# FROM NOW TO THEN:

# PARENTS AND CHILDREN TALK ABOUT

# THE PAST AND THE FUTURE

by

Zena Winona Eisenberg

A dissertation submitted to the Graduate Faculty in Developmental Psychology in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York

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# ABSTRACT

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by

Zena Winona Eisenberg

Adviser: Professor Katherine Nelson

Life in modern cities exposes a young child to numerous concepts of time in that from birth there are schedules for all activities, set times for them to begin and end, order in which they must happen, and so on. The objective of this study was to explore the different contexts in which children are exposed to temporal concepts, and to look more in depth into the negotiations of temporal concepts between children and their parents at dinner. The participants included 20 families and children who were recruited from preschools and day care centers and investigated in regards to the presence of temporal concepts and artifacts in their daily routines. Families were asked to record four dinner conversations and fill out a questionnaire that assessed the presence and use of time in the house. Children were asked to perform a photo sequencing task of their daily school activities, to answer questions from an interview, and they took a language test (PPVT-III) assessing their receptive vocabulary. Schools were observed for temporal structure of activities and quality time children benefited from the teachers. Results indicated that mothers and fathers play different roles in teaching their children about temporal concepts. I also found that children's temporal knowledge relates to their verbal development, to past and future

talk habits at home, to the structure of activities at school and the individual attention children get, and to the use of conventional time language by parents. This was an exploratory study that pointed to the need for a longitudinal study that can establish more direct relationships among the variables.

# ACKNOWLEDGEMENTS

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It is with great relief and sense of completion that I thank all of the people above.

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"*Mother*: Yeah, I don't know if you put all your movies together I don't think that that makes a million minutes.
*Child*: And what if I watch all of them at one time?"
(4 year old girl)

"*Child*: I think the Summer was taken away from us because we went on vacation so much".
(4;8 year old boy)

# Chapter I: Introduction

Overview of Time

Time is abstract, linear, continuous, divisible, homogeneous, and irreversible. Or at least such is the case with the modern concept of time. Without time, a framework that allows us to function in the world, our experiences would remain undifferentiated and unarticulated, since all events would be fragments never linked to one another (e.g., Werner & Kaplan, 1984). But time is not a singular concept, with no single definition; it is a cultural construct, and as such, definitions and uses vary from society to society. According to McGrath and Kelly (1986), other cultures view – or have viewed – time as cyclical, reversible, indivisible, concrete, experiential, and so forth.

Werner (1957) has claimed that tribes in different parts of the world, such as the Aranda from Australia, have concepts of time that are defined in concrete terms. They are events that take place in the person's daily life. For the Bigamul, also in Australia,

midsummer is defined as the time "when the ground burns the soles of the feet", an event that is directly understood through one's senses.

Whorf (1956) too talks about time cross-culturally. He argues that the way in which different languages conceptualize different things influence the way people think. For example, the Hopi language does not objectify time but organizes it in more relational terms or, as Whorf puts it, in ordinals rather than plurals. Hence, speakers of Hopi say "they left after the tenth day", instead of "after ten days".

Finally, Inkeles and Smith (1974) talk about the concept of modernity as it brings many changes to the lives of human beings. Those changes are relevant to understanding the need for a more precise and universal time, that can be understood in the near town as well as in other similarly modernized places. Thus, it is that need that differentiates time concepts in the modern societies from the "primitive" ones which are restricted to smaller groups.

In sum, the qualities of time as conceived in modern societies produce the need for the child to tune in early in their lives to such concepts as linearity, continuity, schedules, and duration among others. They have to be at school at 8:30 am so that the parent can go to work at 9 am, they have to understand that the TV has to be on at 8 am so that they can watch their favorite program which airs no later and no sooner than that time, they have to understand the difference between weekdays and weekends which is when their parents can be at home with them, and so on.

Life in the cities, with all the technology and artifacts we have created to accomplish more in less time, presents itself as daily routines fragmented into numerous activities. These activities have little else in common but the fact that they are put together

into a schedule in a fixed sequence. That way of life binds not only adults, but young children and even infants (e.g., breastfeeding schedules, bath time, etc.).

From the very beginning, the child learns to reorganize her own biorhythms – or natural time – to behave in a different way (Nelson, 1996). Even though he/she may want to eat instead of taking a nap or play instead of having lunch, the child soon learns that these events take place at certain times of the day and that what determines those times has little to do with his/her "want" or "need". Hence, the child is socialized into establishing a fixed routine of small behaviors which order is arbitrarily determined by external agents. For example, should the child disagree with the order of events, that is when negotiation begins.

Time is one of a number of concepts whose study unites the areas of language and cognitive development (Moerk, 1977). Wittgenstein (1953) framed the practice of language as a game in which you need at least two people participating: the pupil and the teacher. He also proposed that the meaning of a word is defined by its use in language. Language too is defined by its use; it does not exist out there as a system. In addition, language allows for negotiation of concepts for which the referent is absent. Since time is an abstract concept with no physical referent, we must be able to talk about it in its "absence". Then, time exists in language and its full comprehension develops through language.

Throughout the years, the study of time has been pursued in the way of establishing stages of development of certain cognitive abilities (e.g., Piaget, 1971) or linguistic achievements - both syntactic and lexical (e.g., Erbaugh, 1992; Weist, 1986). Methodologically speaking, interest has focused on the child's performance on temporal

tasks (such as sequencing cards) in addition to comprehension and production of temporal language.

There has also been some interest in cross-linguistic/cultural differences in time (e.g. (Huang, 2000; Mullen & Yi, 1995; Whorf, 1956) but data are scarce. For example, Boroditsky (2001) performed a series of experiments in an attempt to bring support to the "weak" Whorfian hypothesis which, in short, proposes that language influences thought. She compared Mandarin to English speakers based on the differences between the way they represent time. She measured participants' reaction time on temporal tasks and found that English speakers showed a faster reaction time to horizontal stimuli and Mandarin speakers showed a faster reaction time to vertical stimuli[1]. Also, Mandarin speakers who arrived in the US at a younger age, showed less of a bias towards vertical stimuli than Mandarin speakers who arrived at an older age, however. Length of time of exposure to English made no difference. Boroditsky concluded that there is a semantic bias that influences cognitive perception of abstract concepts such as time.

Displaced time: the object of study

Time is not a single concept but rather can be divided in different ways; for example, there are natural (e.g., cycles of days, seasons), personal (e.g., sequence and duration of events), social-cultural (e.g., differences in how people use time concepts), and educated (e.g., clocks, calendars) types of time (Nelson, 1996).

Children develop different concepts of time at different ages. By eight months of age, children can predict the sequence of actions they had previously experienced such as pulling a blanket to reach an object; but it is only between six and eight years of age that

[1] Thinking of time horizontally implies from left to right; whereas vertically, time passes from bottom to top.

they can appropriately discuss the weeks and months of the year. Since the different concepts show such diverse developmental patterns, we cannot study them as a single concept of Time. Besides, their developments may be domain specific including different variables and contexts. Due to the multiple nature of the concept of time, it is imperative that researchers be clear about which concepts of time are being investigated.

Displaced time was the concept chosen for this study. It represents the not-now; that is, the past and the future as they exist on a continuous timeline and are not immediately available to the child in the present other than through the use of language (talk with others) or artifacts (photographs, videos, calendars, etc.).

My interest in investigating that concept came with the opportunity to examine language and thought together as they inform one another in the learning process. Thus, whatever experience children have with time until they are approximately two years old, is then redefined and reorganized through their verbal interactions with their parents. Parents provide children with the linguistic tools - grammar, vocabulary, and discourse - to discuss the past and future and to organize their experience.

In order to investigate such a concept (or concepts) it is necessary to address its components. Displaced time implies the notion of a timeline over which events are sequenced, thus defining the past, present, and future. The language used to refer to and describe those events can be of two kinds: experiential and conventional.

## Experiential and conventional time

Experiential time words, as presented by Nelson (1996), are words that describe a person's daily experience with time as it is organized in events: their sequence and

duration. Those words are learned through daily conversations with others and experience with routine events (e.g., bedtime) and do not require explicit teaching.

Conventional time (or social-cultural time, as Nelson calls it) words, on the other hand, are specific to the cultural construction of time and require explicit teaching. They are represented in the cultural divisions of time, such as clock time, calendar divisions, as well as deictic words such as "yesterday" and "tomorrow". Because conventional words organize time into culture specific descriptions that benefit less from the support of the child's experience we can derive that experiential words should be learned before conventional ones.

More recently, Weist (2002) drew the distinction between conventional and what he called configurational time. Configurational time refers to the arrangement of events in time and conventional time (as defined by Friedman, 1978) is a sub-system of measurement for cycles and duration that are learned in a formal environment. In order to investigate that difference, he gave children ages three to eight comprehension tests where they had to match a sentence to a picture. Results showed that, overall, configurational time was easier to comprehend than conventional time. Nonetheless, comprehension of conventional time increased with age. Weist argued that the development of conventional temporal expressions is in part accounted for by how deeply embedded the distinctions are in a system of measurement as well as the extent of exposure by the child in her daily conversations.

In this dissertation I will address the distinction between experiential and conventional words and make salient the different paths they may show in children's learning of them.

## The development of displaced time

Interest in the systematic study of the development of time concepts by young children in the United States dates back to the first half of the 20th century (e.g., Ames, 1946; Lewis, 1937; Schecter, Symonds, & Bernstein, 1955) after Piaget's publication of *The Child's Conception of Time* (originally published in French in 1927). Once the English translation (Piaget, 1971) was published, there was renewed interest in the subject matter (e.g., Friedman, 1982; Harner, 1975; Kavanaugh, 1979). Research was aimed at revising and refining Piaget's assertions. Children were given commands to act out or tasks to perform, and success was interpreted as indicative of the child's understanding of time. Language productions also have been analyzed, mostly from child's productions, focusing on the development of tense and aspect.

Werner and Kaplan (1984) proposed four stages in the development of time concepts as they emerge in the child's language. In a first stage, or step, temporality is embedded in the total event. A child expresses a sense of immediate future, when he/she communicates the need for food, for example. In the second step, with increasing differentiation of thing-words from action-words, temporal aspects are more attached to the action words. Example of that would be when a child yells "done!" after a mission is accomplished. In the third step, temporal aspects begin to be articulated in the action words (emergence of tense). That step is accomplished at around age three but the child still does not understand "temporal locus" per se; the tense still seems to reflect aspects of the present action to the child. In the final step, temporal adverbs emerge. At this stage, the child develops the ability to codify activity at specific positions on a time line (past, present and future).

According to the authors, these steps in temporal speech development illustrate two developmental principles: increasing differentiation and exploitation of old means for novel functions. That is, temporality is initially embedded in the expression of concrete action and only later becomes more complex and attached to words in different ways. As for the second principle, the expression of temporality starts with action words already available to the child and only later new forms of linguistic devices are employed by the child.

Aksu-Koç and von Stutterheim (1994) work with the assumption that children at the age of three do not have the concept of a timeline which allows for the integration of separate events into one overall conceptual representation. From that follows that a three year old's concept of simultaneity differs from a fully developed concept. They looked at data from German, Turkish, Spanish, Hebrew, and English speaking children and found that, in fact, children do not express a concept of simultaneity within a sentence but are able to understand the simultaneity of perception. That is, they can look at a picture and understand that the events embedded in it are simultaneous. The children's discourse is marked by an overuse of "and" words which represent the simultaneity link among the utterances. At an early age, such as three, the child can only detect that temporal relation perceptually; later, she will be able to have an abstract-representational conceptualization of time. That conclusion agrees with Nelson's view on the relationship between events and time knowledge in which understanding one implies understanding the other. It also agrees with Nelson's (1996) claim that temporality can exist in discourse before it is present within a sentence.

That increasing differentiation and integration of temporal concepts will be examined in this study as I focus on the different understandings children have of temporal words depending on their level of language development.

**Word and meaning (or language and concepts): the role of language in the negotiation of displaced time concepts**

When parents talk about displaced time with their children, more often than not their main communication tool is language. In displaced time talk, the events being discussed are not physically present and therefore understanding must be negotiated through talk using the tools language affords to translate those concepts into meanings more familiar to the child. There are other tools available to the adult and child that can aid in displaced time talk, for example, photographs, videos, drawings, calendars, and clocks, and those can serve as concrete time markers as well as memory aids. But language has devices that allow one to translate advanced temporal meanings into simpler ones for the child.

Developmental psychologists have placed increasingly larger emphasis on the role of social and linguistic interactions in cognitive development (e.g., Beals, 1997; Hampson & Nelson, 1993; McGrath & Kelly, 1986; Moerk, 1975; Sachs, 1983). That emphasis on the specific role of language in cognitive development generally stems from the writings of Vygotsky (1986) and Nelson (1973; Nelson, 1986, 1991, 1996), among others (e.g., Bruner, 1983; Snow, 1986)

Dore (1979) proposed that when analyzing language interactions between parent and child, it matters less that there is actual full understanding between the two and more that the parent is teaching the child *how* to converse. When the child says an utterance, the

parent's response informs the child about how her utterance is "conventionally" interpreted whether or not that interpretation is accurate. The child listens to the consequence of her speech act and modifies it so that the feedback comes closer to the meaning intended. The child also learns that the way he formed the utterance actually conveys "y" and not "x". That continuous feedback shapes future interactions, both for the parent and the child.

Vygotsky (1986) argued that language and thought develop in a dialectic relationship established with each other through word learning. That is, concepts are initially amorphous and they find their concreteness in words. Word meaning also develops as it is informed by the changing concepts. The word informs the concept which then becomes more differentiated and subsequently requires different words or combinations to convey meaning. In applying Vygotsky's theory to the development of time concepts, we can assert that the child, through her daily exposure to past and future talk, acquires a rudimentary meaning of time words and tense and that those word meanings evolve as the child becomes increasingly capable of differentiating them as concepts.

Vygotsky (1986), originally 1934) also found in his experiments on the development of concepts that:

> (…) the functional use of the word, or any other sign (…) plays a central role in concept formation. (…) concept formation is the result of such a complex activity, in which all basic intellectual functions take part. (…) words and other signs are those means that direct our mental operations, control their course, and channel them toward the solution of the problem confronting us. (pp. 106-107)

As he argued, the development of concepts goes through a process in which the child at first has a context dependent version of the concept (he calls them "complexes") and only later will be able to use that concept "freely". Hence, when a child grasps a concept, his understanding ceases to be situational and becomes abstract and free from context.

If we apply that position to the development of temporal concepts, we have that the young child does not understand time in the same way that adults do; their understanding is restricted to the context in which they are used, be it the pragmatic or the linguistic context. For example, the confusion children make among the deictic words "yesterday", "today", and "tomorrow" when they use one in place of the other shows that they understand that they are somehow linked to one another. That phenomenon might have been interpreted by Vygotsky as the child being in a associative type of complexes phase which, in other words means thinking of words, as they relate to one another.

Nelson (Nelson, 1986, 1991; Nelson & Gruendel, 1979) brought attention to the construction of event knowledge and scripts in the child's daily social interactions as key to the child's learning of temporal concepts. They allow the child to develop a sense of time in that they are organized in a structured temporal sequence from which the child can abstract time concepts such as order, simultaneity, and duration. Nelson (1991) describes a dialectical relationship between the child's understanding of events and of time in which knowledge about one is changed by knowledge about the other.

In the vein of Vygotsky, Nelson (French & Nelson, 1985; Nelson, Hampson, & Shaw, 1993) argues that abstract words, more specifically temporal ones, are used by children before their full meaning is understood since there is no immediate physical

referent in the world to map them onto. Comprehension of terms takes place first in contexts the child is comfortable with and only later becomes context-independent.

Tare and Shatz (2005) found support for that in their study. Children used time words "appropriately" before they used them "correctly". They presented preschoolers ages three to five year old with pictures of daily situations and asked them questions that required knowledge about conventional time markers for duration (minutes, hours, days, years). They found that children gave numbers as measurements of time duration but that the numbers were not reasonable (correct) for the question asked.

Still, according to Nelson, the beginnings of time are experiential but the concepts eventually become organized and formalized in language and in cultural tools (such as calendars, schedules, clocks, etc.). Language allows for the displacement of time to happen and thus for the past and future to exist in the child's discourse and thought. She (Nelson, 1996) not only stresses the role of language in mediating knowledge but she applies it to the development of temporal concepts.

There are three ways in which language organizes (and is organized by) temporal concepts: (a) language makes salient a relation that is not apparent in experience alone just as (b) representations derived from experience support the acquisition of the proper language, and (c) language promotes the construction of abstract concepts which are not available through direct experience.

Although there seems to be wide agreement that conversations between children and their parents are the "place" to look at if we want to understand the development of temporal concepts as Hudson (2002) reminds us, there is very little naturalistic data on parents' conversations to see how they contribute to children's conceptualizations of time.

Below I discuss some of the relevant studies that, first, focus on the development of displaced time and, second, that elect the *process* of that development as the unit of analysis. The variables that are investigated usually include the social-linguistic interactions with adults and peers, interactions with cultural tools, errors in production and in comprehension, as well as other areas of the child's development that relate to the development of time such as memory. In this dissertation, I will attend to variables that may play a role in the development of time and describe their interrelationships based on the research that follows.

## Research on the development of displaced time

Even though there is relative interest in children's development of reminiscing (e.g., Eisenberg, 1985) or planning (e.g., Hudson, 2001), the *transition* from thinking in the present ("here and now") to thinking in a displaced time frame ("there and then") is hardly ever investigated. One would expect differently since it has long been acknowledged that in U.S. culture, it is part of parents' daily conversations to transport the child to displaced time frames (past and future) (Nelson, 1996). Parents ask their children about their day in school, or about an outing with another person, or they reminisce about a past holiday that was exciting for one or both. Sometimes children too initiate those reminiscing routines by suddenly referring back to something they saw on a previous day. Similarly, parents spend time with their child planning their birthday party, or a holiday, or the upcoming weekend, or a visit to relatives, and so on. What is even more significant is that adults engage in those activities long before the child can make a contribution to the conversation. The child is exposed from early on not only to the routine of reminiscing and planning, even though he/she will only show knowledge of past and future after two years of age (Sachs,

1983), but also to more complex temporal concepts such as conventional ones (as Hudson, 2002, has shown).

Through language, adult and child can converse about time frames that are physically absent: the past and the future. At first, infants live in the "here and now" (Harner, 1982; Lewis, 1937) and then slowly develop a sense of the "there and then" as they acquire language. From the "now", children progress to the "not now" and from there they differentiate the time frames even further until, by the ages of eight to ten, when they understand the abstract idea of a calendar year, they achieve a comprehension that is much closer to the adult's concept of displaced time (Friedman, 2000).

Children's talk about the "there and then" is first seen in the beginnings of narrative construction (Lewis, 1937), where they refer to absent situations. Lewis, like Sachs (1983), suggested that initial references to displaced time occur at around age two. Lewis proposes that the development of displaced time be looked at in four phases: (1) reference to absent situations (after age one); (2) growth of linguistic intercourse (after age one and a half); (3) growth of reference to past (at around 1;8 years of age), and finally, (4) growth of reference to the future (after second birthday). Note that the development of future follows the development of past almost immediately. When looking at Lewis' examples, however, one realizes that her definition of future can be translated into "stating a wish"; that is, the child is expressing a want for the near future which does not mean that the child understands the existence of a future that is absent from the present. For that reason, we can not consider her use of future to be displaced in time.

Still, it is interesting to notice Lewis' arguments and assumptions in discussing displaced time. Although not explicitly stated, Lewis' idea of how displaced time develops

is in full agreement with Vygotsky's theory as well as with Nelson's (1991) later formulation on time. The implicit assumptions are that the cause for the development of displaced time can be found in the child's own manipulative and declarative needs in speaking and, more importantly, in the influence of adult reference to past and future in "linguistic intercourse". Lewis says that the role of social interactions had been neglected up to then, and emphasizes the supporting role the adult plays in progressively intensifying and clarifying the child's meager attempts to refer to past and present so that eventually the child can spontaneously produce those instances herself. Hence, it is not farfetched to find, in between the lines, Vygotsky's (1986) description of the transition from interpsychological to intrapsychological in children's learning of higher order functions. Initially, displaced time is negotiated at the interpsychological level – between child and adult – and then it becomes internalized and the child is able to talk about those meanings spontaneously, that is, without the adult's support.

