	RedVO	RedSAI_IO	RedSAI_IO_VO
GTP01G	30	26	0	26	12	140	0.21	0.19	0.09	0.46	0.56
GTP03G	72	33	0	33	17	194	0.37	0.17	0.09	0.31	0.41
GTP05G	16	14	0	14	10	79	0.20	0.18	0.13	0.47	0.60
GTP06B	52	7	0	7	1	169	0.31	0.04	0.01	0.12	0.13
GTP09G	82	9	0	9	8	140	0.59	0.06	0.06	0.10	0.17
GTP10G	28	7	0	7	7	100	0.28	0.07	0.07	0.20	0.33
GTP12G	33	10	0	10	0	103	0.32	0.10	0.00	0.23	0.23
GTP20G	56	15	0	15	5	219	0.26	0.07	0.02	0.21	0.26
GTP22B	55	10	1	11	8	184	0.30	0.06	0.04	0.17	0.26
GTP30B	65	10	0	10	3	181	0.36	0.06	0.02	0.13	0.17
GTP33B	18	24	1	24	32	187	0.10	0.13	0.17	0.57	0.76
GTP36B	11	17	0	17	19	128	0.09	0.13	0.15	0.61	0.77
GTP38G	66	37	1	38	15	240	0.28	0.16	0.06	0.37	0.45
GTP40B	34	23	0	23	19	197	0.17	0.12	0.10	0.40	0.55
GTP42B	40	22	1	23	9	127	0.31	0.18	0.07	0.37	0.44
GTP43B	26	8	0	8	10	96	0.27	0.08	0.10	0.24	0.41
GTP46G	47	9	1	10	13	129	0.36	0.08	0.10	0.18	0.33
GTP50B	32	23	2	25	12	136	0.24	0.18	0.09	0.44	0.54
GTP51G	99	29	4	33	11	282	0.35	0.12	0.04	0.25	0.31
GTP56B	13	21	2	23	21	105	0.12	0.22	0.20	0.64	0.77
Mean	43.75	17.70	0.60	18.30	11.60	156.80	0.27	0.12	0.08	0.32	0.42
SD	24.26	9.18	1.05	9.63	7.54	53.26	0.11	0.05	0.05	0.17	0.20

*Note.* Inverted yes/no = Full SAI questions that were +Tense; Intonation Only = reduced questions that were –Tense (ambiguous and omitted copula); TotRed = total reduced IO questions; Verb Only = reduced VO questions that were –Tense (ambiguous); TotQ = total questions including SAI, IO, VO, WH, and TAG forms; FullSAI = percentage of total questions that were inverted SAI forms; RedIO = percentage of total questions that were reduced IO forms; RedVO = percentage of total questions that were reduced VO forms; RedSAI\_IO = Out of reducible SAI and IO questions, percentage that were actually reduced; RedSAI\_IO\_VO = Out of reducible SAI, IO, and VO questions, percentage that were actually reduced.

Table 4

*Reducible Questions by Person/Number of Grammatical Subject*

Participant	1PS	2PS	3PS	1PPL	3PPL	% reduced	
						2PS	3PS
GTP01G	0	38	14	0	2	0.68	0.00
GTP03G	0	67	36	2	1	0.48	0.06
GTP05G	0	22	8	0	0	0.50	0.38
GTP06B	1	36	18	1	2	0.17	0.00
GTP09G	1	72	13	4	0	0.13	0.00
GTP10G	0	20	14	1	0	0.35	0.00
GTP12G	0	27	13	0	2	0.44	0.00
GTP20G	0	51	16	1	2	0.31	0.00
GTP22B	0	41	22	0	0	0.24	0.05
GTP30B	1	43	21	2	7	0.21	0.05
GTP33B	0	29	13	0	0	0.79	0.15
GTP36B	0	20	10	0	0	0.85	0.20
GTP38G	0	61	36	3	5	0.59	0.03
GTP40B	0	40	14	2	1	0.55	0.07
GTP42B	0	32	28	1	2	0.69	0.04
GTP43B	1	26	5	2	0	0.31	0.00
GTP46G	2	27	23	4	1	0.22	0.09
GTP50B	0	33	23	1	0	0.67	0.09
GTP51G	5	83	39	1	3	0.33	0.08
GTP56B	0	27	8	0	0	0.81	0.00
Mean	0.55	39.75	18.70	1.25	1.40	0.47	0.06
SD	1.19	18.14	9.77	1.29	1.88	0.23	0.09

*Note.* 1PS = first person singular subject; 2PS = second person singular subject; 3PS = third person singular subject; 1PPL = first person plural subject; 3PPL = third person plural subject.

