

2007

Income effects on hierarchical question patterns in children

Rachel Bryner
Carnegie Mellon University

Follow this and additional works at: <http://repository.cmu.edu/hsshonors>

Recommended Citation

.

This Thesis is brought to you for free and open access by the Dietrich College of Humanities and Social Sciences at Research Showcase @ CMU. It has been accepted for inclusion in Dietrich College Honors Theses by an authorized administrator of Research Showcase @ CMU. For more information, please contact research-showcase@andrew.cmu.edu.

Running Head: INCOME EFFECTS ON QUESTION PATTERNS

Income Effects on Hierarchical Question Patterns in Children

Rachel M. Bryner

Carnegie Mellon University

Abstract

The role that questioning plays in language learning and cognitive development in childhood is an area of study that continues to constitute a major point of interest for researchers today. However, there is little current research on the subject of question patterns, particularly in regard to variation by income-level. Whether there are significant differences between parents of varying income-level in relation to the questions they ask their children in casual conversation is the question at the heart of this research. Two sets of transcripts were used from previous studies of 3- and 4-year-olds and their parents. One set was derived from low-income families and one set from mid-income families, which were coded for question types that could be considered meaningful to cognitive development. Question types considered relevant included concrete questions concerning the being, state, or function of an object, as well as questions concerning cause and reason. Nonparametric analyses show significant differences in question type frequencies across age groups and income levels for both parents and children. Practical implications for the study include an increased awareness of the potential impact that parents' questions and income have on children's language, social, and cognitive development as well as on academic success.

Income Effects on Hierarchical Question Patterns in Children

Language acquisition in children is an area of research that continues to grow and foster new and exciting questions about how children learn language, exploring possibilities ranging from genetic variation to environmental cues to cultural norms. Several such research fields focus heavily on the role that parents play in their children's cognitive development. Most notably there has been a subdivision of research concerned with conversation between parent and child, discourse that often proves to be comfortable and unforced, both ideal for learning (Vygotsky, 1962). Oftentimes during such discourse, questions asked both by and to children prompt detailed impartations of information about how one can use questions to gain knowledge about an object, event, emotion, etc. Gee (1992) said the following of the significance of parent-child interactions: "Parents...play alphabet games, recite nursery rhymes...They ask their children 'What's that?' and 'What's that say?' of pictures in a book they've seen a hundred times...and constantly relate what the children have seen or heard in books to the children's daily experience of the world" (p. 2). Parents teach their children in innumerable ways throughout their lives, but in the beginning years of cognitive development the question of how parents relay language skills to their children emerges as one full of possibilities. There has been a growing focus on the effects of questions on language learning, both those questions asked to children and those asked by children, and on the investigation of possible communicative functions of such questions (Corsaro, 1977). Parents ask questions to which they already know the answers to test their children's knowledge and keep them constantly thinking (Rowland, Pine, Lieven, & Theakston, 2003).

Berlyne (1965) suggests that questioning is a great facilitator of cognitive development in children. Children ask questions when they experience a curiosity prompted by conceptual

conflict, the internal state that occurs when clashing ideas exist together in the mind, or when information that is being presented and processed does not fit with that which is already known. To feel such curiosity or conflict a person must be able to generate an interpretation of the discrepancy and eventually relieve the inconsistencies through understanding. This allows for the possibility that children can understand and generate certain basic types of questions before they can understand and generate other, more complex types. Previous research supports the idea that children are able to use their knowledge of a certain category of question to ask a “higher level” question. Stern (1924) divided the stages of development in which questions usually emerge into two periods: the “naming” period and the “when and why” period. He hypothesized that children first ask questions concerning the names of objects, a stage occurring at the end of their second year. Children then move on to “when” and “why” questions, a stage that typically occurs between 3 and 4 year olds. In her research Holzman (1971) provided the example of a child asking the question “What happened?” after he suspected his toy to be broken. The child was able to question the state of the toy because he had already verbally or internally asked the question “What is it?” and had received an answer. Without having a firm label for and an understanding of the toy, the child would be unable to ask a question about its changed state.