Harner (1975) also examined children's learning about the language of past, present, and future. She found that two to four year old children struggle with the use of "yesterday", "today", and "tomorrow": a young child can understand that the past is different from the future but not how either differs from the present. The temporal adverb "yesterday" is typically misunderstood for both "tomorrow" and today. Harner found a developmental progression in which two year olds seem to think of "yesterday" as the same as "tomorrow". Three year olds are able to distinguish the two but seem to understand "yesterday" better than "tomorrow". Finally, four year olds appear to understand both "yesterday" and "tomorrow" equally well.

Harner's findings agree with Friedman's (2000; Friedman & Kemp, 1998) relatively recent work, in that children's learning of displaced time, while going from the "now" to the "not now", is asymmetrical: four year olds have some sense of a timeline in which the past precedes the present and different past events occur at different points in time but they fail to differentiate events from the future. Friedman's (2000) explanation for that difference (while agreeing with Nelson, 1996), is that memory is what makes the past easier to be differentiated. Because the future cannot rely on memory but solely on its social construction with others, it is a more demanding task to be accomplished. In addition, it requires that the child transport herself into a hypothetical situation.

Among the numerous experimental data collected by Friedman, there are two studies of greater relevance for this research. In the first (Friedman, 1990), children of ages three to nine were asked to order four cards that represented routine activities: waking up, eating lunch, eating dinner and going to bed. Friedman found that only at age four were children able to order the cards at above chance rates and only at age six they could do it with perfect accuracy. In the second study, Friedman (1991) asked children to point on a timeline to the relative recency of two events that occurred earlier in the day. Participants were preschoolers, 1st graders, and 3rd graders. Preschoolers did worse than the other two groups on judging which event was more recent than the other. They were able, however, to reconstruct the time of the day onto the timeline scale. Friedman argued that in order to recall the relative recency of an event, a person needs to be able to recall associates of the event that may have temporal value such as time of the day or before lunch and so on. The person also needs to possess general time knowledge and time patterns. That way, he/she is able to orient to the present and achieve a sense of chronological past.

Aksu-Koç (1998) looked at mother-child interaction in the development of tense-aspect in Turkish speaking children. Aksu-Koç found that mothers provide the scaffolding necessary for the use of displaced speech either through recalling or projecting information not directly accessible from context.

Research on the *process* of displaced time development

Until recently, most research on time stemmed from a Piagetian view of development, thus focusing on the child's "discovery" of temporal concepts rather than on the social process involved in their development. Moreover, as already mentioned, naturalistic studies that focus on the linguistic interchanges between parents and children are even harder to find. Add to that the fact that research on temporal concepts has never been of major interest in the field. Thus, there are only a few studies to be mentioned as background for the present one.

Moerk (1975) looked at the verbal interactions between mothers and their preschoolers. Although it was not the focus of his study, Moerk found that past and future talk increased with the child's linguistic complexity (as measured by MLU) between the ages of two and five.

He divided the variables from his study into two clusters: primitive and mature. The primitive cluster included child's imitations and encodings from picture books. The mature cluster included the child's descriptions of: the past, future plans, his/her own acts, and an object or event. Moerk found that the two clusters were negatively correlated with each other. But, more importantly, he realized that while the primitive cluster was correlated with the mother's modeling from picture books and corrective feedback, the mature cluster was correlated with the mother's more "sophisticated" categories: answering

a question, guiding the child's action, giving an explanation, and describing an object or event. Moerk concluded that there seemed to be a high level of calibration between the mother and the child in their conversations.

Eisenberg (1985) investigated two children's (both Spanish speaking) past talk with their families. The objective of the study was to examine the changes in their talk as they moved from less routine (i.e., less scripted) talk to more specific narrations about specifics of events. The two children were observed from age two to three, and their conversations were analyzed in terms of length of talk about each episode, familiarity of events, uniqueness of events, truth in child's statements, context of references, use of temporal forms, and the role of the adult in eliciting and maintaining the conversations. The author found no difference in the role of the adults. There were differences, however, in the actual conversations children had with them.

Eisenberg found that one child (Nancy) showed much higher frequency of past talk (186 instances) than the other (Gabriela, 57 instances). Nancy also established less routine (scripted) conversations (53%) than Gabriela (63%). Furthermore, only 29% of Nancy's talk was elicited by an adult as compared with 68% from the Gabriela's talk. Equally important was the finding that, for Nancy, 35% of talk was elicited by no apparent cue, whereas for Gabriela, the proportion was of 23%. In other words, there seems to be an overall difference between the two children, in which the one who is talking more about the past is learning how to do it and thus relying less on the adult to do so. In addition, that child (Nancy) exercises uncued talk more often than Gabriela and past and future talk frequently depend on the ability to do so.

The above results are corroborated by Fivush and Mandler (1985). They also found that familiarity with events predicted enhanced ability to sequence events in young children. In addition, the results agree with Nelson's theory in that it shows a developmental course in which initially children's participation in past talk is mostly dependent on the adult's; then, children are able to engage in talk about the past but rely on scripted descriptions of events; and finally, the child talks about specifics of events but still shows difficulty in planning a lengthy discourse.

Lucariello and Nelson (1987) looked at temporally displaced talk in mothers and their two year old child in relation to the role of knowledge base (sharing or not sharing information about the event), the effect of mother talk on child talk, and the impact of mother talk on the child's knowledge base. There are a few findings from their research that will serve as foundation to this study and I will discuss their relevance, even if some were not discussed in detail by the authors.

First, the dyads were observed in three different contexts and the authors found that the majority of temporally displaced talk occurred during scripted/routine contexts such as having lunch, getting dressed, bathing, and getting ready for bed. That finding supports the authors' initial hypothesis that temporally displaced talk should be context-sensitive and thus emerge more in routinized activities than in specific ones. According to them, routinized activities are already organized and predictable and so they allow the parent and child to negotiate other meanings, such as the past and future, rather than the present activity. Based on that result, the authors conclude that knowledge base must play a large role in supporting temporally displaced talk. Since mother and child share knowledge about the present activity, they can digress about events that are in the past or in the future.

Second, the content of past talk showed an opposite pattern to that of future talk. Past talk was more about specific events than routine ones, while future talk was more about routine events. Because past talk is about an event that has happened, it is expected that it should include more specific information about the event. Likewise, because future talk is usually about an event that has yet to happen, then details may be left to imagination. If that is due to the way children are being socialized by adults, then if we look at children's spontaneous elicitations of displaced time talk, we should find a similar pattern to what Lucariello and Nelson report. In their study, however, no past talk instances and only three future talk instances were initiated by the child, which does not allow for extensive analyses. That low incidence may be due to the children in their study being only two years old; older children may show increased elicitation of displaced time talk.

Third, children made more spontaneous contributions to future talk than to past talk. That can be explained by the fact that two year olds need to rely more on memory to participate in past talk. That might make it harder for them to contribute, since accuracy is usually a requirement. On the other hand, in future talk, there is no such condition. The child can venture ideas and wishes (see (Lewis, 1937) for the future with a smaller possibility of receiving feedback that might be discouraging.

Finally, Lucariello and Nelson found that past talk topics were more about distant (63%) than same day events. And, again, the opposite was true for future talk, where same day events (95%) prevailed. Since almost all topics were initiated by the mothers, it is fair to conclude that they may be displaying sensitivity to their child's limitations in participating in displaced time talk. Past talk is about events that have a definite reference. Even if not physically present, they are at least present in memory. Future talk, nonetheless,

is often all abstract. Planning what to do that *same day* requires only that the child express her wishes; but planning what to do the *next day* requires that the child know about tomorrow.

Sachs (1979; Sachs, 1983) followed her daughter's language development from age 17 to 36 months. Based on data from the recordings, she delineated the development of displaced reference in her child's talk. Sachs established that between 17 and 25 months the child could talk about the immediate past, that is, about an event that just happened in the immediate context. Between ages 26 and 31 she was able to talk about an earlier past, or that which occurred sometime other than the immediate context. Also around that age, her child talked about the future. Sachs noted, however, that her child was not as "interested" in future talk as she was in past talk. Amplified interest emerged only after 29-30 months of age. Finally, by 32-36 months, the child not only successfully referred to past and future but responded appropriately to 76% of adult questions about displaced reference; which was almost as good as her response to questions about the "here and now" (88%).

In terms of the parents' talk to the child, Sachs found that before 26 months of age, over half of parents' references to the past were the immediate past. Nevertheless, earlier past was also present in the parents' discourse, even though the child would not engage in that talk. Sachs concludes then, that although input becomes more complex as the child's talk "improves" there is no perfect match between parental speech and that of the child at any point in those early years. In other words, the adult seems to be constantly challenging the child to a higher level of complexity in their speech. It is as if the adults were trying to help the child reach higher limits in their zone of proximal development. In agreement

with Friedman (2000), Sachs concludes that learning to talk about the immediate past scaffolds the child's learning to talk about a more distant past.

Bauer and Mandler (1992) found that children as young as one year old can recall 2-act sequences in the correct temporal order. Norton (1993) looked at the relationship between parent-child interactions and the development of a sense of time. She worked with minority groups which she claims share with other groups the goal of socializing children to become competent adults. Developing a sense of time is a goal that is common to any social group.

Norton uses the division of time into two types: physical (objective, quantitative, and universal) and social (subjective, qualitative, and specific). Overall, children in her study heard more social than physical time statements. Furthermore, mothers' time statements were related to children's score on seriation tasks at age three. That is, children who scored higher in the seriation tasks heard many more time statements (mean = 10.8) than those who scored lowest (mean = 3.4). Norton also found that mothers' statements of physical time were related to children's scores on seriation tasks. Hence, even though children hear more statements about social time, their scores on standard tasks of sequencing events relates to their exposure to physical time. The data on which these findings are based, however, are slim since less than 2% of all mothers' talk was related to time.

Norton concludes that the children in the study are not being exposed to enough talk about time and may therefore be at a disadvantage in learning about past, present, and future. She suggests that future research be done within groups, comparing – as she did – upper versus lower subgroups from the samples. That way, one can understand changes

that need to be made that will benefit the group itself, rather than looking for norms from other groups to apply to it.

Huang (2000) observed two three-year old children (both Chinese, who spoke Mandarin) in mother-child conversations. Her goal was to concentrate on the child and see how he/she initiates and establishes temporal reference, as well as what other capabilities he/she may have that contribute to mastering temporal reference. More specifically, she examined the kinds of past references children use, their initiations in conversation, and their use of temporal markers in language.

Huang found that the two children showed different rates of talk about the past. Although there was more same day (like Lucariello and Nelson) and distant past than immediate past, the former ones relied more on the mother's elicitation than the latter. Furthermore, children relied more on aspect markers whereas mothers relied more on temporal adverbs.

Huang agrees that the development of past reference grows out of the immediate, and that through maternal scaffolding, other time frames can be part of the conversation as well. While talk about the immediate past benefits from contextual cues, talk about earlier times benefits from the discourse context. Although her findings support previous studies, Huang does not discuss the role of memory in supporting talk about the distant past.

Research on parental styles is of interest for present purposes because if one is looking at the parent-child conversations, the question that derives from it is whether there are individual differences among parents in the way they interact with their children.

## Differences in parental styles in talk

Moerk (1977) explains that there is extensive research showing that mothers adapt their language, or calibrate it, to "fit" the child's needs. Thus, contrary to what nativists argue, the language the child is exposed to is not a mumble jumble of highly complex meanings but rather it is made more simple and accessible to their needs and capacities. Moerk names that adaptation the "calibration of speech".

Hart (2004) conducted a longitudinal study following nine month old infants until they were three years old. She found that the richness of nouns in children's talk was related to their parents' richness and did not change much with age. That is, household differences were more relevant to richness than developmental change.

Reese and Fivush (1993) studied three year olds reminiscing about past events with their parents and compared the differences between reminiscing styles in relation to the gender of the participants. Their study stemmed from the findings in Fivush and Fromhoff (1988) that mothers' talk to their children could be divided into elaborative and repetitive styles. The elaborative style (or high elaborative) is characterized by lengthy conversations with a great deal of narrative structure; the repetitive style (low elaborative) is characterized by shorter conversations, simple descriptions, and less narrative structure. Reese and Fivush found that parents were more elaborative with girls than with boys. Fathers and mothers were equally elaborative or repetitive. Girls were more engaged in memory talk than boys. Elaborative styles in past talk did elicit more participation from the child, that is, an elaborative parent does predict an elaborative child.

Hudson (2001); (Hudson, 2002) conducted a study comparing mothers' styles (elaborative and repetitive) in relation to talk about the future and past. Children in the

study were two and half and four years old. Mother and child were asked to talk about past and future events both routine and novel.

Hudson found no differences in elaborations between future and past talk. In general, the future was more present in talk about novel than in talk about routine events. Also, there was more reference to generalized event representations in future than in past talk. Older children's past talk looked similar to younger children's in terms of elaborations; but in future talk, they used more elaborations compared to young children. More elaborative mothers did not yield more participation from children in future talk and Hudson interprets that finding as indicative of future talk being of a different nature from past talk. In past talk, elaborations usually provide memory cues for children to increase their participation; but in future talk, such help is of little use since the event has not yet happened. Hudson also examined mothers' use of conventional time language with their children. She found that mothers used more conventional time in future talk than in past talk.

Berko Gleason (Berko Gleason, 1975), as cited in (Barton & Tomasello, 1994) has claimed that because fathers spend less time with children they require the child to make communicative adjustments in order to convey her message to this less familiar partner. She named that the Father Bridge Hypothesis. Contrary to Berko Gleason, Barton and Tomasello (Barton & Tomasello, 1994), while compiling evidence from different sources, concluded that mother's and father's speech are similar with regard to several language measures: MLU, number of verbs per utterance, declaratives, interrogatives, requests, modifiers, locatives, absent object references, and repetitions. The differences were not in the structure of their talk but rather in the pragmatics of their interactions.

Fathers elicit shorter dialogues (Killarney & McCluskey, 1981), participate with fewer turns in conversations (Golinkoff & Ames, 1979; Rondal, 1980) respond less to their child and initiate less interactions with him/her (Hladek & Edwards, 1984). Fathers seem to be more controlling of conversations than mothers (Malone & Guy, 1982); their vocabulary contains a higher proportion of rarely observed words and a lower proportion of highly common words (Bernstein Ratner, 1988), there is more breakdown in conversations with fathers, and children make more effort on clarifying misunderstandings (Tomasello, Conti-Ramsden, & Ewert, 1990).

In summary, Barton and Tomasello conclude that research supports Berko Gleason's Bridge Hypothesis, as far as the father is the secondary caregiver and thus is a more demanding conversational partner.

The Present Study

My main purpose in this study is to understand the process whereby parents and children negotiate meanings about displaced time in their daily linguistic interchanges and the consequent effect those interactions may have on children's understanding and use of those meanings. It is of special interest to understand both how children manage to participate in displaced time talk with their parents and to what extent their parents adjust their language to accommodate their child's limitations.

The underlying assumptions that will guide the investigation are two-fold. First, based on Vygotsky's concept of the movement from interpsychological to intrapsychological, I presume that children internalize the meanings that are negotiated in conversations with their parents and subsequently are able to initiate those meanings on their own. Second, as Nelson has formulated, they learn temporal concepts by abstracting

them from event knowledge and scripts and negotiating their working concepts in conversations with their parents. In sum, temporal concepts are first learned in their linguistic and cultural environments and their bind to those is slowly loosened as the child learns to use them in different contexts.

The literature reviewed above provides a glance into how that process might unravel. We can conclude from it that parents calibrate their discourse to adapt to their child's changing abilities (as children may do themselves) but exactly how they do that with time language is still not clear. Fivush and Fromhoff proposed levels of elaboration as individual styles that might predict children's development of past talk. Those styles do not hold for future talk, however, as Hudson has indicated. In this study I will explore the possibility that parental styles (or fine tuning) may be explained by variables that are specific to the domain of time rather than general to discourse. That is, I proposed that parents adopt strategies in talking with children that are domain specific and that those may vary from household to household.

My other purpose is to take into account aspects of the development of temporal concepts that were not the focus of the studies presented here and that are quite scarce in the field. Namely, it is to investigate the cultural context within which temporal concepts are developed. That is, the family's use of temporal concepts in their daily living – aside from their conversations – and the use of those concepts in preschools and day care centers, where children usually spend half of their day. In short, a socio-cultural account of the development of temporal concepts requires that one look not only at the conversations held at home, but also at the overall presence of time in the places where the child spends her time.

Hence, the development of displaced time talk will be viewed in the dissertation from a socio-cultural approach. My analysis will include the child at home, the child at school, and the child's cognitive understanding of time. My objective is to avoid underestimating the complexity of the phenomenon and to explore it by looking both at its components as well as the whole.

As will be clear, the endeavor is an ambitious one with little background on which to rely, and hence the analyses and conclusions will be mostly exploratory and will require further investigation. Having said that, the methodology chosen for this study can be described in three parts: the child at home, the child at school, and the child's cognitive understanding of time.

For the child at home, I chose to analyze children's dinner conversations with their parents. The reason for looking at dinner conversations is twofold. First, previous research (Lucariello & Nelson, 1987) has pointed to the larger occurrence of time talk during routine events such as mealtimes. At those times, the child (and adult) is performing activities that require little attention thus allowing her to focus on talk about the non-present. Second, dinner occurs at the end of the day and it is typically the point at which the family meets to reminisce about the present day's events as well as to plan future ones (the following day).

In addition, a questionnaire was given to parents which addressed scheduling, presence and use of temporal artifacts, reminiscing and planning habits, and other temporal concepts.

For the child at school, I observed and took notes about the presence and use of temporal artifacts, the organization of time in the classroom, and the level of individual attention given to children.

Finally, children's cognitive understanding was assessed from an interview about time (based on Ames, 1946; and Nelson, unpublished), a sequencing task, and from their participation in dinner talk.

Research questions

Although this study could be called "naturalistic", there was no illusion about the "natural" character of the conversations. All families were told about the purpose of the study and handed the questionnaire questions (which made it even clearer) in my visit to their home. Some may have decided to put more effort into fulfilling that purpose than others. Given that nothing is natural once it is being "watched", we as researchers can only accept that limitation, acknowledge it, and take it into consideration when looking at the data. For example, this study will not be able to answer the question as to how often parents and children discuss past and future events at dinner; or how often they teach them temporal concepts; or even how often they use temporal language at dinner. What can be answered, however, is proposed below in the research questions.

To recapitulate as well as elaborate, children's knowledge about time will be assessed in three different ways. First, children's participation in dinner talk will be considered in terms of: their use of temporal language, their initiation of displaced time talk, and their spontaneous contributions to such talk. Second, all children will be interviewed about their temporal knowledge with explicit questions that range in difficulty. Third, a sequencing task (which is becoming a canonical paradigm for assessing children's knowledge - see the recent presentation by Gosse & Roberts, 2005) was devised with the purpose to evaluate children's capacity to transfer their scripted knowledge about their school routine onto an artificial task with a spatio-visual representation of it (a timeline).

The questions this study addresses are:

1. How do parents use temporal concepts? What are their ideas about time? How do they use time at home and what kind of knowledge do they think that their child has? Do they tailor their talk about time to their child's knowledge about time, to their verbal development, or to their age? In what way?
2. How do children develop temporal concepts? Are there developmental differences among children? Based on what developmental measure? Is their development of time contingent on their parents' use of temporal concepts at home? How? Do experiential and conventional time concepts follow different paths of development? How?