Figure 1.

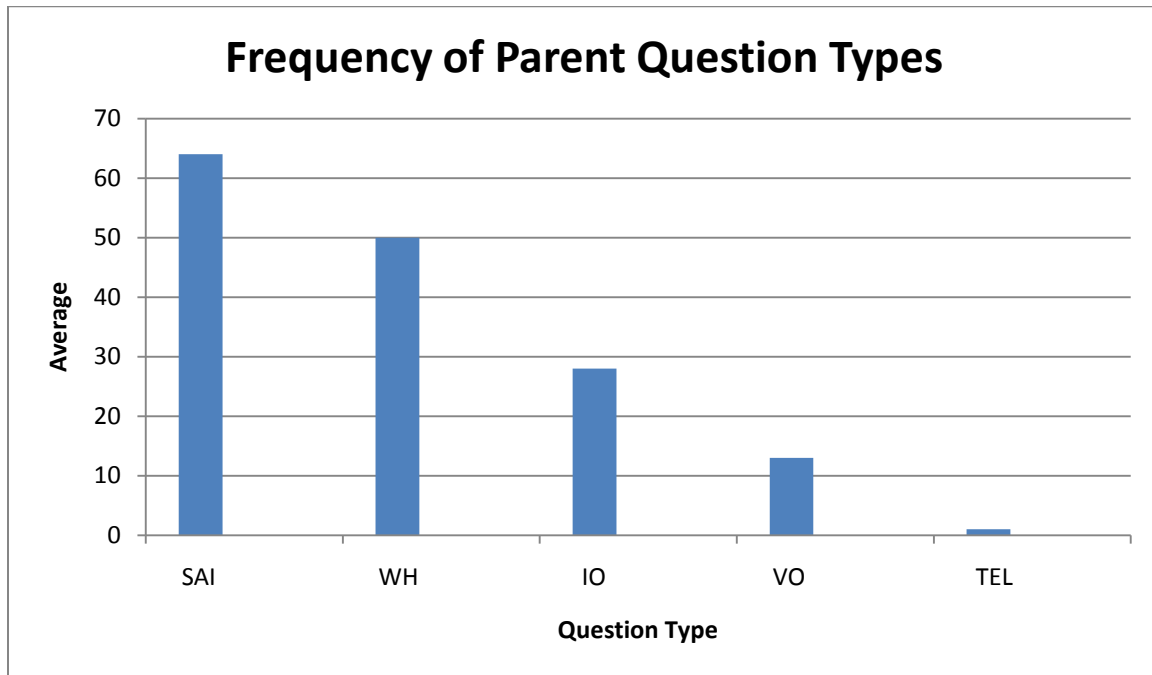


Figure 2.