Research done by Tyack & Ingram (1977) sequenced question acquisition and production in the following order: *what* < *where* < *how* < *when* < *who* < *why*. Rowland, Pine, Lieven, and Theakston (2003) supported the idea of sequencing in their study, finding *where* and *what* questions to precede *why*, *how*, and *when* questions. Bloom, Merkin, & Wootten (1982) further discussed *which* and *whose* questions, suggesting that are typically acquired last because the questions specify something about an object, which, according to investigators, requires a full

understanding of that object. According to Tyack & Ingram's research, *why* and *when* questions are more abstract because they require thought outside of present, concrete information.

Therefore they come after *what* and *where* questions, which are usually asked in the present and have more tangible answers. Additionally, Ervin-Tripp (1970) found that children most often begin asking *who* questions first, and after such questions have been mastered children can begin asking questions pertaining to conceptual time periods, thoughts, and ideas such as *why*, *how*, and *when* questions. In this way lower-level questioning provides a necessary foundation for higher-level questioning, and without an understanding of the first there can be no understanding of the second. Such findings support a possible order of question acquisition, one that could be attributable to a number of cognitive constraints on development. In light of previous research, the hierarchy used in this study begins with *what* questions including Label and Object questions, followed by questions of function, classification, and location, then questions that require the greatest capacity for abstract thinking, *why* questions. Through his influential research, Piaget examined the impact that questioning had on language-learning and on cognitive development. Piaget reasoned that children's questions were firstly used in seeking to better understand their physical realm, and as they aged and became more skilled at asking questions of physical causality, children's cognitive development increased and allowed them to ask questions anchored in the idea of psychological causality, leading to the ultimate goal of understanding and asking questions of cause and reason (Meyer & Shane, 1973).

Parents often ask questions of their children to stimulate thought and understanding as well as maintain communication, and cognitive skills among young children vary greatly (Weizman & Snow, 2001). One potential reason for differences in children's cognitive development is that some parents are more capable of asking their children the types of questions

that best gauge and expand upon their children's understanding of objects. Hart and Risley (1995) investigated differences in interaction frequencies among parents and their children and found that parents in the high-SES groups directed conversation toward their children more frequently than those in the low-SES, with high-SES parents talking to their children approximately 55 minutes per hour and low-SES parents talking to theirs approximately 20 minutes per hour. Shatz (1979) examined the significance of hierarchical question forms and the influence they might have on cognitive development and hypothesized that parents use hierarchical questioning with children as a way of minimizing confusion and of allowing them to learn at their own pace. She proposed that parents should broaden the range of questions and levels of difficulty as children begin to display an understanding of the questions being asked them. Shatz recognized that children with low utterance rates had parents that asked them far fewer information-seeking questions and many more directive questions, whereas children with higher utterance rates had parents that asked them primarily information-seeking questions. Whether there are significant differences between parents of varying income level in relation to the hierarchy of questions they ask their children in casual conversation is the question at the heart of this research.

Because of the nature of the families used for this study, income level served as a variable of interest instead of socioeconomic status. However, information was gleaned from a large pool of previous research done on the effects of socioeconomic status on children's development because there has been a greater amount of research done on the effects of SES than on the effects of income level. Income is a contributing factor in determining socioeconomic status, which can be defined as a person's place in a social structure that depends on variables including income, occupation, and education. Hart and Risley (1995) observed

significant differences in the amount of parent-child conversation between SES groups. In families with parents in professional and managerial occupations, 75% of parent utterances were addressed to the baby; in families with parents that worked in offices and hospitals, 60% of utterances were addressed to the child; in the lower-SES families in which parents were working in construction, factories, and services, 54% of parent utterances were directed at the child; and in the families on welfare, only 50% of parent utterances were addressed to the child. Such findings are substantiated by Rowland, Pine, Lieven, & Theakston (2003), who found that frequencies of parental question types affect frequencies of question types produced by the child. Further research done by Heath (1983) suggests that the amount of speech directed toward children is not only smaller for low-income mothers, low-income mothers have also been found to most frequently interact with their children for the purpose of controlling their behavior, and they also show interest in the child's speech or in engaging the child in conversation less frequently. Similarly, Lawrence and Shipley (1996) found significant differences in parental interaction based on SES, race, and activity, with substantial deficits in low-SES children's questions and utterances during a picture identification task.