# Chapter II: Methods

Because research on the development of time usually adopts experimental methodologies, the idea of exploring dinner conversations required a first gauge into its ecology, to verify whether that was indeed a context of negotiation of temporal concepts and of past and future talk. Hence a pilot study was conducted using transcripts publicly available through the CHILDES database (MacWhinney, 1993). The study that follows allowed for a broader understanding of the prevalence of displaced time talk in dinner conversations, who participates and to what extent, as well as who initiates DT talk. The possibility of gender differences was contemplated but was not as dominant in the main study.

## Pilot Study

Studies that examine parent-child past and future talk at dinner time are rare so the analyses of the pilot data are general descriptions of the participation by the mother, father and child, and of the frequency with which past and future talk occur.

A subsample of transcripts was extracted from Gleason's 1970's data (Bellinger & Gleason, 1982). The subsample represents the conversations of 16 children with their parents at dinnertime. Children's ages ranged from 26 to 52 months and there were eight boys and eight girls. Participants at dinner usually included only the child and his/her parents; in situations where a younger sibling was present, his/her participation was limited.

The subsample was analyzed in terms of the length of talk, how much each participant contributed to dinner conversation, the frequency in which talk about past and future events occurred, who elicited displaced time talk, and the recency/distance of each event.

The length of dinner conversations varied to a great extent, ranging from 213 to 740 turns[2] (M= 486) altogether. The proportion of dinner that was accounted for by the mothers' talk varied between 22% and 44% (M= 35%). Father's talk ranged from 21% to 38% (M= 31%) of the transcript. Finally, the children's talk varied between 25% and 41% (M= 34%) of the dinner conversation. Nevertheless, on average, mother and child participated slightly more than father (M= .35, for mother, M= .34 for child, and M= .31 for father). Thus, speakers' participations at the dinner table were roughly even, and comparable throughout the sample. There was, however, a negative correlation in parental talk, that is, the more one talked the less the other did too.

Past events were discussed more often than future ones. There was a total of 160 past and 54 future events discussed altogether but there was a wide range in number of instances per household. Past event talk ranged from 1 to 16 instances and future events ranged from 0 to 13 instances per dinner.

Mothers elicited past talk (N= 77) more often than fathers (N= 41) but in future talk they were comparable (mother, N= 20, father N= 24). Children also elicited more past talk (N= 42) than future talk (N= 12). Increase in elicitation of displaced time talk seems to be only slight for past talk (ranging from zero to ten instances) and non-existent for future talk. The small amount of data may explain that pattern.

There were gender differences in the frequency of past and future talk. Girls were exposed to more past talk than boys (M= 12, for girls, M= 8, for boys) as well as to more future talk (M= 5.5, for girls, M= 1, for boys). They also elicited more past talk (M= 4, compared to M= 1) and more future talk (M= 1.25, compared to M= .25) than boys. There

[2] A turn is defined by the speaker's talk preceded and/or followed by another speaker's turns. The number given is the sum of total times any speaker took a turn in conversation.

were developmental differences as well. Past talk increased as children's MLU increased. Furthermore, fathers initiated more past talk with higher MLU children. With future talk, on the other hand, there was much more variability.

Finally, the distance of events showed different patterns as well. Parents' discussion about events in the future are usually about the distant future (77%), that is, the next day, week, or month rather than later that same day. That might be explained by the fact that dinner takes place at the end of the day when there is not much left to do before going to bed. Most past talk was about same day events (66%) such as telling the father what the child and mother did during the day.

There seems to be an increase in distant past talk as children's MLU increases that is more prevalent in household with boys than with girls. Conversely, there is an increase in same day past talk as MLU increases that is accounted for by the girls' more than the boys' data.

One other transcript from the same data set was looked at because it represented breakfast talk. As already mentioned, some of the results reported above may be explained by the fact that dinner occurs at the end of the day. Consequently, one would expect an opposite pattern for breakfast talk. The child analyzed is a girl, 38 months old (MLU= 2.89). Surprisingly, results show that past talk (N= 13) was still more prevalent than future talk (N= 4). The distance of the events discussed, however, was different. Past talk was mostly about distant events (N= 12). Future talk, on the other hand, was equally distributed between same day and distant (N= 2, each) events. Even though those data are for one child only, they indicate that: (1) past talk may indeed be more prevalent than future talk in

the child's daily routine, and (2) the distance of events discussed between parents and child may be contingent on the time of the day that they are talking.

In sum, dinner talk consists of a fair amount of displaced time talk but because there is such wide range of frequency of instances per dinner it might be prudent to collect repeated recordings of dinner talk to ensure that individual (dinner) variations are somewhat reduced. On the other hand, even though there was variability in the frequency of displaced time talk, the proportions of participation by each member of the household varied within similar range.

Another finding worth discussing is the mothers' higher elicitation of past talk, as compared with fathers and their equal elicitation of future talk. Gleason's data were collected in the 70's and, based on the content of the transcripts, it is evident that all mothers stayed at home during the day while the father was out working. Thus, when the father came home for dinner, the mothers had a lot to tell them about what happened with their child throughout the day. Conversely, future talk involves planning and that can be done by both parents. It is possible that a household where both parents are out all day might show a different pattern in who elicits what kind of displaced time talk. Lastly, gender differences were prevalent in these data. Those differences may or may not be confirmed by the data that will be collected because societal customs and parents' attitudes toward their children may or may not have changed substantially.

## The present study

As stated previously the methods devised for this study had the objective of tackling different areas in the child's life that could be of relevance to their development of temporal understanding, while focusing mostly on their conversations with their parents

during dinner. As such, what follows is an explanation of the procedure used in each step of the study, starting with the recruitment, the characteristics of the participants, followed by the methods used at the child's home and school.

## Recruitment

Children ages 36 to 65 months old were recruited from the pool of students at the Graduate Center and CUNY at large through the Child Development Center and other child care centers as well as through e-mail. A total of 20 families participated in the study; 9 with a daughter and 11 with a son. All but two of the children were an only child. Of the two children who had a sibling one was a boy who had an older brother who lived with a different family and only visited on weekends; the second child was also a boy who had a younger sister who was pre-verbal and did not participate at dinner. All families resided throughout the greater New York metropolitan area and all children attended a child care facility of some sort.

Since there is not much knowledge about the extent of variation of past and future talk in different socio-economic and ethnic backgrounds, the sample consists of middle-class households with some range of difference in income and in education. Families had only one child present for all dinner conversations. Eighteen children lived with both father and mother who were usually present during recordings. Two of them only saw their father on weekends. The other two children in the study lived with their single mother, but one of them also lived with the grandmother. All children were monolingual in English, with no or minimal exposure to a second language.

In recruiting the present sample, middle class households were the target pool. Initially, there were certain criteria to be met by all families. Preferably, they would

include a father, a mother, and an only child between the ages of two and a half and five. If the house or family included other members it was required that they not be regular participants of the dinner routine. Second, English had to be the child's first and dominant language. And third, they had to have dinner together on a regular basis.

Nevertheless, these strict criteria turned out to be an artificial stereotype of middle class households. There were two striking surprises that challenged that stereotype – not to mention the difficulty in finding only child households who speak dominantly English in New York City. First, single parent families were quite common. Second, parents did not consistently sit for dinner with their children. They either found other occasions to have quality talk with their child – such as breakfast or commute - or none at all. One parent – who could not participate in the study – regretfully told me that not only did she and her husband work during the day but at night her child ate dinner in front of the TV. A common reason given for not participating in the study was that the family never sat together for a meal. Parents often had different schedules in which the mother ate early with the child and the father ate much later alone (or vice versa).

Thus, along with the challenge of finding the "traditional" family unit in New York households, there was the additional issue of modern life where work hours outside the house are extended, commutes take up long hours, and parents have different schedules. In short, sitting down for dinner as a family seems to have become a luxury for many middle class households.

Having said that, in the present sample, one family has a mother who travels a lot and so they had to record their conversations during the days the mother was at home. Three other families where the father often travels or comes home late had to make

concerted effort to record a dinner when they all sat together. One of those used a Summer vacation in the country to record their dinners.

Appendix H has the consent form given to parents prior to their participation in the study.

## Participants

Children's ages ranged between 36 and 65 months with a mean of 49 months of age (*SD* = 9.01). Children who participated in the study were given two additional developmental scores based on the following measures: PPVT-III, used for receptive vocabulary and MLU (mean length of utterance in morphemes) for expressive vocabulary. PPVT-III scores are expressed in months and they ranged between 21 and 86 months, with a mean of 60 months (*SD* = 19). MLU scores ranged between 2.71 and 4.68 morphemes with a mean of 3.74 morphemes per utterance (*SD* = .57). A third score was given using PPVT-III/age which gave a rough idea of the extent to which children were more or less verbal for their age. That variable was given the name LANGAGE, and its scores ranged between .53 and 1.68, with a mean of 1.22 (*SD* = .33). Since this was an exploratory study, it seemed appropriate to have multiple descriptors with which to compare children. See below in Table 1 a description of all children and their developmental measures, and in Table 2 the intercorrelations among the measures.

Table 1. Children ordered by age, with PPVT-III scores, LANGAGE, and MLU

| Child | Age | PPVT-III | LANGAGE | MLU |
|---|---|---|---|---|
| 1 | 36 | 21 | 0.58 | 2.8 |
| 2 | 38 | 56 | 1.47 | 2.71 |
| 3 | 39 | 30 | 0.77 | 3.34 |
| 4 | 40 | 67 | 1.68 | 4.22 |
| 5 | 42 | 56 | 1.33 | 3.91 |
| 6 | 44 | 38 | 0.86 | 3.19 |
| 7 | 44 | 57 | 1.30 | 4.47 |
| 8 | 44 | 65 | 1.48 | 3.61 |
| 9 | 46 | 46 | 1.00 | 3.75 |
| 10 | 47 | 25 | 0.53 | 2.73 |
| 11 | 47 | 73 | 1.55 | 3.56 |
| 12 | 47 | 78 | 1.66 | 4.01 |
| 13 | 48 | 72 | 1.50 | 4.26 |
| 14 | 56 | 63 | 1.13 | 3.44 |
| 15 | 56 | 71 | 1.27 | 3.56 |
| 16 | 57 | 74 | 1.30 | 4.32 |
| 17 | 61 | 72 | 1.18 | 4.09 |
| 18 | 62 | 86 | 1.39 | 4.68 |
| 19 | 63 | 72 | 1.14 | 4 |
| 20 | 65 | 86 | 1.32 | 4.08 |

Table 2. Correlations among developmental measures

| | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| 1. LANGAGE | -- | | | |
| 2. PPVT-III | .82** | -- | | |
| 3. Age | .14 | .68** | -- | |
| 4. MLU | .58** | .74** | .51* | -- |

Note: **p < .01, *p < .05

As the table shows, there is a high correlation between LANGAGE and PPVT-III, but with age the correlation is low. PPVT-III, on the other hand, shows a significant correlation with age. MLU correlates with LANGAGE, but the relationship with PPVT-III is stronger. Finally, MLU also correlates with age. Thus, the measures of verbal development all seem to correlate with one another.

There were four children whose age in PPVT-III scores was lower than their chronological age, and thus had a LANGAGE of less than 1.0. One child had the same age in PPVT-III and in chronological measure, and all others had PPVT-III scores higher than their age (N = 15).

Although there were more boys (N = 11) than girls (N = 9) in the sample, there were no significant gender differences in age, PPVT-III, LANGAGE, or MLU. The means for those variables are below in Table 3 below.

Table 3. Means and *SDs* by gender

| | Age (in months) | PPVT-III (in months) | LANGAGE (PPVT-III/Age) | MLU (mean length of utterance |
|---|---|---|---|---|
| Boys (N = 11) | 50 (9) | 65 (16) | 1.31 (.29) | 3.74 (.60) |
| Girls (N = 9) | 48 (9) | 55 (22) | 1.11 (.35) | 3.73 (58) |

## Procedure

Once the family agreed to participate in the study, there usually was an initial visit to either the household or the child's school, so that the investigator could get acquainted with the child and with one of the parents, and explain the procedures of the study.

### Language Measures

Children's language skills were assessed using two measures: the Peabody Picture Vocabulary Test (PPVT-III, (Dunn & Dunn) and MLU[3] (mean length of utterance). The former measure was used either at the child's home or at school. It entails showing the child a series of pictures to choose from when the investigator says a word. The child is asked to point to the picture that represents the word. Thus, PPVT-III

[3] See (Brown, 1973).

measures the child's receptive vocabulary. This measurement was done right before the temporal task, in school.

MLU is a measure of the child's expressive language. It is calculated from the transcripts of the dinner talk and it is a count of morphemes produced by the child in 100 utterances. The CLAN program from the CHILDES (MacWhinney, 1993) database was used for computing children's MLUs.

The LANGAGE measure was computed by dividing PPVT-III by age. The purpose of this measure was to compare children based on how "advanced" they were for their age.

**At school**

There were one or two visits to the school, depending on the arrangement made with each family and with each school director. The visit was scheduled with the parents and the school so that I could observe a typical day and perform the study tasks with the selected child. Depending on the school, that scheduling was done only with the teacher, or with the teacher and the principal. More often than not schools were welcoming. Two centers were concerned about privacy when I announced that I had to take pictures of the child; and they asked me not to take pictures of children who were not in the study. Since that could not be avoided altogether, for one of the centers I had to surrender the pictures that did include other children.

The school was then advised that I would need a separate corner or room to work quietly with the child at some point during the day, and in most cases arrangements were made to accommodate the study; with the exception of one center, where all classrooms were connected, with no walls, so that there was no separate room or quiet corner. In that

center, I performed the tasks during naptime – the only moderately quiet time at the center.

I usually arrived at the center in time for the first activity of the day, and left after performing the tasks with the child (usually after lunch or nap ). In the classroom, I offered to help teachers, but they usually declined. My participation in the classroom varied from center to center. If I was invited by other children or by the teachers to participate in an activity, or to read a book, I obliged. Otherwise, I sat in a corner and observed. I made a point of not taking notes or holding notebooks or papers while in the classroom so that the teachers and children could be more at ease with my presence there. For that reason, notes about scheduling, presence of temporal artifacts and individual attention given were taken once I left the school (explained below). The only time when I disturbed the classroom was when I got up to take a picture of the child. I tried to be as nonchalant as possible, but it did draw some children's attention for a few seconds, until they became accustomed to it.

As soon as I arrived in the classroom, I approached the target child and reminded him/her of why I was there and what would happen throughout the day. I asked for the child's verbal consent and was never refused. I explained: "I am here to do my school project and your mommy said that you would like to be a part of it. Did she talk to you? [answers yes] Well, I am going to spend the day here with you, and take pictures of you doing different things. Then, when you wake up from naptime/when you're done eating your lunch, we are going to play a fun game with the pictures! Isn't that exciting? Do you want to? [yes] Ok, so I'm going to take one picture now, ok?" Then, I would answer any

questions the child might have and reiterate the plan, to make sure there would be no surprises – both for the child and for me.

Teachers typically did not announce my presence or the reason for it to the other children. Nevertheless, children were often curious and asked, so either I explained or the teacher did. Children were presented either with the explanation that I was there to play with child x, or that I was there to spend the day with them; a special visitor. In one classroom, children were so used to having strangers visit all the time that my presence was never questioned.

When it was time, I approached the teacher to announce that I was going to remove the child from the classroom for about fifteen minutes. Then, I approached the child, and told her it was time to play our special game. I then took the child to a separate room or corner where I had set up the materials for the game and an interview.

School structure and individual attention

Once I left the school, I made notes about: (1) whether or not there was a formal structure of daily activities, (2) whether or not there were temporal artifacts in the classroom and what use was made of them, and (3) how many teachers interacted with the children in the classroom. That last observation would provide the basis for examining the individual attention the target child could receive. Those notes provided an indication of how time was organized in school for the child.

The structure was rated as low or high, based on whether or not there was a fixed daily schedule at school. Classrooms with no clocks (or clocks that were not explicitly used with children) or calendars (standard or school made) were rated as low in temporal artifacts; conversely, when the objects were present and were used, then the school was

rated as high on temporal artifacts. Finally, individual attention was noted both in terms of the number of teachers in the classroom and their attitude towards children; that is, if they acted as directors of the cohort as a whole or if they divided their attention with the individual children.

A total of 11 preschools and day care centers participated in the study. The least structured center was one where there was no routine at all: children arrived and played until it was time to go home[4]. A snack was made available and the only structure imposed on them was the amount of time children could spend on each activity. That is, if a child was perceived to be spending too much time on a single activity, she was warned that a timer would be set for five minutes; at the bell, she was told to find a new occupation.

On the other end of the continuum, a few of the centers were highly structured with the same daily routine and set times to start and to end each activity. See Table 4 below for a description of each center along the two dimensions rated.

Table 4. Classification of schools/centers according to organization of time

| School/Center (# of children in study) | Temporal structure of activities | Individual attention[5] |
|---|---|---|
| A (3) | Low | Low |
| B (1) | Low | Low |
| C (1) | Low | Low |
| D (1) | Low | Low |
| E (1) | High | Low |
| F (2) | High | Low |
| G (1) | High | Low |
| H (3) | High | High |
| I (5) | High | High |
| J (1) | High | High |
| K (1) | High | High |

[4] Contrary to what one might expect, this school was one of the most prestigious of the centers visited. There was no relationship found between level of temporal structure in school and socio-economic status of parents.

[5] The ratio of child/adult ranged between 2:1 up to 12:1

Note: There were 11 schools of which a different number of children were in the study.

Temporal task

The task was given as an assessment of children's knowledge about the temporal concept of " sequence" – that is, the better the child sequenced the pictures on the board, the more abstract may be their understanding of how event follow one another on a timeline. It is important to stress that the task required not only that the child know her routine at school (script knowledge), but that she be able to manipulate that knowledge onto an abstract representation of that routine – a timeline.

The set up included a video camera pointed at a game board with a drawn cut out of the sun on the left hand corner, and a moon and stars on the right hand corner. In the middle, there were seven paper slots with Velcro on them. There was also a set of training cards, which had drawings of a cat going about her day. The cards were made from the book *Telling Time with Big Mama Cat* (Harper, Moser, & Moser, 1998). The pictures taken during the day were prepared with Velcro and numbering of the order in which they were taken; both in the back of the picture. See Appendix A for a picture of the board and the training cards.

I took Polaroid pictures of the child's activities in school throughout the day. The pictures were taken from behind or beside the child whenever possible, so as to try to get the child's point of view of the activity. When that was not possible, frontal pictures were taken instead.

Later in the day, usually after naptime, the child was removed from the classroom to either a quiet corner or a separate room, where the task was performed. There, the child was told about the game we would play. A set of training pictures (the cat story)

was prepared to help the child understand the idea of the sequencing game. The instructions given were as follows:

> "ok, so we're gonna put the pictures up here in the order of your schedule; when they happened during the day. So here is the morning, when you come to school, and here is the night, when you go home. First let's see how mama cat goes through her day. First, she wakes up. We'll put that picture up here in the first box. Then she has breakfast. We'll put that picture in the next box. Do you want to do it? Then she ……
> Now let's do the same with your pictures! Let's look at them. What are you doing here? And what about here? [and so on until all pictures are identified correctly] . Great! So let's put them up on the board, like we did with mama cat! What is the first thing you do at school when you come in the morning? Do you remember?".

Thus, the child is first asked to identify each picture. If the child misidentified a picture, I interfered and corrected it, to make sure that we agreed on the representation of each picture. Some pictures were ambiguous; either because the activity was repeated at a different point in the day, or because the picture was badly taken and you couldn't really tell what the child was doing. In those cases the picture was either eliminated from the sequence, or I explained it to the child. The pictures were designed to represent the routine activities at school. That way, even if the child couldn't remember exactly the order of their activities, he/she could rely on script knowledge to do so.

Six pictures were used with each child with the exception of one child for whom only five pictures could be used. Since children frequently required some help getting

started with the sequencing of pictures (usually the first and sometimes the second picture was placed by me), only the last four pictures were included in the coding of these data. Only 19 children were considered, because one boy did not have a routine of activities - children at his school had free play all morning with snack always available on the side.