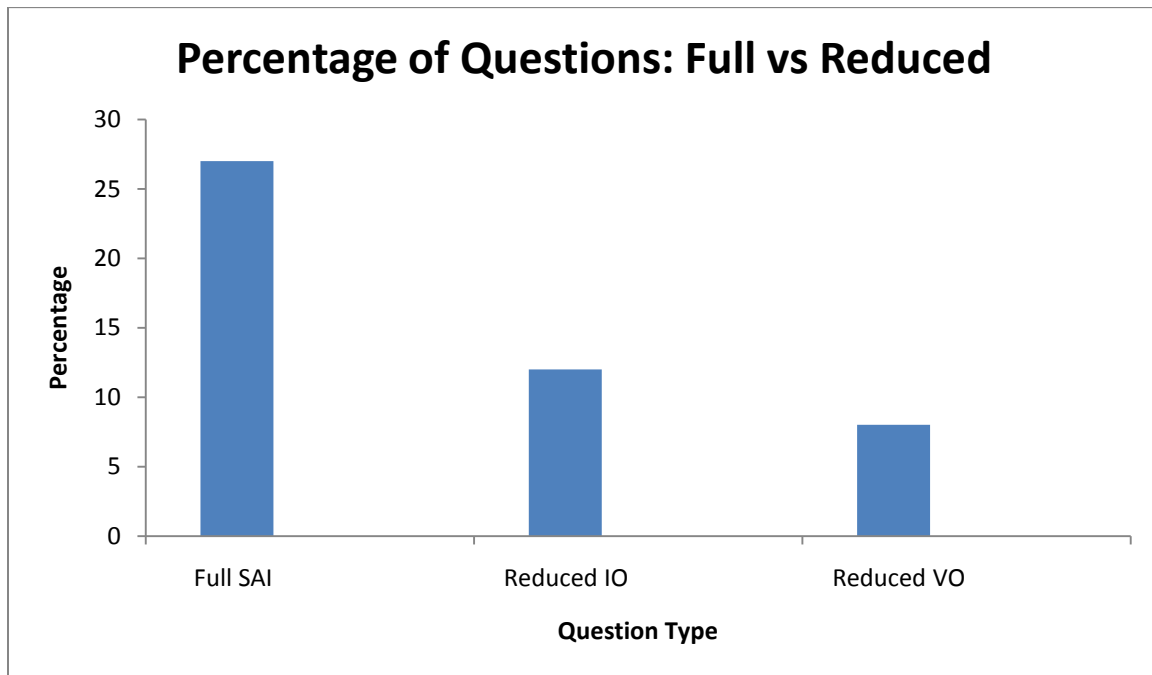


Figure 3.

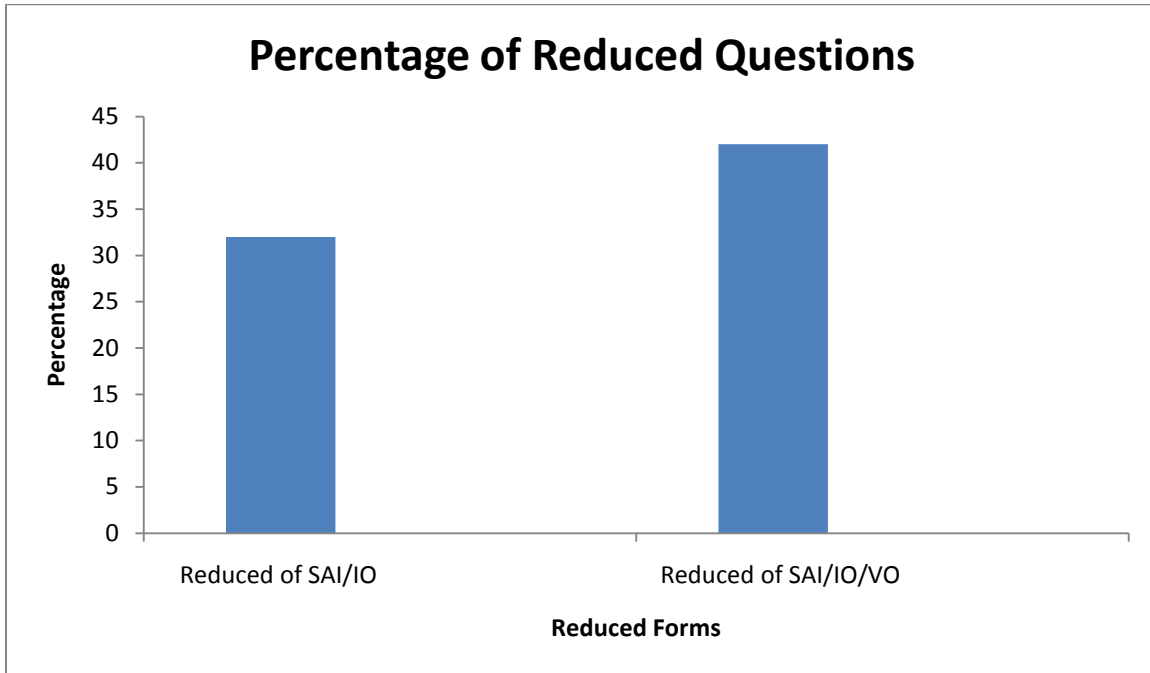


Figure 4.