Findings and experiences presented by Heath (1983) in her ethnographical Ways with Words allow for the idea that income and SES are less important to a child's cognitive development than the parental stimulus they receive. Heath studied the different academic environments present in two neighboring towns, and her research allowed for a glimpse into the impact of parental input on children's development. Primarily white working-class families populated one of the towns, and primarily black working-class families populated the other, but both populations were trying to become more aware of the home and community factors that influence academic success. Such concerns exhibited by the community over academic success

greatly contributed to Heath's future research on the language learning habits of these communities, and in her time researching and interacting with the people of both towns she documented several familial interactions, oftentimes including question-asking patterns, styles, and uses. During one such interaction with members of the black working-class community, Heath spoke with a 4-year-old boy and his sister of the same age while the children's mother was in the store, and the questions both children asked consisted exclusively of questions concerning the present, venturing questions about the color of different objects seen out the window, the names of buildings they could see, and their mother's location. Upon further interacting with the townspeople of the community, Heath found that the adults of the black working-class community did not consider children to be suitable conversationalists and thought instead that children learned most effectively by listening, not talking. Heath made the following observation: "Children do not expect adults to ask them questions... This is especially true of questions for which adults already have an answer... they do not construct questions especially for children, nor do they use questions to give the young an opportunity to show off their knowledge about the world" (p. 45). Additionally one mother in the town told Heath the following: "Ain't no use in me tellin' 'im: 'Learn dis, learn dat, what's dis? What's dat?' He just gotta learn, gotta know; he see one thing one place one time, he know how it go, see sump'n like it again, maybe it be de same, maybe it won't." Parents asked very few questions to which they already knew the answers, but when they were asked it was usually as a reminder of politeness or etiquette, such as "What do you say?". Such findings illustrate the impact of cultural norms on child-rearing techniques. They also imply that lower SES communities might simply be less aware of the language learning benefits of asking children questions to which they already know the answer.

Heath's recordings of conversations between parents and their children in the other working-class town, however, indicated conversations with higher question-asking frequencies. Questions in which the parent already knew the answer were asked much more frequently, particularly between the ages of 2 and 4. One of the children's parents directed approximately 110 sentences toward her son when he was 3 years old, with 54% of the sentences being questions. She went on to find that parents in this community, when reading stories with their children, begin by asking several *what* and *where* questions, those question types that are learned most quickly by children. This difference in practice between the communities indicates that one of the working-class communities placed greater emphasis on asking their children informational questions than the other. It also allows for an understanding of why simply using these types of questions regularly could lead to greater academic success. Heath points out that the types of questions asked of children in school are those like "How do you spell it?" "What does the light bulb do?" and "Why does that happen when we mix the two together?". A working knowledge of those question forms could be advantageous to a child in school both because of the high level of reasoning required of students and because the questions would be more familiar. Heath's work suggests that SES is not always the determining factor in a child's acquisition of question types. Rather, it is parental input that can most strongly influence cognitive development.

Just as Heath pointed out possible similarities between questions asked at home and in school, Irving Sigel's (1983) research on the correlation between parent-child interactions and academic success emphasizes the significance of question-asking by both parents and children as well as that of similarities between learning styles at home and at school. His research suggests that the way mid-SES parents interact with their children parallels the interactions they will receive in school more than low-SES parent-child interactions. Discrepancies between these two

environments can create dissonance in the low-SES child and can make it difficult to maintain equilibrium between both environments (Sigel, 50). Sigel's proposed program for preschools emphasizes the importance of mental representations of objects and how a competent educational environment can instill learning habits in children that strengthen mental representations. In particular, his program outlines the importance of hierarchical learning. When describing methods for developing this way of thinking, he suggests strategies that include labeling, describing, reproducing, and comparing with questions. A Sigel label question for a parent or child could be "What color is the cat?" or "Where is the clock?"; a description question could be "What did the car look like?"; a reproduction question could be asking a child to reconstruct previous experiences with a question such as "How do you do that?"; and a comparison question could be "In what ways are the truck and airplane different?". Sigel (as cited in Elkind & Flavell, 1969) encouraged teachers to ask questions in particular orders. They first assessed a child's knowledge of an object, then they asked questions of greater detail about the object to stimulate thought. Next, Sigel instructed teachers to use scaffolding techniques to allow the child to slowly learn more about the object. Overall Sigel put great emphasis on question-asking in parent-child and teacher-child interactions, stating that questions should be used to first gauge children's current knowledge or representation of an object and then used to expand upon that knowledge or representation by asking questions that are, ideally, easy enough for children to understand and challenging enough that the child is forced to think and retain new information.