Accuracy in sequencing was measured in three different ways: by looking at the (1) **proportion of pictures correctly ordered**, (2) **general direction of the timeline**, and the (3) **probability of relative order** (using Kendall's *Tau*). **Extent of help** was also measured, based on the number of pictures the investigator had to place to help the child understand the nature of the task.

For the first outcome, **proportion of correct responses**, the denominator was the number of pictures attempted by the child and the numerator was the number of pictures correctly placed by the child. A picture was correctly placed if it was after a previous event and/or before a future one. Out of order events were considered incorrectly placed.

The second outcome, **general direction of the timeline**, assessed the child's ability to place pictures along a timeline, respecting the *directionality* of past → present. The child's timeline was coded on a scale from one to three. When either all pictures were placed in the correct order or there was only one inversion of pictures, that child was given score "1". Children who misplaced one picture by *two or more slots* were given score "2", and children who misplaced two or more pictures were given score "3". The rationale behind the scale was that a switch between two pictures could have been the result of a distraction or confusion. But, as long as the general direction of events had been followed, the child was considered to have a complete representation of the timeline. Nonetheless, when a picture was displaced by two or more events, then the direction of the timeline was

considered to be compromised. Finally, if the child misplaced 2 or more pictures, that was considered to be a poor representation of the timeline.

The third outcome, **Kendall's *Tau*** (τ), was used to estimate the probability that the child's relative ordering was beyond chance. In this formula, the canonical order 1-2-3-4-5-6 was compared to the child's order looking for inversions in the sequence. The probability score acquired varies in magnitude from 0 to 1.

The **extent of help given** to each child was also recorded and added to the analyses as an explanatory variable; that is, the underlying assumption is that the more difficult the task seemed to the child, the more help he/she would ask for. It was measured on a 3-point scale, where "1" equals "no help" given (other than standard instructions), "2" equals "some help" (one picture was placed as the beginning point), and "3" equals "more help" (investigator places two or more pictures along the timeline).

The following example illustrates the coding: a child sequenced the pictures in the following order: 1-*2*-3-5-4-6, where 1 and 2 were placed by the investigator. In this case, extent of help was scored "2". The proportion of correct ordering was 75% (3/4). The general direction score was "1" and Kendall's *Tau* was .83, which means that the probability of the child matching the correct order was .83 more than by chance.

Kendall's *Tau* was calculated in the following manner: $\tau = 1-\frac{2(I)}{}$

where $I$ = # of inversions and $N$ = # of photos. Thus, in the example above, $\tau = 1-\frac{2(1).}{}$

That is, 1- (2/12), or 1 - 0.16, which equals 0.83. So this child's Kendall score was 0.83.

Interview with children

All children were then interviewed about their knowledge of temporal concepts (see Appendix B, for interview questions). There was a total of 18 temporal questions asked of each child, always in the same order. The questions included knowledge about age, days of the week, birthday, periods of the day (morning, afternoon, evening and night), mealtimes, definition of clock, scripted routine of waking up, difference between weekday and weekend, as well as more abstract concepts such as the irreversibility and universality of time. See attached list of questions.

**At Home**

Questionnaires

Parents were asked to fill out a questionnaire, which assessed the presence of scheduling in theirs and their child's lives, as well as their expectations about time. The objective of the questionnaire was to better understand how much scheduling goes on around the child, with whom they are at what times of the day, their expectations about their child's understanding of time, their use of TV and times of shows the child watches, and so on. See Appendix C for the full questionnaire.

The questions were divided into three groups that assessed: a) presence of time: amount and consistency of scheduling at home and use of cultural temporal tools with the child (clocks and calendars); b) DT practices: reported habit of reminiscing and planning events; and c) parent's perception of their child's knowledge about time. Appendix D shows the questions that belong to each of the three groups.

In analyzing the responses to the questionnaires, each question from each group was scored as either low or high in temporal awareness/presence. Then, high temporal

scores were added for each family in every category and used in the analyses. For example, if the parent responded that she engaged in the habit of reminiscing with her child and gave examples, that was considered to be high in temporal presence; whereas if the parent answered that they did not routinely engage in such kind of talk, then that was considered to be low awareness. The high scores were then added in each group of questions for each child. The final score was entered into analyses.

Dinner conversations

Parents were given a tape recorder and four tapes, to be used at dinnertime to record their conversations. Two families recorded some breakfast conversations, and one of those also recorded the morning commute (instead of dinner). Although the investigator expressed concern about the time of talk, parents guaranteed that those instances were when they had "quality" time to talk with their child.

Families were instructed to turn on the recorder as soon as the child sat down to eat, and to turn it off once the child had finished dinner and left the table. Parents were asked to record their dinner conversations twice a week – preferably on Mondays and Fridays[6] – for two weeks. Thus, there should be a total of four conversations per household, and those were to be analyzed as a single body of data for each household. The days of the week when families recorded their conversation were flexible, however. They were told that the main requirement was to get at least four instances recorded. Once all recordings were done, I either visited the family to retrieve the tapes, or they were handed to me through the school their child attended.

[6] The choice of days of the week for the recordings was made to increase the likelihood of displaced time talk to occur: the family may plan the weekend on Fridays and reminisce about it on Mondays.

There was a total of 81 dinners recorded. Of those, 10 were transcribed by a professional transcriber and then checked by me. The remainder 71 tapes were transcribed only by me.

Families recorded different numbers of meals, depending on their enthusiasm, equipment efficiency, their understanding of the instructions given, and their idea of what was feasible. The distribution of number of dinners per family was as follows: three dinners in four families, four dinners in 14 families, six in one family, and seven in another. Thus, most families did record the four dinners requested. One family recorded two breakfast sessions and one commute to work (in the car)[7]. Another recorded two breakfast sessions and five dinners. All others recorded dinners only.

The dinner table composition varied somewhat. See Table 5 below with parental data and attendance.

[7] That same family had recorded one more commute which was inaudible and thus excluded from data.

`Table 5. Mother (M) and father (F) presence and attendance at recorded meals

| PPVT-III | Family | Attendance |
|---|---|---|
| 21 | M | M |
| 25 | M & F | M & F (no participation) |
| 30 | M & F | M & F (only at 2/3 dinners) |
| 38 | M & F | M & F (only 1/3 dinner) |
| 46 | M & F | M & F |
| 56 | M & F | M & F |
| 56 | M & F | M (5/6 dinners) & F (3/6 dinners |
| 57 | M & boyfriend sometimes | M & boyfriend (1 dinner) |
| 63 | M & grandmother | M & grandmother (3/4 dinners) |
| 65 | M & F | M & F |
| 67 | M & F | M & F |
| 71 | M & F | M & F |
| 72 | M & F | M & F |
| 72 | M & F | M & F* |
| 72 | M & F | M* & F |
| 73 | M & F | M & F |
| 74 | M & F | M & F |
| 78 | M & F | M & F |
| 86 | M & F | M & F |
| 86 | M & F | M & F* |

* parent often times was not present at dinner, so that recording was done when parent could be there.

Coding the data

First, all transcripts were scanned using a list of temporal words (see appendix E) that were then divided into experiential and conventional words. The number of temporal words produced by each speaker in each family over all dinner sessions was computed and then entered into analyses. The denominator in computing the proportion of temporal words each speaker produced, was the total number of utterances they produced.

All dinner conversations were then coded by two people: the investigator and a research assistant. Coders read the transcripts and selected all instances of displaced time (DT) talk in each. Instances of DT talk included all conversations initiated by one of the

speakers that was about an event that happened in the past or in the future at least an hour before or after dinner. The child's participation in the conversation was not a pre-requisite for the conversation to be coded, as long as the child was sitting at the dinner table. The instance started at the beginning of the topic and ended when there was either a long interruption, a pause, or a change of topic (for a detailed description see the coding manual in Appendix F).

Once all DT instances were selected and it was established where each started and ended, each coder completed the remaining coding for half the data set, which was then checked by the other coder. There was a 79% agreement on the coding of DT instances, and that was based on 20% of the dinner sessions (16 transcripts). The interrater reliability was computed based on the coding of all transcripts, using the codes described below.

All instances were coded as either past or future talk depending on the time frame selected by the speaker who initiated the topic. They were then further coded as explained below.[8]

For each instance, it was determined which participant *initiated* the DT topic (i.e., mother, father or child), and the total *length* of the conversation for that instance (counted in number of utterances). The *relevance* of the topic to the child was also assessed. The criteria for that was the nature of the topic – related or not to the child – and whether or not the child chose to participate in the conversation. The topic was coded as either *near* (when event took place on the same day as dinner) or *distant* (when the event happened a day or more away from dinner time)[9]. *Scaffolding* of conventional temporal terms was

[8] For a complete and detailed account of each code, please refer to the coding manual in the appendix.

[9] This variable should be looked at with caution, since most conversations happened at dinner. It is expected then that most future talk will be distant (next day) and past talk will be same day (near).

coded whenever a parent added an explanation to a conventional temporal concept that came up in the conversation. *Negotiation* of temporal terms occurred whenever an adult pursued a clue given by the child that she might not be following or understanding the conversation (that clue could be in the form of silence or a question, or even an interruption). The number of *temporal words* produced by each speaker was counted for each instance. Finally, the number of *spontaneous contributions* was counted for each child. Spontaneous contributions were those that added elements to the conversation and that were not prompted by either adult.

# Chapter III: Results

The results of this study are organized in three parts. In the first part I set the background to the study; that is, I discuss the presence of time at home and in school, based on the parents' answers to the questionnaires, on my observations at school, on children's performance on the sequencing task, and on the interview. In the second part I examine the dinner conversations and the relationships among the variables included in the coding. In the third part I relate the variables discussed in parts I and II and make salient the more interesting relationships.

## Part 1: Questionnaires and observations at school

### Parents' reports of time at home

The aim of the questionnaires was to gauge how different the routines were in each of the households, what kind of displaced talk habits they had, and what perception parents had of their children's knowledge about time. The reported work schedule indicated that most parents worked full time; two mothers stayed at home, one worked part time, and three fathers worked part time.

**Group a: The presence of time**

Overall, only nine families (45%) had consistent schedules upon which children could rely. Most had varying schedules. Being on time was considered important for most families (70%) as was having dinner at home at the same time every day (85%), a regular bed time routine (90%), and a regular wake up time (85%). All children went to school or day care at least three times a week and all but one started day care at or before age three.

Clocks and calendars were reported to be used to different degrees by different families. Clocks were not used with children in seven families. One family claimed the

child could tell time. The other 12 families were in the process of teaching their child how to use clocks and tell time. Four children were reported to use the clocks but make up the time. Three children were said to know how to tell the hour but not the minutes on the clock and a couple of children had a digital clock they used. Calendars, on the other hand, were not used by 13 families. Only seven families showed some indication of using a calendar with their child to: show the days of the week; write in important dates; plan the future; teach the months of the year; or mark informal divisions of days: sweet days versus no sweet days.

It was more common for families to claim that their child used clocks somewhat and no calendars at all than the other way around. The exception to this was one child whose parents claimed that he used calendars but not clocks. That child's mother traveled often on business and the child showed distress in the dinner conversations about not being sure when the mother would be leaving again. That may have been a reason why calendars were more important in that family than in others. See Appendix G for more on parents' answers to the questions.

In coding the presence of time a plus or minus was given to each item for the child depending on whether the parents reported structured scheduling or not. No score was given when it was not clear from the answer. For example, if the parent reported that the wake up routine was: "a warm bottle of milk, wash face, brush teeth and get dressed", then that was given a plus. If, on the other hand, the parent reported being on time as "somewhat important for mom, but not for dad" then that was given a minus. In the end all pluses were added as the final score for the child.

**Group b: Displaced time talk practices**

When asked to provide a scenario of planning a birthday party, only seven (35%) families portrayed their child as giving significant and spontaneous contributions to the planning. Ten scenarios portrayed the child as passively answering the parent's questions and in three families, children made no contributions at all. See the examples below that illustrate the three types of portrayal.

Spontaneous contribution from child:

M1: Do you want lots of balloons?
C1: I want a big ladybug balloon and candy and potato chips and a silly clown… and

M2: we are going to have your party at Fafa's house.
C2: I want to have Harry and Peter Hero come.
M2: ok.
C2: can we have a pirata?

Passive answers:
M3: do you want to have friends over for your party?
C3: uh huh.

M4: what kind of cake do you want?
C4: chocolate.

F5: what kind of theme would you like to have?
C5: Star Wars.
F5: who would you like to be?
C5: Anakin.

No contributions:
M6: I'll be sending in cupcakes to school for you to celebrate at school. How about
C6: ok.
M6: how about x, y, and z?
C6: ok.

Reminiscing was a habit all families claimed to enjoy. Nonetheless, only five families said that their children also initiated it. Also, families were more emphatic about children's joy in reminiscing about a vacation than about their birthday party. When reminiscing about a vacation, children were said to provide rich details, enjoy looking at

photos, and to bring it up often. In reporting on birthdays, on the other hand, parents provided few details about children's reminiscing.

Planning birthdays, vacations, or family visits with the child was a common practice and was claimed to be done at least one week ahead of time. The anticipation in planning was coded from one to three, in which one represented notice shorter than one week; two represented one or two weeks; and three represented any time longer than 2 weeks. There was no apparent developmental pattern where children with lower PPVT-III were given shorter notice than older ones. The total number of questions where parents positively claimed to indulge in reminiscing and planning habits (DT habits) was entered for each family, and later compared to the other variables in the study.

**Group c: Parents' ideas about children's awareness of time**

Most families (70%) claimed that their child anticipated scripted events, and they gave examples. Of the ten families who said that their child had consistent TV/video viewing times, nine stated that the child could anticipate the sequence of programs or the time to sit down and watch. Although most families (17/20) asserted that their child was interested in clocks and/or calendars, as we saw above, their use of those tools in inconsistent.

There was a moderate correlation between scheduling in children's routines and children's knowledge of time; thus, children whose routine was consistent and where temporal tools were part of it were perceived by parents as being more aware of time ($r = .55$, $p < .05$).

There were gender differences in parents' perception of their child's awareness of time (t (18) = 2.26, p = .04). Boys were said to have more awareness (M = 3.73, sd = .79) than girls (M = 2.78, sd = 1.09).

Time in School

As described in the methods section, there were three parts of the research that were conducted at the child's school: observation of the school routine, sequencing of pictures that represented that routine, and an interview on temporal concepts. Below are the results for each.

Organization of time in school

There were three types of schools/centers: (A) low structure, low individual attention (N = 4); (B) high structure, low individual attention (N = 3); (C) high structure, high individual attention (N = 4). It should be noted that there were no schools with low structure and high individual attention. Large classrooms with few adults usually meant a highly structured environment (probably as a way to keep control over potential chaos).

The distribution of children per school type, age, PPVT-III, and MLU are described in Table 6 below.

Table 6. Number of children per school category and their descriptives: means and *sd*s

| School | Structure | Individual Attention | Children (N) | Age (months) | PPVT-III in months | LANGAGE | MLU |
|---|---|---|---|---|---|---|---|
| A | Low | Low | 6 | 46 (9) | 55 (24) | 1.18 (.42) | 3.46 (.64) |
| B | High | Low | 4 | 47 (6) | 46 (17) | .96 (.35) | 3.32 (.49) |
| C | High | High | 10 | 52 (10) | 70 (12) | 1.35 (.21) | 4.07 (.36) |

Independent samples t-tests were computed to verify whether or not the differences in means among schools were significant. The difference in PPVT-III between schools types B and C was significant, ($t(12) = -3.00$; $p < .05$); when age is taken into account, however, as is the case in LANGAGE, that difference is not significant. There also were significant differences in MLU between schools A and C ($t(14) = -2.48$; $p < .05$), in addition to B and C ($t(12) = -3.21$; $p < .01$). Although there were more children in school type C, the gender distribution was balanced for each school type.

**Children's knowledge of time**

Children's knowledge of time was assessed with measures apart from the dinner conversations. The first one was the sequencing task and second was the interview. The results for those are presented below.

Children's sequencing of school activities

Children were asked to arrange the Polaroid pictures of their activities during the day along a timeline placed on a board that represented their day. From the video tape of the sequencing, three scores were obtained: proportion of correct placements, Kendall's *Tau*, and the extent of help needed for the child to complete the task. The table of scores below summarizes the results.

Table 7. Scores on sequencing task ordered by PPVT-III.

| PPVT-III | Correct (%) | Kendall's *Tau* (0-1) | Help (1-3) |
|---|---|---|---|
| 21 | 0 | .33 | 2 |
| 25 | 0 | .50 | 3 |
| 30 | 0 | .67 | 3 |
| 38 | 33 | .83 | 3 |
| 46 | 50 | .83 | 2 |
| 56 | 100 | 1.00 | 3 |
| 56 | 100 | 1.00 | 3 |
| 57 | 100 | 1.00 | 3 |
| 63 | 100 | 1.00 | 2 |
| 65 | 50 | .67 | 1 |
| 67 | 100 | 1.00 | 1 |
| 71 | 100 | 1.00 | 1 |
| 72 | 50 | .83 | 2 |
| 72 | 75 | .83 | 1 |
| 72 | 100 | 1.00 | 1 |
| 73 | 100 | 1.00 | 2 |
| 74 | 100 | 1.00 | 2 |
| 78 | n/a | n/a | n/a |
| 86 | 100 | 1.00 | 1 |

Results were analyzed using the ANOVA procedure with both categorical and continuous variables. The scores for the sequencing task were compared to PPVT-III scores. Gender differences also were considered.

PPVT-III predicted how well children did on the sequencing task, as measured by **proportion of correct responses** ($F = 25.28$, $p < .001$) and by **Kendall's *Tau*** ($F = 16.47$, $p < .001$). When PPVT-III was controlled for, **extent of help** predicted how well children performed on the task as measured by **Kendall's *Tau*** ($\tau = 3.31$, $p < .01$). For **proportion of correct responses**, the effect was only marginally significant ($\tau = 1.91$, $p = .07$). No gender effects were found in children's performance on the sequencing task. No age effect was found either.

As already explained, children's performance on the sequencing task was measured in two ways: using % of correct responses and Kendall's *Tau*. Since the correlation between those two outcomes was nearly perfect, $r = .93$, $p < .001$, the two measures were used interchangeably in the remaining analyses.

Children's answers to the interview

The interview was the second assessment given to children in this study as a way to evaluate their knowledge about time. The challenge in summarizing the results from the interviews lay in the fact that the questions were neither standardized nor previously tested. Thus, the results should be considered an exploration in need of further validation.

A regression analysis was used to find which developmental measure best described children's correct responses to the interview. The result indicated that both PPVT-III and MLU predicted children's knowledge of time ($F = 67.16$, $p < .001$). That is, children with higher receptive and expressive language skills were also those who knew more about time. Age showed no relationship to children's answers on the interviews.

Answers to the questions varied somewhat from child to child. In order to compare the answers across children, they were divided into three groups, based on their PPVT-IIIs and the split was made at the larger gaps in scores. The *first* group, whose PPVT-III scores ranged between 21 and 46 months, included five children; the *second* group, whose PPVT-III scores ranged between 56 and 67 months, included six children; and the *third* group, with PPVT-III scores between 71 and 86 months, included nine children. The low PPVT-III group answered an average 33% of questions correctly; the second group averaged 68%; and the third group averaged 84% correct answers. What follows is a sample of the differences in answers to two of the questions from the interview.

Answers to two of the questions

"What day is today?"

In the *lower* PPVT-III group, none of the children knew the answer. Two children waited for examples from the investigator and then picked the last day mentioned as their answer; one child gave the next day to the ones mentioned as her answer, and then tried reciting the weekdays "Monday, Tuesday, Friday, Monday, Tuesday"; and the other two children offered no answer. In the *second* group, only one child gave the correct answer ("Monday, cause that was Saturday, the other day was Saturday"). Three other children offered a weekday as an answer and one child gave an event as a response: "school". In the *third* group, three of the children gave a correct response (one sang a weekday song in order to remember which day's turn it was); another three claimed they did not know; one said she needed to consult a calendar; one offered a weekday in the form of a question; and the last child asked the question back to the investigator.

In sum, there seemed to be a progression in children's response to the conventional temporal question of what day it is. The lower group indicates no familiarity with the concept echoing the last day mentioned. In the second group more children showed familiarity with the concept, and attempted to answer it by offering an appropriate even if incorrect response. Finally, in the third group there were more correct responses, and even the display of a strategy to respond.

"Is it the same time here as it is at home?"

The answers to this question also showed a progression from lower PPVT-III scores to higher ones. In both lower PPVT-III groups, two children answered the question

correctly; in the highest PPVT-III group five out of nine children correctly answered the question.

Scripts in answers

Answers that came from the children in the highest PPVT-III group were more scripted than the ones from lower PPVT-III children. See the example below, with age in PPVT-III in months in parentheses:

*Q: Will you be bigger or smaller next week?*
A: I'm small. (25 mos.)
A: I think bigger. (46 mos.)
A: A little bigger. (74 mos.)
A: Everyday you get bigger. (78 mos.)

*Q: When do you have breakfast?*
A: on the morning. (30 mos.)
A: breakfast? I don't know. (38 mos.)
A: once I wake up I dress first. (46 mos.)
A: afternoon. (56 mos.)
A: I only have it in the afternoon and in the night. (63 mos.)
A: in the morning after bed. (65 mos.)
A: in the very first morning. (72 mos.)

*Q: What do you do in the morning when you wake up?*
A: (no answer) (21, 25, 30 mos.)
A: I wake up with/ when my mom makes the bed on the floor. That's it. (38 mos.)
A: I go for school. (46 mos.)
A: eat some breakfast. Then I go back upstairs in my room. They I put on my Sega. (63 mos.)
A: breakfast time. I have breakfast. Papa make it. (73 mos.)
A: brush your teeth and eat breakfast. (78 mos.)

The examples illustrate how the younger children give either no answer, or specific short answers to the questions. The more verbal they are, the more specific information they provide. In the highest PPVT-III range children's answers were scripted, short and general.

Part 2: Time in language: dinner conversations

Since length of dinner varied greatly, it was measured using the total number of utterances per dinner, per family. The software from the CHILDES database (MacWhinney, 1993), CLAN, was used for counting utterances. Total talk per family ranged between 831 and 4,093 utterances (M = 2,237, sd = 1,090). Dinner talk averaged between 234 and 1,023 utterances per dinner. Children participated with 75 to 334 utterances per dinner, fathers produced from 5 to 337, and mothers from 104 to 410 utterances. The mean number of utterances produced per dinner was the highest for mothers (*M* = 253 utterances) followed by children (*M* = 180 utterances) and then by fathers (*M* = 163 utterances). Fathers showed the most variability in participation (*SD* = 110, compared with *SD* = 97 for mothers, and *SD* = 72 for children).[10] Gender differences were evident in the amount of talk at dinner. Table 8 summarizes the results.

Table 8. Means and standard deviations for amount of talk (in utterances) per dinner session

| | Total talk | Mother talk | Father talk | Child talk |
|---|---|---|---|---|
| Boys (N = 11) | 702 (261) | 307 (16) | 223 (105) | 214 (69) |
| Girls (N = 9) | 413 (166) | 187 (64) | 98 (76) | 139 (55) |

As shown, dinners in households with boys were longer on average than with girls ($t(18) = 2.87$, $p = .01$). Also, boys spoke more at dinner than girls ($t(18) = 2.62$, $p = .02$). Parents talked more with boys. The difference was significant both for mothers ($t(18) = 3.44$, $p = .003$) and fathers ($t(15) = 2.77$, $p = .01$).

[10] Average dinner length for one child was calculated based on four dinners, even though there were seven. The reason for this is that three of those were short breakfast attempts which were interrupted before they were finished, so they were grouped together with the others.

A correlation matrix was computed to look at the relationship between dinner length, participation, and gender. See the table below.

Table 9. Intercorrelations of LANGAGE, PPVT-III, age, MLU, gender, dinner length and participation at dinner (in number of utterances per dinner)

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| 1. LANGAGE | -- | | | | | | | | |
| 2. PPVT-III | .82** | -- | | | | | | | |
| 3. Age | .14 | .68** | -- | | | | | | |
| 4. MLU | .58* | .74** | .51* | -- | | | | | |
| 5. Gender | -.35 | -.28 | -.09 | -.01 | -- | | | | |
| 6. Length of dinner | .63** | .50* | .06 | .27 | -.56* | -- | | | |
| 7. Children's participation | .48* | .32 | -.06 | .22 | -.53* | .88** | -- | | |
| 8. Mothers' participation | .61** | .39 | -.10 | .13 | -.63** | .94** | .82** | -- | |
| 9. Fathers' participation | .60** | .59* | .20 | .40 | -.58* | .92** | .70** | .80** | -- |

Note: **$p < .01$, *$p < .05$
$N = 20$ for mothers and children, and $N = 17$ for fathers. For gender, boys = 1 and girls = 2, thus the negative correlations.

As shown, length of dinner correlated both with LANGAGE (r = .63, $p < .01$) and with PPVT-III ($r = .50$, $p < .03$). That is, dinner conversations were longer with children whose vocabulary was more advanced. Length of dinner did not correlate with MLU or with age.

## Overall use of temporal words

In order to get an estimate of the extent to which parents use time language at dinner, and compare that to children's use, a list of common temporal words was compiled [see methods and Appendix E]. For each participant's total dinner talk, the frequency of those words was computed. The total number of uses in all transcripts was then divided by

the total number of utterances each participant spoke. That proportion was used in further analyses as a representation of the presence of temporal words in each participants' talk.

As a whole, mothers used temporal words the most ($M$ = .18, sd = .04), followed by fathers ($M$ = .14, sd = .06), and then by children ($M$ = .12, sd = .05). Length of dinner talks correlated only with father's use of temporal words; that is, the more the father used time language, the longer the dinner (r = .70 , p < .01).

In order to investigate the relationship among the temporal variables and the descriptive variables, a correlation matrix was computed. See the table below with all coefficients.

Table 10. Intercorrelations of LANGAGE, Age, MLU, PPVT-III score, length of dinner, and temporal words for each participant

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| 1. LANGAGE | -- | | | | | | | | |
| 2. PPVT-III | .82** | -- | | | | | | | |
| 3. Age | .14 | .68** | -- | | | | | | |
| 4. MLU | .58** | .74** | .51* | -- | | | | | |
| 5. Gender | -.35 | -.28 | -.09 | -.01 | -- | | | | |
| 6. Children's Time Language | .42 | .49* | .35 | .68** | -.20 | -- | | | |
| 7. Mother's Time Language | .33 | .45* | .36 | .31 | -.11 | .55* | -- | | |
| 8. Father's Time Language | .72** | .52* | -.06 | .25 | -.29 | .36 | .52* | -- | |
| 9. Length of dinner | .63** | .50* | .06 | .27 | -.56* | .25 | .26 | .70** | -- |

Note: **$p$ < .01, *$p$ < .05
$N$ = 20 for mothers and children, and $N$ = 17 for fathers.

As the correlation table indicates, children's PPVT-III scores related to all speakers' use of temporal language. That is, the higher the child's receptive vocabulary, the more temporal language was used at dinner. MLU only correlated with children's use of temporal language ($r = .68$, $p < .001$). Age did not correlate with any of the measures of temporal words use.

So as to verify the correlations between children's temporal language and the developmental variables, a regression analysis was used. It indicated that neither age, PPVT-III, nor gender showed a relationship with children's use of temporal language. Nor did father's use of temporal language. Analyses indicate that children's use of temporal language is best explained by MLU, *beta* = .57, $p < .01$ or by mother's use of temporal language, *beta* = .37, $p < .05$ ($R^2 = .59$, adjusted $R^2 = .54$). That is, the more expressive the child, or the more temporal language they hear from their mother, the more temporal language they will use.

## Experiential and conventional time words

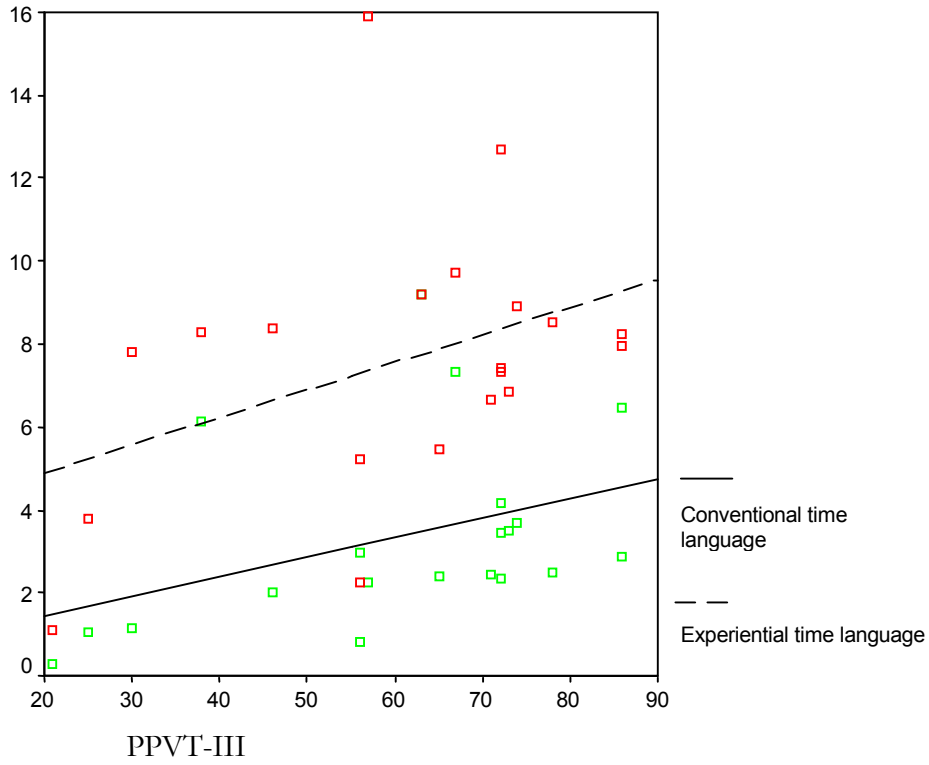
The list of temporal words was then divided into experiential and conventional words (see Appendix E for full list), based on Nelson's definitions (1996). Experiential time words were counted separately from conventional time words, and each was then divided by the total number of utterances for each speaker. Those proportions were used in further analyses. See table below.

Table 11. Mean proportion (%) of use of experiential and conventional time out of total talk by speaker.

| | Experiential time (SD) | Conventional time (SD) | Total (SD) |
|---|---|---|---|
| Mother | 9.12 (2.4) | 6.96 (2.7) | 17.74 (3.7) |
| Father | 7.39 (3.1) | 5.49 (3.2) | 13.86 (5.8) |
| Child | 7.58 (3.3) | 3.35 (2.3) | 11.50 (4.8) |

Overall, experiential time was used more frequently than conventional time in all households. For children, that difference was even greater than for parents. A one sample repeated measures test verified that children used experiential time more than conventional time, $F(1,19) = 35.86$, $p < 0.0001$; that is, children used experiential time more often than they used conventional time. That difference did not seem to increase or decrease with greater language development, however. See figure below for an illustration of the pattern, ordered by PPVT-III score.

Figure 1. Children's use of experiential and conventional language across PPVT-III scores.




To test whether children used conventional time less often than their parents, a one-way ANOVA was used. It revealed that there were no significant differences between mothers' or fathers' use of conventional time, and that children's use was considerably smaller than their parents' ($F$ (2,54) = 8.91, $p$ < .001). There were no differences in the use of experiential time.

In order to verify whether participants' use of conventional or experiential time language was related to any of the developmental measures, a correlation matrix was computed. See Table 12 below for a summary of results.

Table 12. Intercorrelations of LANGAGE, Age, MLU, PPVT-III score, and experiential and conventional time for each participant

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. LANGAGE | -- | | | | | | | | | | |
| 2. PPVT-III | .82** | -- | | | | | | | | | |
| 3. Age | .14 | .68** | -- | | | | | | | | |
| 4. MLU | .58** | .74** | .51* | -- | | | | | | | |
| 5. Gender | .35 | -.28 | -.09 | -.01 | -- | | | | | | |
| 6. Children's Experiential Time | .36 | .39 | .23 | .72** | -.09 | -- | | | | | |
| 7. Mother's Experiential Time | .18 | .16 | .04 | .13 | .04 | .28 | -- | | | | |
| 8. Father's Experiential Time | .62** | .54* | .09 | .17 | -.26 | .07 | .50* | -- | | | |
| 9. Children's Conventional time | .28 | .39 | .36 | .29 | -.29 | .40 | .46* | .21 | -- | | |
| 10. Mother's Conventional Time | .34 | .53* | .50* | .31 | -.18 | .22 | .21 | .15 | .69** | -- | |
| 11. Father's Conventional time | .68** | .38 | -.21 | .25 | -.28 | .19 | .46 | .61** | .49* | .09 | -- |

Note: $^{**}p < .01$, $^{*}p < .05$
$N = 20$ for mothers and children, and $N = 17$ for fathers.

As displayed above, mother's use of conventional time increases with the child's age. Their use also increases with children's PPVT-III scores; as does fathers' use (although not significant).

Based on the indication of a relationship between children's use of experiential time and MLU (r = .72), a regression analysis was used, controlling for PPVT-III. Results confirmed that MLU, *beta* = .724, $p < .001$, predicted children's use of experiential time ($R^2 = .53$, adjusted $R^2 = .50$).

Contrarily, children's use of conventional time did not increase with either MLU or PPVT-III. It did increase, however, with parents' use of conventional time. The correlations table indicated a relationship that was confirmed in a regression analysis. Mother's use of conventional time, *beta* = .505, $p$ = .02 or father's use of conventional time, *beta* = .443, $p$ = .04 both predicted children's use of conventional time independently ($R^2$ = .49, adjusted $R^2$= .42).

Parents' use of conventional time correlated differently with children's descriptive variables. Mother's use correlated with PPVT-III and age, while father's use correlated with the proportion of both, LANGAGE.

There were no gender differences in the use of experiential and conventional time in the households; in fact, the average use was nearly the same for boys and girls. See table below.

Table 13. Boys' and girls' use (%) of experiential and conventional time out of all utterances

| | Experiential time | Conventional time |
|---|---|---|
| Boys | 7.84 | 3.94 |
| Girls | 7.27 | 2.63 |
| All children | 7.58 | 3.35 |

Displaced in time: a closer look at past and future talk

All instances of displaced time (DT) talk, that is, talk about the past or future, were coded and entered into a spreadsheet for statistical analyses. The parts of the dinner conversations where parents and children talked about either a past or future event that occurred more

than one hour before or after dinner were selected and analyzed in more detail. Those instances were chosen because of the lack of visual or concrete information that might have helped them in negotiating temporal concepts. In other words, the objective was to analyze how parents and children managed to discuss temporal concepts having language as their main tool for negotiation.

Results indicate that there was a total of 795 (M = 24.99, SD = 30.05) DT instances altogether. They ranged in length between 1 and 421 utterances. There was a total of 564 past talk instances (14,362 utterances) and 231 future talk instances (5,508 utterances). Although there was a total of 14,362 utterances in past talk, and 5,508 utterances in future talk, on average past talk was not expressively longer (M = 25.46 utterances per instance, SD = 27.80) than future talk (M = 23.84 utterances per instance, SD = 34.98),. That is, participants spent similar lengths of time discussing DT topics, whether those were about the past or the future.

Out of the 795 DT instances, mothers initiated 456, fathers initiated 238, and children initiated 101 instances. That is, mothers were clearly leading talk about events displaced in time. All speakers initiated more DT talk the more they participated in dinner conversations. That is, if we look at the raw number of DT instances initiated by each speaker and compare that to the total number of utterances they produced, there was a positive correlation. See figures below:

Figure 2. Number of DT instances initiated by children and their total talk

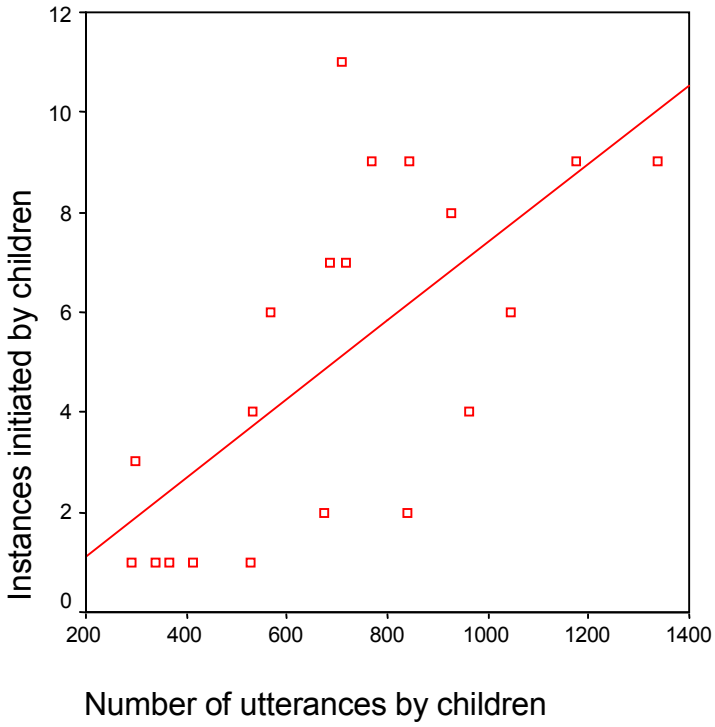


Figure 3. Number of DT instances initiated by mothers and their total talk

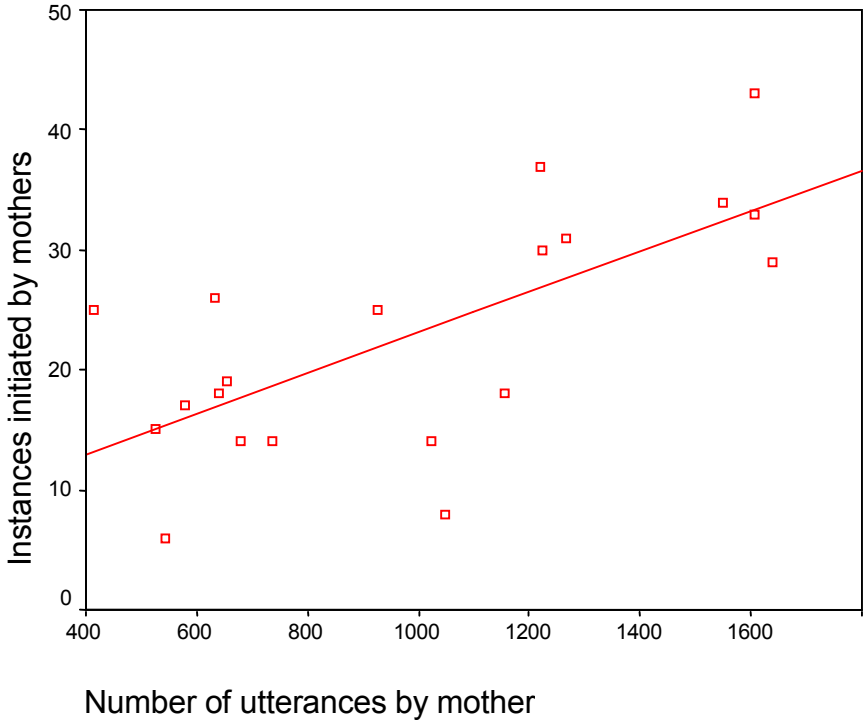
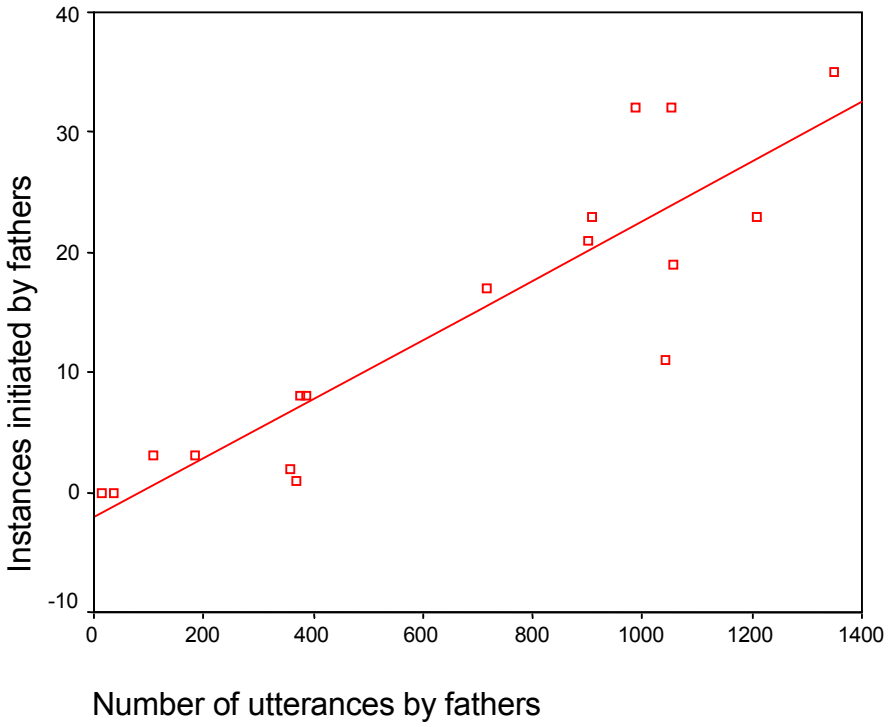


Figure 4. Number of DT instances initiated by fathers and their total talk




If we look at each family separately, households where fathers initiated more DT talk (number of father's DT instances divided by father's total talk) had children with higher receptive vocabulary in relation to their age (LANGAGE), and these children also initiated more DT talk ($r = .78$, $p < .001$). Mothers, however, did not show such pattern. See figures below.