The effects of income on cognitive development have been studied in various contexts, and although there is a growing collection of existing research on the significance of questions posed to and by children, little has been researched or found in the way of establishing an association between rates of questions and income levels. Questions dealing with a possible

relationship between frequencies of significant question types, ranging from labeling to event to explanation questions, and varying income levels have remained largely unanswered within the research community. Such questions have led to an array of hypotheses, all working toward a better understanding of income's effects on question frequencies. The first is that a positive correlation will be found between general and specific frequencies of question types asked by parents and frequencies of question types asked by their children. This hypothesis is supported by the research of Hart and Risley (1995), who observed that 86%-98% of children's utterances were taken directly from their parents' utterances. Secondly, I hypothesize that there is a necessary hierarchy of learning question forms, and by parents facilitating that hierarchy and asking questions at or directly above their child's level of understanding, children will ask greater frequencies of useful, knowledge-seeking questions. This is supported by the wealth of research on questions first acquired by children such as *what* and *where* questions, with a progression from these to more complicated questions such as *how* and *why*. Both 3- and 4-year-old children were included in the study as a way of measuring changes in question type frequencies over time. Lastly I draw largely from both Heath's and Hart & Risley's research investigating the significance of income on children's development and hypothesize that mid-income parents will be more likely to ask their children the questions that build most effectively upon their present knowledge, working toward the ultimate goal of children asking questions concerning cause and reason.

Method

Participants

Of the 65 children who were included, 35 were 3-year-olds and 30 were 4-year-olds, and 19 were from a mid-income family and 46 were from a low-income family. There were eleven 3-

year-olds from mid-income families; eight 4-year-olds from mid-income families; twenty-four 3-year-olds from low-income families; and twenty-two 4-year-olds from low-income families.

Refer to Table 1 for mean ages across and between income levels and age groups. Families were divided into two groups: low-income and mid-income. All families consisted of English speakers.

Corpora

Transcripts from two previous studies served as the corpora, one done with low-income families and one with mid-income families. The mid-income families' transcripts were taken from the Berko-Gleason research and consisted of middle class families from Massachusetts with a son or daughter between the ages of 3 and 4, approximately. The low-income families' transcripts were taken from the Home-School Study of Language and Literacy Development and consisted of lower class families from Massachusetts with a child between the ages of 3 and 4, approximately.

All transcripts came from Brian MacWhinney's (2000) Child Language Data Exchange System (CHILDES) website. The transcripts were found on the CHILDES website under Database. Under Local Transcripts they were located in the English-USA database. The families' transcripts were chosen because of their availability in CHILDES and because of their similar demographics. Both groups contained similar age groups and engaged in similar activities including book reading, toy play, and an eating session, but activity sessions between groups differed in structure, materials, and length. The eating session for the mid-income group came from a snack time, whereas the session for the low-income group came from a dinnertime. The books given to parents to read differed between groups, and the mid-income families were asked to read a wordless book. Additionally the toy play sessions differed in content, with the

mid-income families receiving instructions and toys, including a play store and car, for a much more structured play session and the low-income families receiving a wide variety of smaller toys.

Data Analysis

Data were analyzed using the nonparametric analysis Mann-Whitney U and the Spearman r correlational coefficient test due to violations made on skewness and homogeneity of variance assumptions. The Mann-Whitney U tests differences between groups, and the Spearman r correlational coefficient is a test of relationships. The Nonparametric analyses were used to test for relationships across age groups and income levels. Analyses were performed using SPSS version 13, and an alpha level of .05 was used for all analyses.