Figure 5. LANGAGE and father's initiation of DT talk per household

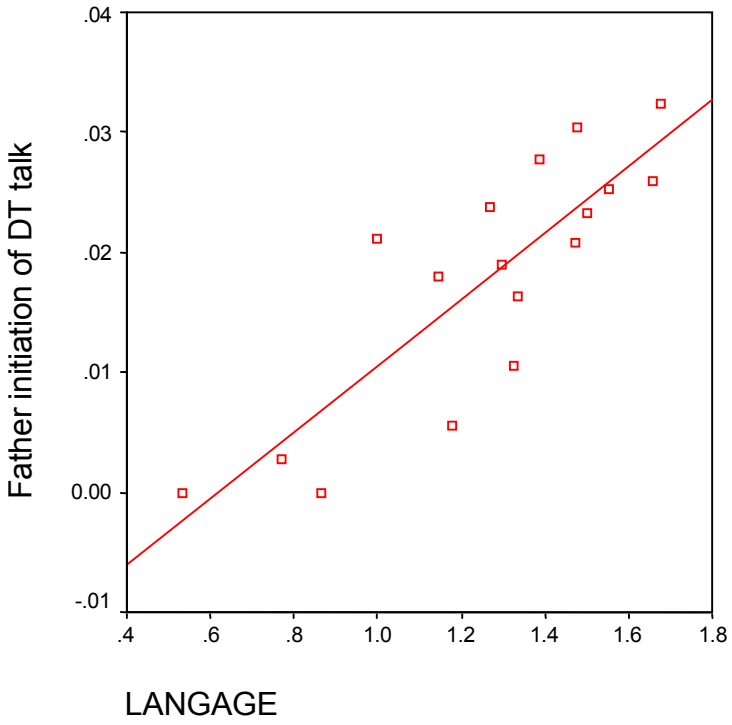


Figure 6. Total number of instances initiated by father and by child

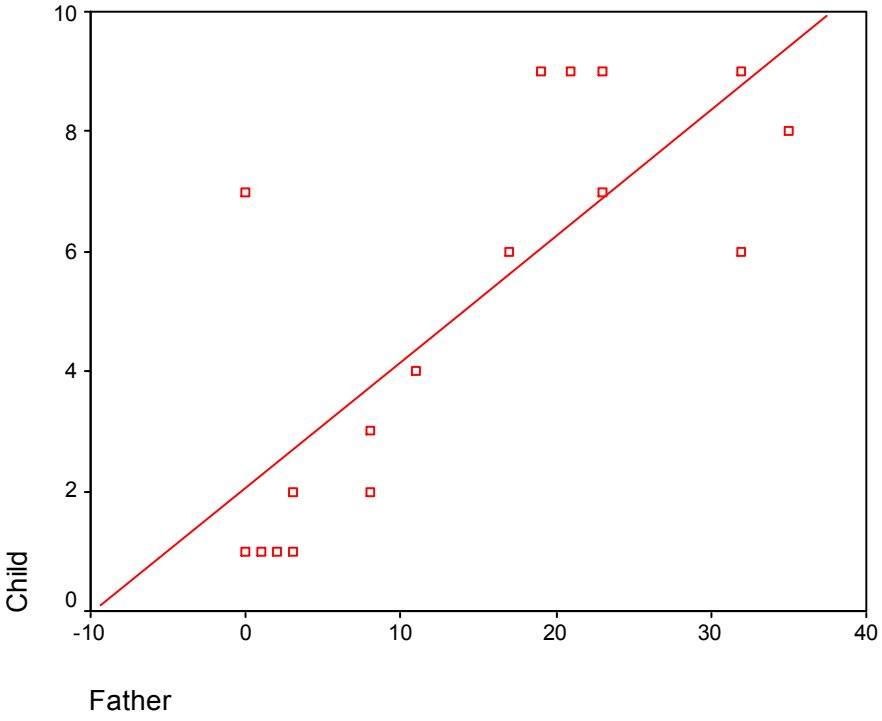


Figure 7. LANGAGE and mother's initiation of DT talk per household

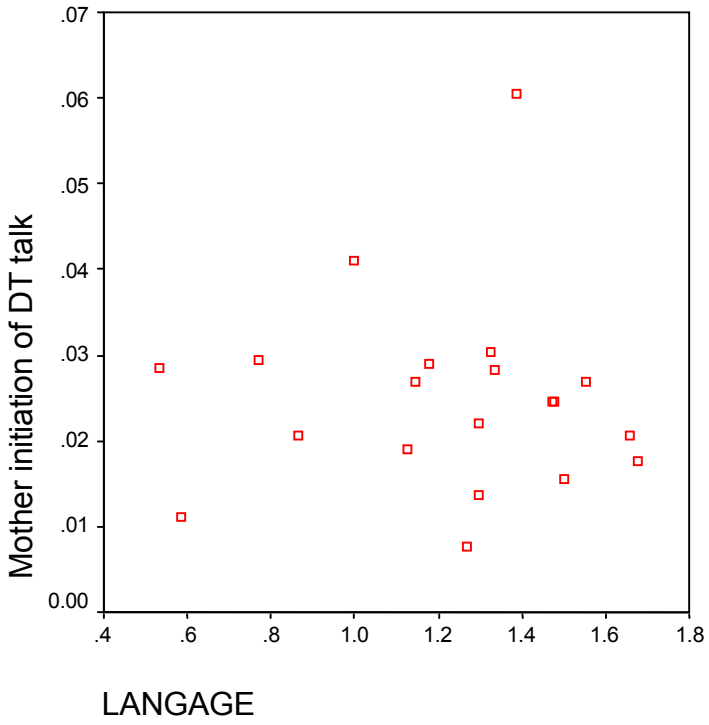
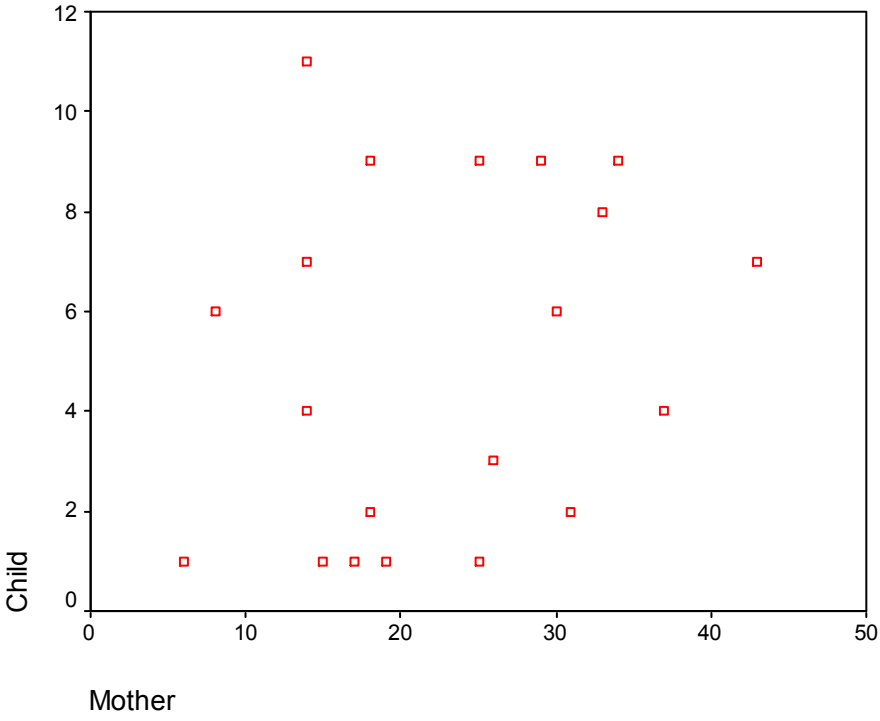


Figure 8. Total number of instances initiated by mother and by child




If we look at families as the unit of analysis - as opposed to DT instances - we find that there was an average of 39.75 (SD = 21.91) DT instances per family. Altogether, they ranged in length between 76 and 1,730 utterances per family. Past talk instances averaged 28.20 per family (SD = 18.05) and future talk averaged 11.55 (SD = 7.27) per family.

**Initiation of DT talk**

Since most conversations were held at dinner time it was expected that future talk would be about distant events and past talk would be about near events. That prediction held true. In past talk a mean of .36 (sd = .48) of events being discussed had happened on a different day, whereas in future talk that proportion rose to .78 (sd = .42).

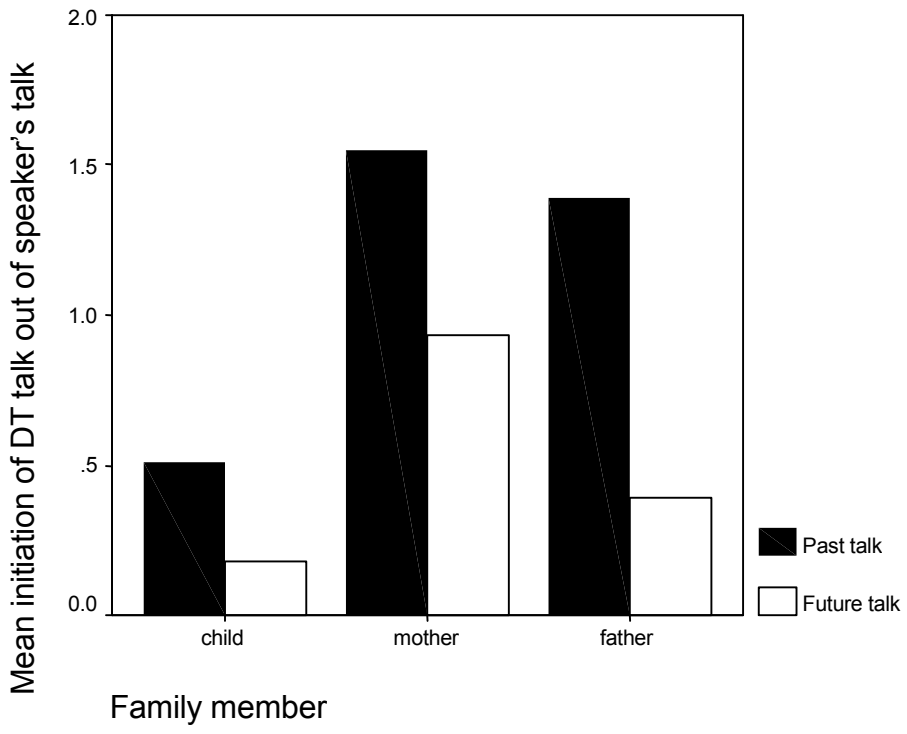
The table below shows how many instances of past and of future talk were initiated by each speaker.

Table 14. Past and future talk: total number of instances initiated by each speaker, with means and SDs

| | Past talk (M, *SD*) | Future talk (M, *SD*) | Total |
|---|---|---|---|
| Mother | 309<br>(15.45, *9.13*) | 147<br>(7.35, *4.90*) | 456 |
| Father | 179<br>(10.53, *9.04*) | 59<br>(3.47, *4.53*) | 238 |
| Child | 76<br>(3.80, *3.27*) | 25<br>(1.25, *1.37*) | 101 |
| Total | 564 | 231 | 795 |

As the table indicates, past talk was more common than future talk among speakers. Nevertheless, those refer to raw numbers. For the figure below, the number of instances initiated by the speaker was divided by their total talk.

Figure 9. Initiation of past and future talk per family member



Based on the figure, mothers seem to have dedicated more of their dinner talk to initiating DT talk compared to fathers and to children. Additionally, both parents initiated more DT talk in their dinner talk than their children did. One way ANOVA analyses were computed to investigate those differences. See below.

In past talk, there was a significant difference between children and mothers ($t(29) = -5.55$, $p < .001$) and between children and fathers ($t(22) = -3.96$, $p < .005$). There was no difference, however, between mothers and fathers. In future talk, there also was a significant difference between mothers and children ($t(21) = -3.64$, $p < .005$), and between fathers and children there was trend ($t(21) = -1.77$, $p = .09$). Different from past talk, there was a significant difference between mothers and fathers in future talk ($t(35) = 2.24$, $p < .05$).

The proportion of instances initiated by each speaker dedicated to past or future talk indicates that out of all of mother's DT talk instances 64% (sd = .24) were past talk instances (and thus 36% was future talk); out of father's, 70% (sd = .31) were; and out of children's, 69% (sd = .33) of all instances were about a past event. Thus, fathers and children initiated similar proportions of past and future talk, while mothers initiated slightly more future talk than they did.

Given that length of talk varied greatly among households, the presence of DT talk was computed in two different ways. First, the number of DT instances was counted for each family and entered as a raw score. Then, the number of utterances in every instance per family was counted and subsequently divided by the total number of utterances produced by that family. That way, past and future talk had two scores for each family.

If we consider the number of DT utterances in relation to all of each family's talk, then we have that, on average, 44% of talk was about events displaced in time with a mean of 29% dedicated to past talk and 14% dedicated to future talk.

With the purpose of finding out whether there was more displaced time talk as children develop, intercorrelations were computed among the descriptive variables for children and past and future talk proportions. See the table below.

Table 15. Intercorrelations among children's descriptors and the presence of past and future talk in the household

| | # Past talk instances | # Future talk instances | **Total DT instances** | Proportion of past talk utterances | Proportion of future talk utterances | **Proportion of DT utterances** |
|---|---|---|---|---|---|---|
| LANGAGE | .79** | .33 | **.76**** | .49* | -.20 | **.30** |
| PPVT-III | .60** | .40 | **.63**** | .33 | .01 | **.34** |
| Age | .03 | .27 | **.11** | -.03 | .29 | **.25** |
| MLU | .35 | .30 | **.39** | .15 | -.03 | **.12** |

Note: **p < .01, *p < .05

As shown, the LANGAGE measure predicted past talk; that is, the higher the child's PPVT-III for their age, the more past talk they experienced at home. Likewise, the child's receptive vocabulary (PPVT-III) was related to past talk habits in the household. Future talk showed a smaller relationship that was not significant.

The figures below illustrate how past talk increased with development while future talk showed a less clear pattern when we looked both at the raw number of instances of past and future talk in each family, and when we looked at the proportion of past and future talk out of total number of utterances.

Figure 10. Total number of past and future talk instances and children's PPVT-III scores.

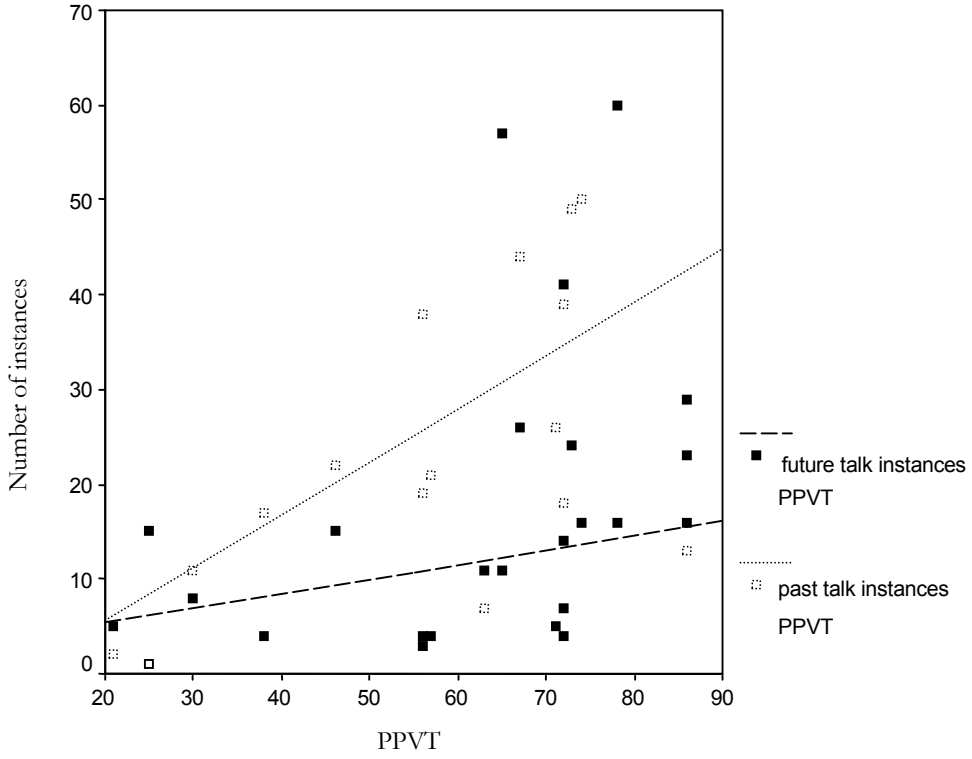
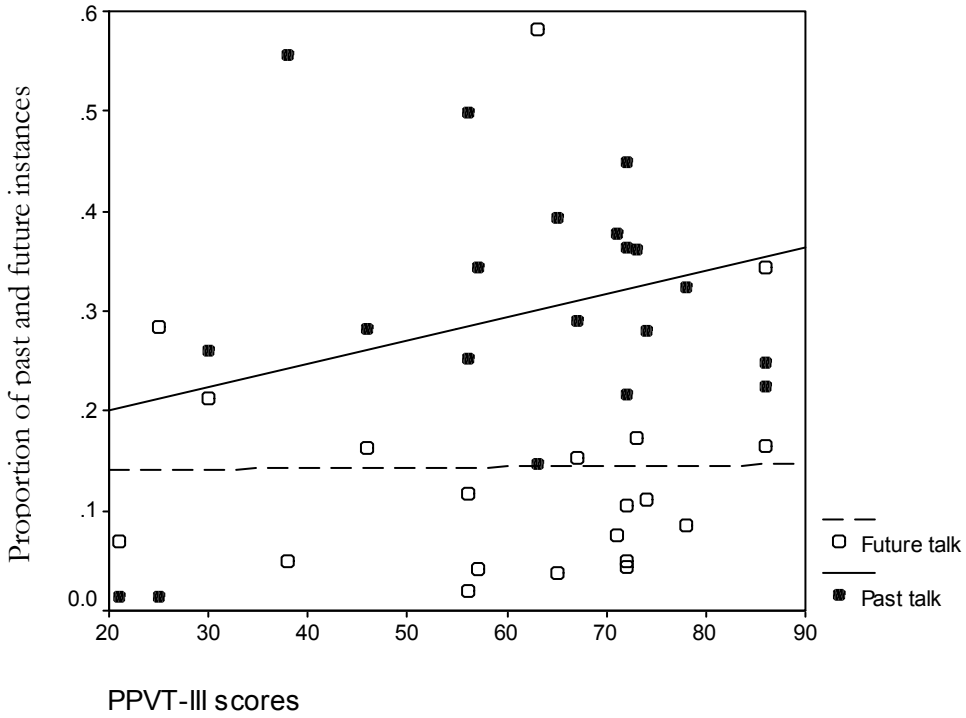
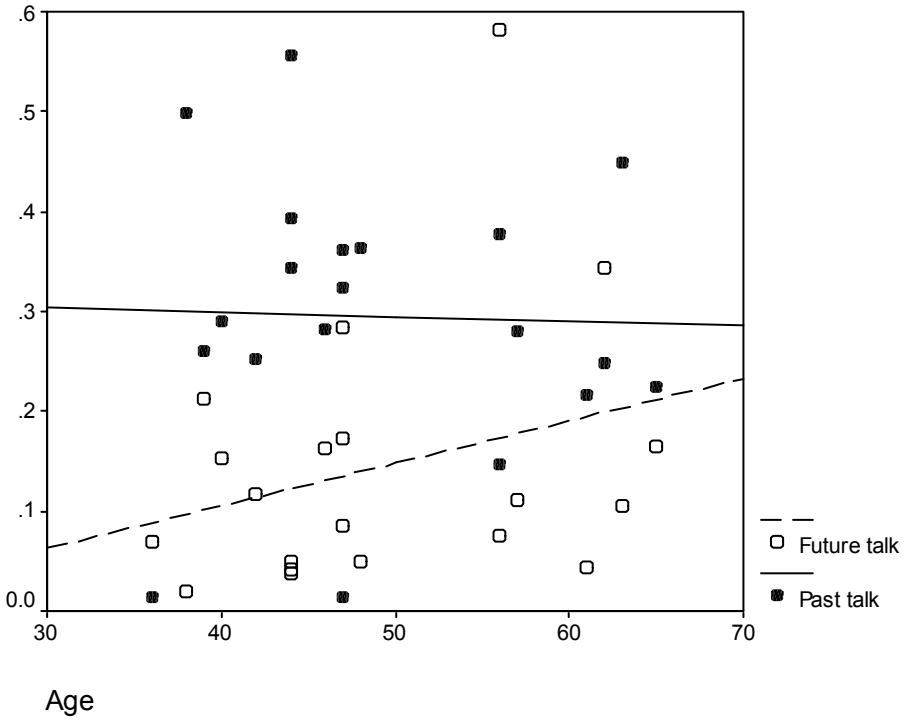


Figure 11. Proportion of past and future talk instances out of total talk and children's PPVT-III scores.




Surprisingly, however, when we looked at children's age, rather than PPVT-III scores, the opposite picture presented itself. Future talk revealed to have a stronger link to age (r = .29, n.s.) than past talk. See the figure below.

Figure 12. Proportion of past and future talk and children's age.




If we consider the length of talk in each DT instance, it was generally longer when children initiated past talk (M = 32 utterances per instance, sd = 33.6) than when they initiated future talk (M = 22, sd = 20.9) or when either mother or father initiated DT talk.

Independent samples t-tests were computed across all instances of DT talk to find whether negotiation and scaffolding had differed between past and future talk. Since future talk is more abstract than past talk, it was expected that it would require more negotiation and more scaffolding. Results confirmed that prediction: there was more negotiation in future talk (M = .21, sd = .41) than in past talk (M = .15, sd = .36) ($t(385) = -1.80$, $p = .07$). There was also more scaffolding by the mother in future talk (M = .15, sd = .48) than in past talk (M = .07, sd = .37) ($t(349) = -2.01$, $p = .05$). In addition, mothers used more temporal words in future talk (M = 4.69, sd = 7.55), than in past talk (M = 2.95, sd = 4.02)

(t(285) = -3.32, p = .001). None of the father or children variables showed an effect in these analyses.

**Spontaneous Contributions and use of temporal words in DT talk**

Independent samples t-tests were run to see under which conditions children participated more in DT talk, as well as used more time language.

More expressive children (MLU) gave more spontaneous contributions (t (774) = 1.81, p = .07). There were more spontaneous contributions when the topic being discussed was relevant to children (t (19) = 18.41, p < .0001) and when they initiated DT talk (t (13) = 7.94, p < .0001), as opposed to their parents. The mean number of spontaneous contributions when children initiated DT talk was 4.44 and when either parent initiated it that number dropped to 1.37. DT talk was lengthier the more children participated in it (t (19) = 25.08, p < .0001).

Furthermore, there were more contributions by children when there was negotiation (t (774) = 8.43, p < .0001), and when the topic was about a past event (M = 2.36) rather than a future one (M = 1.88) (t (19) = -1.90, p - .08).

Finally, children used more temporal words when they initiated DT talk (M = 1.34) rather than their parents (M = .58) (t (19) = 7.53, p < .0001).

Summary

The results above are evidence that verbal measures of development are key elements in explaining children's learning of temporal concepts. Both performance on the sequencing task and on the interview were explained by PPVT-III scores, and results on the interview also were explained by MLU.

In relation to dinner talk, both total length and father's participation at dinner related to children's PPVT-III scores. LANGAGE was related to all dinner variables (participation and length) and to father's initiation of DT talk. Use of temporal words related to LANGAGE, PPVT-III, and MLU; more specifically, children's use of experiential words was explained by MLU. Also, both LANGAGE and PPVT-III related to increased discussion about past events at dinner. Finally, MLU was related to increased spontaneous contributions to DT talk by the child.

Conversely, age did not show significant results in explaining children's development of time. In the next section I bring the variables together, and move beyond the developmental measures in explaining children's learning about time. I will re-examine some of the explanatory variables and then relate them to the outcomes that measured children's temporal knowledge.

Part 3: Relating the variables

The purpose of the multi-methodological approach in this study was to explore the possibility of a convergence among all or some of the results in telling a story about how children develop temporal concepts. To that aim, the next step in the analyses was to relate the multiple variables to evaluate the possible convergence that might exist in answering the research questions proposed. First, the outcome variables that together represent the child's temporal knowledge in this study are re-defined, together with the explanatory variables that have emerged from the previous analyses. These are then considered in terms of their influence and interactions.

Once I have established which outcome and which explanatory variables to focus on, I will examine (1) how the parental explanatory variables converge in predicting

children's knowledge of time (the outcomes), then (2) how parents' ideas about the presence of time at home relate to their practices at dinner and children's knowledge, and, finally, (3) how the structure of time at school may influence children's knowledge about time.

Lastly, I will explore some of the data more qualitatively, in an attempt to bring home some of the findings from the quantitative analyses, and see whether the actual conversations reverberate them.

*Outcome variables*

Children's temporal knowledge:

Sequencing of school activities

Interview (number of correct responses)

Spontaneous contributions to DT talk

Use of time language at dinner – experiential and conventional

Initiation of DT talk

*Explanatory variables*

Child characteristics:

Age in months,

PPVT-III (language age in months),

LANGAGE (PPVT-III/chronological age, ranges from 0 to 1), and

MLU (mean length of utterance derived from dinner talk).

Home characteristics:

Amount of scheduling and

DT talk habits (both derived from parental reports)

School characteristics:

Structure of activities and

Individual attention (both derived from observation)

Dinner talk:

Initiation of DT talk (by mother and father)

Relevance of DT talk to child

Use of time language (by mother and father)

Scaffolding and negotiation

Before discussing the relation of explanatory to outcome variables, let me first explore the relationships among the outcome variables themselves to determine whether the five outcome variables were consistent in the stories they told about children's knowledge of time. To that extent, a table of intercorrelations was computed. See the table below.

Table 16. Intercorrelations among children's outcome variables

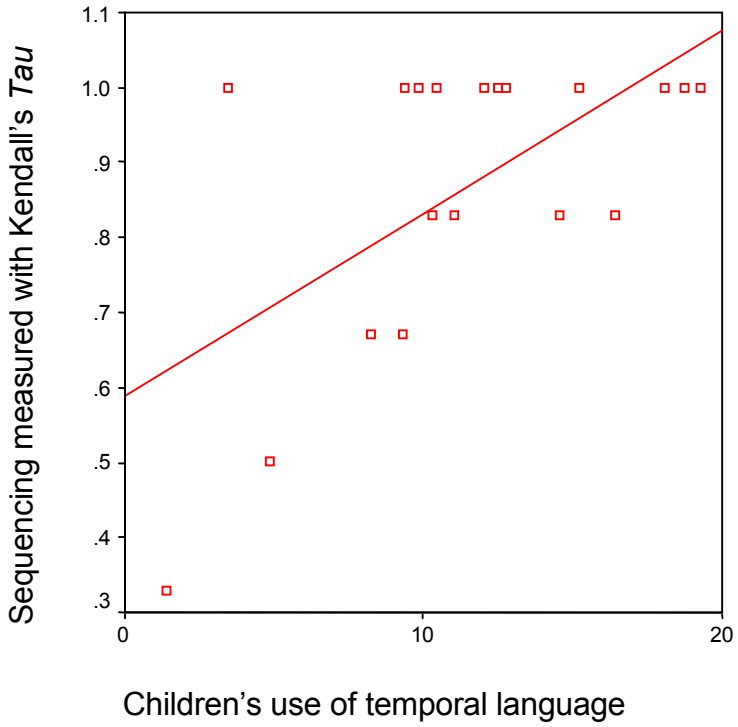
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 1. Time words | -- | | | | | | |
| 2. Experiential time | .89** | -- | | | | | |
| 3. Conventional time | .75** | .40 | -- | | | | |
| 4. Initiation of DT talk | .55* | .60** | .30 | -- | | | |
| 5. Spontaneous contributions | .54* | .53* | .29 | .35 | -- | | |
| 6. Interview | .55* | .49* | .37 | -.12 | .41 | -- | |
| 7. Sequencing task (Kendall's*Tau*) | .61** | .48* | .51* | .17 | .50* | .77** | -- |

Note: **p < .01, *p < .05

As shown above, children's use of temporal words correlated with their initiation of DT talk, their spontaneous contributions, their answers to the interview, and their performance on the sequencing task. Those correlations were all positive, which means that the more children used temporal words, the more knowledge they seemed to display, both in cognitive tasks and in their conversations with their parents.

The relationship between children's overall use of temporal words and their performance on the sequencing task is illustrated in the figure below.

Figure 13. Children's use of temporal language and their sequencing of school activities




Children's spontaneous contributions to DT talk correlated not only with use of time language, but also with their performance on the sequencing task and, to a smaller degree, to the interview answers.

In addition, children's use of conventional time correlated with their performance on the sequencing task; that is, the more conventional time language they produced, the better they were able to sequence daily school activities. Their performance on the sequencing task also showed a strong correlation with their performance on the interview.

Children's initiation of DT talk correlated with their use of experiential time at dinner ($r = .60$, $p < .01$), which in turn correlated with spontaneous contributions ($r = .53$, $p < .05$), and with answers to the interview ($r = .49$, $p < .04$).

In sum, all outcome variables seem to point to the same direction, with the exception of the negative correlation between the interview answers and children's initiation of DT talk. More importantly, the cognitive measures (interview and sequencing tasks) are in strong agreement, and children's use of time language also agrees with them.

Parental styles in DT talk

In order to characterize a profile of the parent who interacts with the child at dinner during DT talk and to find which one best predicts children's knowledge of time, the first step is to draw tables of intercorrelations for mothers and for fathers, and then to compare the profiles that emerge to the variables that represented children's knowledge of time.

The variables considered for the profile correlations were 1) overall use of temporal words in dinner conversations (divided by number of utterances produced by speaker), and its subgroups: 2) experiential time words and 3) conventional time words; 4) number of instances of initiation of displaced time talk (divided by total number of utterances by the speaker), 5) scaffolding of conventional temporal concepts (divided by utterances produced by speaker in DT talk), 6) instances where negotiation of temporal concepts took place in

DT talk, and 7) number of temporal words in DT talk (divided by total number of DT utterances). See the tables below.

Table 17. Intercorrelations among profile variables for *mothers*

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1. Temporal words | -- | | | | | |
| 2. Experiential time | .77** | -- | | | | |
| 3. Conventional time | .77** | .21 | -- | | | |
| 4. Initiation of DT talk | .02 | -.36 | .43 | -- | | |
| 5. Scaffolding in DT talk | .55* | .39 | .55* | .04 | -- | |
| 6. Temporal words in DT talk | .32 | .46* | -.04 | -.24 | .38 | -- |

Note: **p < .01, *p < .05

As shown, mothers who initiated more DT talk also used more conventional time language. Mothers who used more conventional time language also used more scaffolding. Thus, the style that can be drawn for mothers include the use of conventional time language and scaffolding. Scaffolding by the mother also predicted negotiation and the relationship was positive (*Wald* Chi-square = 4.31; p = .04).

Table 18. Intercorrelations among profile variables for *fathers*

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1. Temporal words | -- | | | | | |
| 2. Experiential time | .88** | -- | | | | |
| 3. Conventional time | .90** | .61** | -- | | | |
| 4. Initiation of DT talk | .54* | .47 | .53* | -- | | |
| 5. Scaffolding in DT talk | .43 | .16 | .63** | .16 | -- | |
| 6. Temporal words in DT talk | .79** | .82** | .64** | .49* | .17 | -- |

Note: **p < .01, *p < .05

With fathers, their measures of use of time language were all related, and the more they initiated DT talk, the more time language they used (both overall and in DT talk). Like the mothers in the study, the fathers' increased use of conventional time was related to their use of scaffolding in DT talk.

## Parental styles and children's outcomes

Parents' results were then compared to the measures of children's knowledge of time outside the conversations, that is, their scores on the interviews and the sequencing task only. The objective of this analysis was to examine the relationship between what parents were doing at home and the possible effect that might have on the child's construction of temporal concepts. The table below shows the intercorrelations among the variables.

Table 19. Intercorrelations among parental variables and children's outcomes

| | | Sequencing task (correct) | Interview |
|---|---|---|---|
| Mother | Conventional time | .49* | .48* |
| | Scaffolding | .24 | -.00 |
| Father | Conventional time | .58* | .38 |
| | Scaffolding | .45 | .18 |

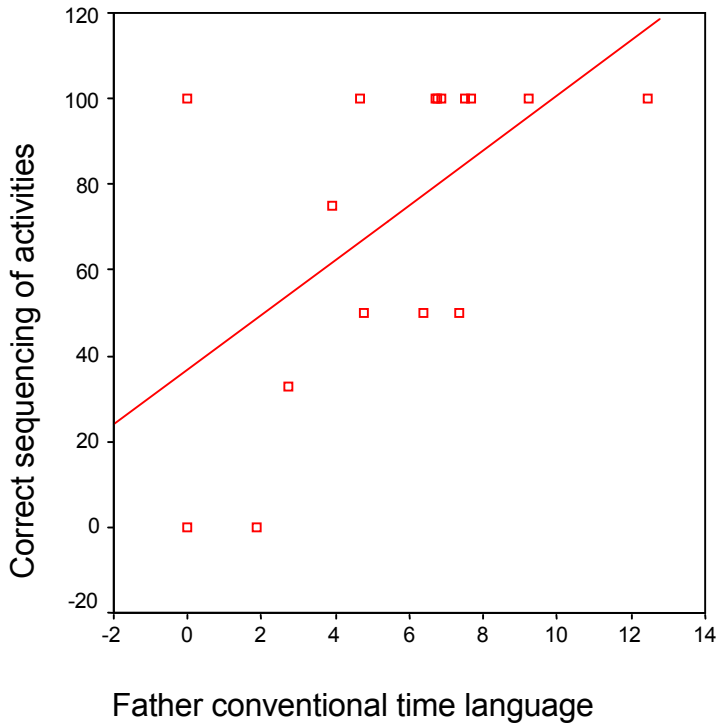
Note: *$p < .05$

As displayed, parents' use of conventional time seems to be the strong predictor of children's knowledge of time. Although it did not reach significance, fathers' scaffolding showed a moderate relationship with children's performance on the sequencing task.

So as to investigate a possible relationship between parents' use of temporal language and children's performance on the sequencing task, a regression analysis was computed with parental measures as the explanatory variables (in addition to PPVT-III as

the control). Results revealed that neither mother variable changed the variance accounted for by the model that already included PPVT-III. In contrast, there was a trend towards father's use of conventional time language (*beta* = 3.33, $p < .08$) predicting children's performance on the sequencing task as measured in proportion of correct sequencing ($F(2,13) = 18.29$, $p < .001$). See the figure below:

Figure 14. Father's use of conventional time language and children's sequencing of activities




Although father's use of experiential time also correlated with children's sequencing ($r = .59$, $p < .05$), when it was entered in the regression model with PPVT-III as the control variable, the beta coefficient was not significant.

The proportion of utterances dedicated to displaced time talk also was related to children's performance on the sequencing task ($r = .62$, $p < .01$). When it was entered into

the regression model together with PPVT-III as the control variable, the model was significant ($F(2,16) = 21.12$, $p < .001$). When both proportion of DT utterances and father's conventional time language were entered into the model, it was significant ($F(2,15) = 10.53$, $p < .001$), as were all beta coefficients.

Children's use of temporal words was treated as an outcome measure of children's knowledge about time. As such, it was compared to the explanatory variables in the study to see which ones may explain its variability.

As it turns out, the mother variables were the ones with an impact on children's use of time language. We already know that mother's use of time language predicted children's use (together with MLU); but mother's use of scaffolding in displaced time talk also correlated with children's use of temporal words ($r = .44$, $p = .05$) and, more specifically, with children's use of conventional time language ($r = .66$, $p < .01$). In addition, children used more conventional time language the more displaced time talk there was ($r = .58$, $p < .01$) and, more specifically, the more future talk ($r = .47$, $p < .05$). Other than father's use of conventional time, no other father variable related to children's use of temporal words.

Time at *home* – parental reports

In order to assess how the extent of scheduling that goes on in the child's life, as well as parents' perceptions of the presence of time at home relate to what goes on at dinner and the knowledge that children have about time, correlations were computed comparing the specific variables of interest. Those were: scheduling and DT practices. Scheduling was scored based on how busy the child's day was on a typical week. DT practices were scored based on parents' reports on

Households with more scheduling had mothers who participated more at dinner ($r = .44$, $p = .05$), and gave more scaffolding ($r = .44$, $p = .05$) to their child in DT talk. Surprisingly, fathers gave less scaffolding in the more "scheduled" houses ($r = -.54$, $p < .05$).

Displaced talk practices were found to be related to the sequencing task results ($r = .57$, $p = .01$). A regression analysis was used to verify the relationship, and, as it turned out, it was found that both DT habits and LANGAGE explained children's performance on the sequencing task ($F = 17.98$, $p < .001$). That is, children whose receptive language was more advanced for their age and who experienced more DT talk at home had a better performance in sequencing their daily activities at school.

There was a trend for a relationship between reported DT practices and LANGAGE ($r = .38$, $p = - .96$). DT practices also correlated with father's use of temporal words, both overall at dinner ($r = .55$, $p = .02$) and specifically during DT talk ($r = .51$, $p = .04$). Fathers' correlations with DT practices was the strongest with their use of experiential time at dinner conversations ($r = .64$, $p < .01$).