Question codes

Two trained investigators performed transcript coding with Computerized Language Analysis (CLAN), a program specifically used to analyze data transcribed in CHILDES. This study was looking at the semantic rather than the syntactic qualities of questions in accordance with Piaget's work on the relationship between question forms and cognitive development. Only informational questions, or questions that are asked to gain information about someone or something, were coded. Any question considered to be conversational maintenance was coded as *Other*. *Test* questions, although not asked to gain information about an object or person, were used as informational questions also because they serve as models for the informational questions asked by children. Both *Test* and *Real* questions were coded for parents, looking most closely at parents' *Test* questions because the study aimed to investigate the significance of parents' deliberate questioning as a way of sharing information with children. Children primarily only ask *Real* questions, but both *Real* and *Test* questions were coded to look for

possible significance. *Real* questions are those inquiries made out of genuine curiosity, and *Test* questions are those questions parents ask to which they already know the answer, used primarily to stimulate learning and better gauge the child's knowledge of a particular object.

After a question was labeled as *Real* or *Test*, it was further categorized as one of the following: *Thing*, *Property*, or *Why*. *Thing* questions are used to identify or label an object and include *Label* and *Object* questions. *Property* questions are used to acquire information about an object's type, function, amount, or location and include *Classification*, *Function*, *Quantity*, and *Location* questions. *Why* questions are used to ask cause or reason questions about objects and include *Cause and Reason* questions. If a question fell into none of those categories, it was coded as *Other*. A *Label* question is one in which both a name and brief explanation of purpose are given for something, such as:

Child: What is this?

Parent: It's a toaster, used for warming bread.

An *Object* question is similar to a *Label* except no explanation of function is required, such as:

Parent: What is this?

Child: A toaster.

Classification questions are those that refer to type, kind, or form and are seeking further information about something. An example would be:

Parent: Hand me the wrench.

Child: Which one?

Parent: The green one.

Location questions ask for the location of an object, such as:

Parent: Where is the butterfly in this picture?

Child: Above the cat.

Quantity questions ask for the amount or number of an object, an example being:

Child: How many carrots are on your plate?

Parent: Twelve.

Cause and Reason questions are those asked about an object that refer to why something can or cannot happen, what causes something to occur, or what makes something so, such as:

Child: Why does the rabbit want water?

Parent: Because it is thirsty.

Additionally, *Classification*, *Function*, *Quantity*, and *Location* questions were only coded if they pertained to a tangible object. Below is an example of a question that would be coded as an *Other* question because it relates to a person instead of an object:

Child: Which one is Aunt Sue?

Parent: The lady in the blue dress.

Procedure

Transcripts created from book-reading and toy play activities were coded because they have been shown to allow for rich, complex interactions between parent and child (Snow et al., 1976). Ginsberg (1991) stated the following: "...maternal speech during book reading...includes a higher frequency of questions, of talk about language, of labeling, and a lower frequency of directive and social regulatory speech" (p. 23). Dunn, Wooding, and Herman (1977) also found that toy play interactions can allow for stimulating interactions depending on toy selection. Additionally, researchers coded transcripts from mealtimes or snack times to capture interactions unmotivated by set activities.

Results

The study aimed to investigate question type frequencies between children and their parents and across age groups and income levels. The first hypothesis was that there would be a positive correlation between frequencies of question types asked by parents and frequencies of question types asked by children. The second hypothesis was that children's understanding of the necessary hierarchy of question forms would lead to greater frequencies of knowledge-seeking questions, supported by research on questions first acquired by children such as *what* and *where* questions, with progression from these to more complex types such as *how* and *why* questions. The third hypothesis was that mid-income parents would be more likely to ask their children questions that build most effectively upon their present knowledge.

An alpha level of .05 was used for all statistical tests, and due to the skewed nature of the data, medians were calculated instead of means. Refer to Table 2 for frequencies of question types for children and their parents between age and income level. *Test* question frequencies for parents positively correlated to *Real* question frequencies for their children, $r(63) = .241$, $p = .026$. There were also positive correlations found for *Real* question frequencies, $r(63) = .258$, $p = .019$, *Test* question frequencies, $r(63) = .331$, $p = .004$, and all question frequencies, $r(63) = .424$, $p = .001$, between children and parents. None of the frequencies, however, for specific kinds of questions between parents and children were statistically significant.

A Mann-Whitney Wilcoxon Test was used to determine significant mean rank differences between groups. The Mann-Whitney Wilcoxon Test indicated that mid-income children had higher mean ranks than low-income children in asking *Real* questions, with a more pronounced difference seen in both mid- and low-income 3-year-olds ($W = 329.50$, $z = -3.65$, $p =$

.001). Additionally the test showed significant correlations between income level and *Real Procedure* question frequencies for both 3-year-olds ($W = 322.00, z = -4.00, p = .000$) and 4-year-olds ($W = 292.00, z = -2.34, p = .019$). Similarly a Mann-Whitney Wilcoxon Test was used to find differences in rank between mid- and low-income parents and their *Test* question frequencies, indicating consistently higher ranks for mid-income parents of 3-year-olds ($W = 371.50, z = -2.152, p = .030$) and 4-year-olds ($W = 286.00, z = -2.58, p = .008$).

Differences between frequencies of parents' *Test* questions and children's *Real* questions for *Thing*, *Property* and *Why* questions were statistically insignificant. Table 3 presents differences in correlations between parents and children for *Thing*, *Property*, and *Why* questions, looking at *Test* questions for parents and *Real* questions for children. Low- and mid-income 3-year-olds had no difference in median *Real Why* questions asked, but mid-income 4-year-olds asked more *Real Why* ($Mdn = .67$) questions than low-income 4-year-olds ($Mdn = .00$). Similarly, parents of mid-income 3-year-olds and parents of low-income 3-year-olds had no median difference in *Test Why* questions, but parents of mid-income 4-year-olds asked more *Test Why* ($Mdn = .33$) questions than parents of low-income 4-year-olds ($Mdn = .00$).

Discussion

The major findings of the study suggest that there are differences in question frequencies between mid- and low-income parents and their children as well as between 3-year-olds and 4-year-olds, though this difference is less defined and is slightly counterintuitive, with 3-year-olds and their parents asking more questions overall than 4-year-olds and their parents. The results of the statistical analyses broadly support the proposed hypotheses of the study but do not support them with relation to specific correlations between *Thing*, *Property*, and *Why* questions.

The first hypothesis was that a positive correlation would be found between frequencies of parents' questions and frequencies of children's questions. In support of this hypothesis, researchers found strong correlations between parent question frequencies and child question frequencies overall but not for the specific *Thing*, *Property*, and *Why* question types, even though correlations between all three categories were close to significant ($p < .05$). Possible explanations for weak correlations between parents' *Test Thing*, *Property*, and *Why* questions and children's *Real Thing*, *Property*, and *Why* questions include a small number of participants as well as a delay in children's knowledge acquisition. The idea of a delay in children's acquisition of question types is supported by an unexpected correlation of .262 found between parents' *Test Why* questions and children's *Real Thing* questions, suggesting that even though parents are asking *Why* questions, children may still be strengthening their comprehension and use of *Thing* questions. I secondly hypothesized a necessary process of learning different categories of questions, and by parents facilitating that process and asking questions at or directly above their child's level of understanding, I hypothesized that children would ask greater frequencies of informational questions; findings concerning the frequencies of parents' *Test* and children's *Real* questions support this hypothesis. Mid-income parents asked significantly more *Test* questions across age groups than low-income parents, and mid-income children asked significantly more *Real* questions across age groups than low-income children. Additionally, mid-income parents and children consistently asked more *Test* and *Real Thing*, *Property*, and *Why* questions, respectively, than low-income parents and children. The third hypothesis, which stated that facilitation of an informational question hierarchy would lead to more frequent usage of *Why* questions in children, was not supported by the results of the analyses regarding hierarchical learning because researchers did not find strong correlations between parents' *Test*

questions and children's *Real* questions. However, mid-income parents asked more *Test Why* questions overall than low-income parents, and mid-income children asked more *Real Why* questions overall than low-income children, allowing for the possibility that mid-income parents and children understand and use *Why* questions, the highest level of questioning proposed in this study, more often than low-income parents and children.

Findings generally corroborate those found in previous research. Analyses revealed that *Why* questions were only asked by 4-year-old participants and their parents, which supports the idea that *Why* questions are more complex than other categories of questions and also supports the work of Berlyne (1965), who hypothesized hierarchical question learning in children, or that children needed to first understand and use certain types of questions before they could understand and use more complex types of questions. Additionally Holzman's (1971) research emphasizes the basic or complex nature of different types of questions. One of his examples is that of a child inquiring about what happened to a toy that had been broken, and Holzman points out that the child could not comprehend and ask a question like that if the child did not already know something of the state and being of the toy. The findings also support those of Hart and Risley (1995), who found significant differences in interaction frequencies between mid- and low-SES families. Similarly Rowland, Pine, Lieven, & Theakston (2003) found correlations between parent question frequencies and child question frequencies, a correlation also found for all questions across income levels. Of the previous research gathered for the study, a majority of the findings correlate to those found in the study.

The limitations of the study were numerous and included a small sample size, possible coding discrepancies, and data drawn from two corpora that differed in several ways. Firstly, the sample size was minimal and allowed for little power in statistical analyses. Also, because of the

nature of the coding scheme, the data were skewed, making it impossible to use parametric tests to analyze them. Another limitation was that two investigators coded the transcripts used in the study, and although both had been trained on the appropriate coding scheme, there is a possibility of coding discrepancies between the investigators. Additionally there were inconsistencies between the two corpora used. Although each of the sessions consisted of a mealtime, book reading, and toy play, the structure and content of each differed between groups. In the future, collecting data from one corpus and thoroughly training coders are advisable for purposes of continuity.

Erika Hoff-Ginsberg (1998) said that, because language development potentially affects several facets of development, from social to cognitive to academic, understanding the effects of SES and, accordingly, of income on language development is crucial to understanding the broader consequences and implications of differences in both, and for that reason the study has strong significance for academic success. Sigel (1983) emphasized that the types of questions encountered by children in school are *Test* questions of state, form, function, and reason, and in that way a child that has had experience with these different questions could have a greater chance at success in school, not because of intelligence but because of question type recognition and familiarity. The implications, therefore, are vast, considering the potential importance of question-asking in the home as well as in the classroom.

References

- Bloom, L., Merkin, S., & Wootten, J. (1982). Wh-questions: linguistic factors that contribute to the sequence of acquisition. *Child Development*, 53, 1084 - 1092.
- Bruner, J.S. (1975). The ontogenesis of speech acts. *Journal of Child Language*, 2, 1-19.
- Corsaro, W. (1977). The clarification request as a feature of adult interactive styles with young children. *Language in Society*, 6, 183 – 207.
- Elkin, D., & Flavell, J.H. (1969). The Piagetian system and the world of education. *Studies in Cognitive Development: Essays in Honor of Jean Piaget*. London: Oxford University Press.
- Ervin-Tripp, S. (1970). Discourse agreement: how children answer questions. *Cognition and the Development of Language*. New York: Wiley.
- Gee, J.P. (1992). *The social mind: Language, ideology and social practice*. New York: Bergin & Jarvey.
- Hart, B., & Risley, T.R. (1995). *Meaningful Differences in the Everyday Experience of Young American Children*. York, PA: The Maple Press Company.
- Hall, W., Nagy, W., & Linn, R. (1984). *Spoken words: Effects of situation and social group on oral word usage and frequency*. Hillsdale, NJ: Erlbaum.
- Heath, S.B. (1983). *Ways with words: language, life, and work in communities and classrooms*. New York: Cambridge University Press.
- Holzman, M. (1971) The use of interrogative forms in the verbal interaction of three mothers and their children. *Journal of Psycholinguistic Research*, 1, 311 – 336.

- Lawrence, V.W., & Shipley, E.F. (1996). Parental speech to middle- and working-class children from two racial groups in three settings. *Applied Psycholinguistics*, 17, 233 – 255.
- MacWhinney, B. (2000). *The CHILDES Project: Tools for Analyzing Talk*. 3rd Edition. Mahwah, NJ: Lawrence Erlbaum Associates
- Magill-Evans, J., & Harrison, M.J. (2001). Parent-child interactions, parenting stress, and developmental outcomes at 4 years. *Children's Health Care*, 30(2), 135 – 150.
- Meyer, W.J., & Shane, J. (1973). The form and function of children's questions. *The Journal of Genetic Psychology*, 123, 285 – 296.
- Rowland, C.F., Pine, J.M., Lieven, E.V.M., & Theakston, A.L. (2003). Determinants of acquisition order in wh-questions: re-evaluating the role of caregiver speech. *Journal of Child Language*, 30, 609 – 635.
- Sigel, I.E., & Saunders, R.A. (1983). On becoming a thinker: An educational preschool Program. *Early Childhood Development & Care*, 12(1), 39-65.
- Snow, C.E., Arlman-Rupp, A., Hassing, Y., Jobse, J., Joosten, J., & Vorster, J. (1976). Mothers' speech in three social classes. *Journal of Psycholinguistic Research*, 5, 1 – 20.
- Stern, W. (1924). *Psychology of Early Childhood*. New York: Henry Holt and Co.
- Tyack, D., & Ingram, D. (1977). Children's production and comprehension of questions. *Journal of Child Language*, 4, 211 – 228.
- Vygotsky, L.S. (1962). *Thought and Language*. Cambridge, MA: MIT Press.
- Weizman, Z., & Snow, C. (2001). Lexical input as related to children's vocabulary acquisition: effects of sophisticated exposure and support for meaning. *Developmental Psychology*, 37, 265 – 279.

Table 1

Mean Age by Age Group and Income-Level

	<i>N</i>	<i>M</i>	<i>SD</i>	<i>Range</i>
<i>Age Group</i>				
3-year-old	35	3;7	5.96	2;5 to 4;3
4-year-old	30	4;6	4.73	3;11 to 5;5
<i>Income</i>				
Low-Income	46	4;3	6.18	3;6 to 5;5
Mid-Income	19	3;6	8.12	2;5 to 4;8
<i>Age Group by Income</i>				
Low-Income 3-year-olds	24	3;10	2.94	3;6 to 4;3
Mid-Income 3-year-olds	11	3;0	4.70	2;5 to 3;7
Low Income 4-year-olds	22	4;8	4.14	4;1 to 5;5
Mid-Income 4-year-olds	8	4;2	2.89	3;11 to 4;9

Table 2

Overall Median Question Frequencies for Children and their Parents

Age Group	Income Level	Parent/Child	Question Types	<i>Mdn</i>	<i>Range</i>
3-year-old	Both	Both	All	30.58	158.00
4-year-old	Both	Both	All	32.00	115.33
Both	Low-Income	Both	All	27.00	130.67
Both	Mid-Income	Both	All	51.33	149.33
3-year-old	Low-income	Parent	All	34.50	117.33
3-year-old	Mid-income	Parent	All	85.33	122.00
4-year-old	Low-income	Parent	All	33.67	16.00
4-year-old	Mid-income	Parent	All	83.83	60.00
3-year-old	Low-Income	Child	All	8.50	37.33
3-year-old	Mid-income	Child	All	26.67	28.67
4-year-old	Low-Income	Child	All	12.50	32.00
4-year-old	Mid-income	Child	All	22.17	49.33

Table 2 (cont.)

Age Group	Income Level	Parent/Child	Question Types	<i>Mdn</i>	<i>Range</i>
3-year-old	Low-Income	Parent	Test	4.50	23.00
3-year-old	Mid-Income	Parent	Test	9.00	29.67
4-year-old	Low-Income	Parent	Test	3.17	16.00
4-year-old	Mid-Income	Parent	Test	8.92	22.00
3-year-old	Low-Income	Child	Real	1.67	7.33
3-year-old	Mid-Income	Child	Real	5.00	8.67
4-year-old	Low-Income	Child	Real	1.67	8.67
4-year-old	Mid-Income	Child	Real	2.83	16.33

Table 3

Correlations for parents' and children's Thing, Property, and Why questions

Parent Question Type	Child Question Type	Correlational r	p
Test Thing	Real Thing	.192	.063
Test Property	Real Property	.199	.056
Test Why	Real Why	.186	.069
Test Property	Real Thing	-.008	.475
Test Why	Real Property	.175	.082

* $p < .05$

Figure Caption

Figure 1. Children's question frequencies by income-level

Figure 2. Parents' question frequencies by income-level

Figure 3. Children's *real* question frequencies by income-level

Figure 4. Parents' *test* question frequencies by income-level