Time at School – structure of activities and individual attention

In order to verify whether school type related to children's knowledge of time, the results on their use of time language, spontaneous contributions, their interview scores, and their performance on the sequencing task were analyzed for each school. Overall, school type C showed the highest: PPVT-III, MLU, age, use of temporal words, correct sequencing, and the least amount of help.

Independent samples t-tests were computed comparing the schools a pair at a time. Spontaneous contributions showed no difference among the schools. Neither did the

sequencing scores. The other measures showed differences among schools. See Table 20 below for a summary of the data.

Table 20. Mean use of temporal words and mean scores on interviews by school type

| School/ center | Time words (SD) | Experiential time (SD) | Conventional time (SD) | Interview scores (SD) | Extent of help (SD) |
|---|---|---|---|---|---|
| 1 | 8.16 (4.70) | 5.88 (3.36) | 1.81 (1.27) | 10 (4.9) | 2.20 (.84) |
| 2 | 11.88 (6.10) | 6.62 (2.54) | 4.83 (3.58) | 8.25 (3.77) | 2.75 (.50) |
| 3 | 13.35 (3.67) | 8.99 (3.1) | 3.68 (1.83) | 14.7 (2.31) | 1.50 (.71) |

When looking at temporal language children produced during dinner conversations, there was a significant difference between school types A and C only ($t(14) = -2.47$, $p < .05$). That difference was best explained by conventional time use ($t(14) = -2.19$, $p < .05$). Experiential time showed a trend, but was not significant ($t(14) = -1.89$, $p = .08$).

The interview scores showed a trend on the difference between school types A and C ($t(14) = -2.21$, $p = .07$). Nonetheless, school types B and C showed a significant difference ($t(12) = -3.96$, $p < .01$) in children's scores.

The extent of help given to the children was significantly lower in school C than it was in school B ($t(12) = 3.19$, $p < .01$).

## Summary of findings

Thus far, the findings point to the importance of conventional time language, maternal scaffolding, reported DT habits, and the type of school when considering children's knowledge about time.

Parents who use more conventional time language have children who use more as well, who have more knowledge about time, and who frequent schools where there is high

structure and high individual attention dedicated to them. Furthermore, fathers who use more conventional time language have children with more temporal knowledge.

Households with busier and more structured schedules have mothers who use more scaffolding of temporal terms with children at dinner as well as children who know more about time. Furthermore, parents who report engaging more in talk about the past and the future also have children who know more about time.

A qualitative look at the data

The next step in the analyses was to take a closer look at the data, appreciate how parents and children negotiate temporal concepts in their daily conversations, and what kind of knowledge children demonstrate to have in those interactions.

At first, 44 instances of negotiation were analyzed. The common themes that were discussed in those interactions revolve around the child's everyday experiences – the reminiscing and planning of events, and the discussion of issues relevant to the child's life. Talk was about past and upcoming: school trips, school schedule, home schedule, meals, TV schedule, their day, visiting friends and play dates, birthday parties, special outings (visits to the doctor, movies, carnival), week plans, weekend plans, vacations, and summer. Issues relevant to the child's life that were discussed include age and the weather. Thus, parents and children negotiated those experiences that by nature require the use of temporal concepts in order to be discussed: the "when", in "what sequence", duration or simultaneity of events.

In the quantitative analysis it was found that children's use of conventional time was contingent on their parents' use and not on their own development (PPVT-III, MLU or age). Based on that finding, the questions that emerged were: (1) how are parents teaching

their children about conventional temporal concepts? And (2) how do those interactions differ from household to household?

In order to approach these questions, two pairs of children were selected from the sample, based on their similar age and PPVT-III score. The first pair consisted of the two oldest children (a boy and a girl) in the sample, who were also the ones with the highest PPVT-III score. The girl was 62 months old and the boy was 65 months old. Both children's verbal age based on their PPVT-III score was 86 months. Also, both children came from the same preschool and both were middle to upper-middle class.

The second pair of children were two boys whose age and PPVT-III were close to the average in the sample. One boy was 44 months old (65 months in verbal age) and the other was 40 months old (67 months in verbal age). They came from different preschools, both middle to upper-middle class.

What follows is an exploratory analysis of the characteristics of the negotiation observed in the households of the two pairs of children selected.

**The structure of negotiation**

The negotiation of conventional temporal concepts followed a pattern that was similar from instance to instance. At first, it was determined that there was a *problem*: a question the child asked (e.g., "what's a vacation?"), an inappropriate use of a temporal word or incorrect information (e.g., "Tuesdays, Mondays, and four days"), or a miscommunication between the child and his/her parents.

Chi: in the morning what time o'clock? Two time o'clock?
Fat: I don't know what you mean.

Then, a reaction (or strategy) from the parent(s), which could be characterized in three ways: (1) to make an effort to help the child overcome the hurdle she is faced with; contrarily, (2) to make it even more difficult for her to understand; or yet (3) to avoid the issue altogether.

When parents were making an effort to resolve the problem with the child, they scaffolded her working concepts by using one of a number of *strategies*: (a) to **translate** a conventional concept into either an experiential concept, another conventional concept or an event, (b) to **explain** the misunderstanding, (c) to **correct** the child's misrepresentation of the concept, and to (d) **validate** the child's attempt to revise her representation of the concept. When parents were making it more difficult for the child, they either **complicated** the concept even further by making long convoluted sentences, or by using even more complex concepts to explain the one the child was already questioning, or they **ignored** their child's attempts to explore the concept. Finally, parents who avoided the issue would either **cease participation** or start a new topic.

The third and last part of the negotiation structure was the *conclusion*, or resolution, of the conversation, in which either there was (1) success in communication, where the child gave indication of being satisfied with the strategy and explanation chosen by the adult, (2) evasion by the child, by ceasing her participation, or (3) change of topic by either child or parent.

What follows are examples from each of the pairs of children that illustrate the strategies described above. Then, each pair was analyzed separately and subsequently compared to the quantitative outcomes previously discussed.

**First pair: oldest and highest verbal age (boy and girl, hereon B86 and G86)**

MOT: xx say think about our vacation? [proposes temporal topic]
CHI: oh.
MOT: yeah?
CHI: xx.
MOT: are you excited?
CHI: xx.
MOT: yeah. do you know when we're going on vacation?
CHI: what?
MOT: do you know when we're going on vacation?
CHI: hm. tomorrow? [*problem*: incorrect guess]
MOT: not tomorrow. we're going on Sunday. [*corrects* child]
CHI: when is that? [child inquires]
MOT: Sunday is # +/. [unfinished answer]
CHI: I feel a xx under here. I don't know if it's xx. I think it's a xx of xxx.
MOT: Sunday is three days from now. is it? [*translates* concept]
FAT: I don't know.
CHI: [% talking all the while and not paying attention to mother] it means almost. [*conclusion*: changes the topic]
MOT: our cat's name is not xx.
CHI: uh one cat I know whose name is Emma [?] and he got that complete. his name is Lucy.
MOT: his cat's name is Elmo!
(G86)

In the example above the child showed an initial interest in finding out the correct answer, but the insufficient response from her parents turns her off to the topic and she changes it. The mother makes one tentative try at explaining to her child, when she says "Sunday is three days from now. Is it?", but the father does not validate it or expand on it. In the next example that negotiation style repeats itself, where the child tries to extract some knowledge from her parents, was greeted with indifference and decides to change the topic.

If we look at the excerpt seeking this child's knowledge of the temporal concepts being discussed, we find that she understands that "tomorrow" is a point in time that answers the question "when". When she was told that it was the incorrect point in time,

and that the correct one was “Sunday”, she wonders when that point in time is. Thus, days of the week were still a mystery for her.

CHI: what's a vacation mommy? [*Problem*: poses question]
MOT: what?
CHI: what's a vacation?
%act: no answer [*ignores* child]
CHI: what's a vacation? what's a vacation?
MOT: Josh, what's a vacation? [transfers question to father]
CHI: but like where are we going? [*conclusion*: child changes topic]
FAT: we don't know.
MOT: [% laughs].
(G86)

In the last example for this child, the mother makes an effort to explain the relativity of time to her child, but ends up complicating more than helping.

MOT: you know Illinois? you know where Illinois is? it's all the way in the middle of the country.
CHI: I know but is [/] is everybody going # home for supper? [*problem*: question]
MOT: in Illinois? Illinois is about two hours earlier than here. [introduces difficult concept: relativity of time]
CHI: what are they doing?
MOT: well, let's see. let's look outside. what does it look like? does it look dark out? [*translates* into experiential time]
CHI: no not yet.
MOT: it's getting there though right?
CHI: yeah.
MOT: so that's almost nighttime here. but in Illinois # it's # the [//] it's two hours earlier so it's still probably sunny out. people are just starting to think about dinner. [*explains* the difference in terms of the experience of light]
CHI: oh.
MOT: we're having a /late dinner tonight. but +/. [*complicates*]
CHI: I don't like dinner why xxx?
MOT: cause this is a late dinner. it's about eight o'clock. [*complicates*]
CHI: I thought [/] I thought you said a /lake dinner.
MOT: a lake? no /late! cause it's about eight o'clock.
CHI: hm.
MOT: so. can't put [//] in Illinois it's about six o'clock. it's about /real dinner time. you know? earlier. why did you like Illinois so much? [*complicates* and *concludes*: change of topic]

[*complicates* even further, by relativizing what is real dinner time with the special late dinner they are having; then *concludes* by changing the topic]
(G86)

The mother starts off well, by using translation and explanations and she has her child engaged and interested. But then she starts to complicate it by adding another relative component: the fact that they were having an extraordinarily late dinner and that in Illinois they were probably having dinner at a time that would be regular for them in New York. The mother then quits and changes the topic.

Next are some examples from the boy's family.

MOT: I know you're going to the park next week # on your city school.
[introduces temporal topic]
CHI: why? [*problem*: question]
CHI: why?
%act: pause
MOT: don't you go to the park on Mondays? [*explains*]
CHI: Tuesdays Mondays and four days. four days. all days of the week except Friday. they didn't have en [/] enough money to get the # bus to come /all days of the week.
[discussion of weekdays]
MOT: ok. four days is pretty good. [*validates*]
CHI: Monday Sunday Tuesday and Wednesday # Thursday? [incorrect sequence]
MOT: Monday Tuesday Wednesday and Thursday. [*corrects*]
%act: pause
MOT: and then comes Friday Saturday and Sunday. [and elaborates]
CHI: yeah.
%act: pause
CHI: then it's come on Monday or Tuesday or Wednesday or fur +//.
[second attempt to sequence days of the week, but interrupts himself before continuing the mistake]
MOT: right you'll be there Monday and Wednesday next week. [goes back to previous topic]
%act: pause
MOT: or you'll be there Monday Thursday and Fridays. [corrects herself]
CHI: I'm still gonna be there fur [/] Thursday furr um # sixteen hundred days a week right? [incorrect representation of time]
%act: mom laughs
MOT: /seven days a week. [*corrects*]
CHI: eight hundred. [engages in a game that meets approval by mother]
%act: mom giggles

CHI: nine hundred. ten hundred.
MOT: xx some pretty big numbers. [*translates*]
CHI: brrrrr. how do you make seven? or six or seven or seven or eight or eight or nine xx. or ten plus ten. ten days? one day two day # three days # forty # fivy # sixty # seventy # eighty # ninety tenty!
%act: giggles
MOT: [% noise]. [*conclusion*: change of topic]
%act: pause

As one can see, contrary to the previous family, in the example above the mother validates, explains, and engages in temporal talk with her child. As for the child's knowledge of time, he seems to have a clear understanding that the days of the week have names that come in a sequence, and that on some of them he goes to the park; but he fails to tell the entire sequence. He also showed knowledge about the frequency – four days a week. In view of his inability to sequence all days correctly (and on the mother's confusion as well) he engages in a play with numbers as measurements of frequency, and breaks the rule where the maximum frequency allowed in a week is seven.

See the next example:

FAT: swimming's over.

MOT: right.
FAT: no swimming.
MOT: but his tennis starts in June so.
FAT: June first I think.
MOT: uh huh.
CHI: June [/] June twenty first? [*problem*: incorrect information]
FAT: no June one! [*corrects*]
MOT: so we'll call and see if we can get you a reservation xx +/.
FAT: or June two maybe xx exactly.
CHI: June twenty first is the beginning of June. [trying to understand temporal concept]
MOT: the beginning of summer [>]. [*corrects*]
FAT: June first [<]! [also *corrects*]
FAT: June twenty first is the first day of summer.
FAT: xx the twenty second the twenty third it's right in there. [*explains*]
MOT: alright.
MOT: so you wanna go on the big boat. [*conclusion*: changes topic]

CHI: hm.

In that example, both parents were invested in helping the child understand how the calendar relates to the seasons of the year. They correct and explain to him in response to his attempts at getting it right.

In sum, compared with the girl's family, the boy's family seems to be more in tune with their child by acknowledging his attempts and helping him understand the complexity of time. If we look at the quantitative analysis of the two families, we see that in all dinners the boy's father used more time language than the girl's father, especially conventional time language. Mothers showed similar use of temporal words, and the boy used more conventional time but not experiential time. See the table below.

Table 21. Use of experiential and conventional time language in the first pair's households

| | Experiential time language* | | | Conventional time language* | | |
|---|---|---|---|---|---|---|
| | Mot | Fat | Chi | Mot | Fat | Chi |
| G86 | 7 | **4.6** | 8 | 12.1 | **0** | **2.9** |
| B86 | 8.4 | **9.5** | 8.2 | 11.4 | **7.7** | **6.5** |

* % from total number of utterances by speaker

**Second pair: average age (A65 and E67)**

FAT: look how pretty the color is outside.
MOT: yeah it is!
CHI: what is [?] # what do you mean? [*problem*: question by child]
%act: pause [no answer]
CHI: what do you mean Dad? [repeats question]
FAT: what do you see out there +/.
MOT: well still [?].
FAT: well it's just interesting how [/] how it looks light out # well it's still light out but it's gradually darker # this time of day is called dusk # and the light is pretty. cause it's not direct sunlight. it's very diffuse and it's reflecting off of the sky.
[*complicates*]
CHI: no sun today.
FAT: since it's cloudy +/.
CHI: daddy there was no sun today!

FAT: that's right it's a [/] it's a +//. well there's always sun, it's just that we couldn't see it because # clouds are like a blanket. [*explains*]
CHI: yes but [/] there's the sun behind the clouds.
FAT: that's right, it was above the clouds. the clouds are like a blanket.
CHI: like +/.
FAT: so it's interesting to look at it outside because the clouds are making [/] making it a special kind of color outside. [*complicates*]
CHI: now I'm done I can play with Scoop. [*conclusion*: change of topic]
(A65)

The father hesitates to answer the child's question. When he does, he starts with experiential knowledge: the color, the light, the dark; but then he complicates it by introducing more advanced concepts such as "diffuse", "not direct sunlight". The child tries to sum up the long string of thought the father uttered with "no sun today". The father then explains it and the child understands it. But then, the father goes back to the image he was creating before and the child changes the topic.

In the next exchange, the father and mother also assume that the child has more knowledge than he probably does:

FAT: I guess someone needs a bath.
MOT: yeah you might need a bath.
CHI: no, I don't want to.
MOT: but I just remembered you didn't have one yesterday. [introduces temporal topic]
%Act: pause
MOT: you know?
CHI: no. not tomorrow, not today! [*problem*: "inappropriate" use]
MOT: not tomorrow, not today? [repeats]
CHI: nope.
MOT: just when are you gonna clean yourself? maybe next week? [extends time lag]
CHI: next week. [echoes]
MOT: [% laughs].
FAT: you're gonna be the stinkiest boy in the planet!
CHI: [% laughs].
MOT: [% makes noise].
MOT: what are you doing. [*conclusion*: evasion]
CHI: I'm stuck.
MOT: Aiden stop, you're pushing the xx on him.
MOT: enough fooling around, sit down.
(A65)

Here, there was a play with the deictic temporal words “yesterday”, “today”, and “tomorrow”. When the mother mentions that the child did not have a bath “yesterday” he showed knowledge of the category of deictic words in temporal reference, by immediately stating that a bath will take place “not tomorrow, not today!”; that is, never? The mother extends the time lag as if posing an absurd time and the child simply echoes it. The mother laughs and the father jokes about it. The child ceases his participation and engages in some forbidden activity.

The second child in the pair, E67, benefits from more involvement from the parents. See the example below.

CHI: we can see them another day? [*problem*: question]
MOT: we'll see them in July, when we're out in California! [*translate* into event]
CHI: yeah the end of # July!
MOT: uh huh. middle # even. [*corrects*]
CHI: this is July.
MOT: hm hm.
CHI: what's this?
MOT: May # it goes May June July, so there's still a whole other month.
[*corrects* and *explains*]
CHI: mom, xx May June July +/.
MOT: there's twelve months in the year. and +/. [*explains*]
CHI: and next month /after June is July!
MOT: right [>]. [*validates*]
FAT: right [<]. [*validates*]
MOT: and what's the month after May?
CHI: June!
MOT: good! [*validates*]
FAT: very good! [*validates*]
CHI: and then +/.
MOT: do you wanna [/] do you wanna learn all the months?
[*conclusion*: success and more time discussion]
(E67)

The child showed that he can use the language that organizes the months of the year. He offers “the end” of July as a date for a visit, and he orders the months using the appropriate sequencing markers: “next” and “after”. Both mother and father validate their

child's attempts to organize the temporal concepts. The mother explained and taught the child the order of the months and the child was actively participating in the conversation. Further into the dinner conversation they were still discussing the months of the year. And the parents were still encouraging the child to understand and recite them in the correct order:

MOT: those are all the months of the year [>].
CHI: and then we do it again [<]!
MOT: that's r [//] exactly right! very good Eli! it just keeps repeating and repeating.
CHI: and October December eleven twelve. [*problem*: inappropriate use]
MOT: [% laughs] well, that's a good start. [*validates* child's attempt]
FAT: eleven twelve is November December. [*translates*]
MOT: well, that's how you would indicate # those months by numbers. [*explains*]
FAT: right.
CHI: now we do it again!
(…)
MOT: January February March April May June July August September October November December.
CHI: now you [//] now you do it again! do it again!
MOT: alright and then you wanna repeat +//. you can [//] well you try! what's the first one [>]? [*explains*]
CHI: October December eleven and twelve and thirteen and fourteen and fifteen [<] +/.
(…)
FAT: so your birthday +/. [elaborates]
CHI: what?
FAT: is in the month of December which is the last month of the year. [*explains* and *translates*]
MOT: that's right you gotta wait all the way until the end of the year. [*explains*]
CHI: I have to wait till the end of the year?
MOT: can you believe that?
CHI: yes that's very long. [*Conclusion*: success]
(E67)

The example above showed that the E67 enjoys practicing the order of the months of the year, even though he still does not know all of them. He mixes the names with the numbers, which were in correct sequence themselves, but that belong to a different sequence.

In summary, like the first pair, the households in the second pair showed different styles in negotiating temporal concepts. A65's family hesitates, complicates, and ignores the child by engaging in adult conversations, while E67's family was concerned with including the child, explaining the concepts with accessible language, translating and validating their child's attempts. Thus, compared with A65's family, E67's parents seem to be more in tune with their child's knowledge and limitations. When we look at the quantitative investigation of the two families, we see similar results to the previous pair; that is, both E67 and his father used more conventional time language than A65 or his father. Differently from the previous pair, however, E67's mother also used more conventional time, and the child also used more experiential time. See the table below.

Table 22. Use of experiential and conventional time language in the second pair's households

| | Experiential time language* | | | Conventional time language* | | |
|---|---|---|---|---|---|---|
| | Mot | Fat | Chi | Mot | Fat | Chi |
| A65 | 8.9 | 9.8 | **5.5** | **6.9** | **6.4** | **2.4** |
| E67 | 11.8 | 8.4 | **9.7** | **10.8** | **12.5** | **7.3** |

*% from total number of utterances by speaker

If we compare the results from the 1st pair and the 2nd pair in light of the children's scores on the interview and on the sequencing task, we see that in the 1st pair both B86 and G86 answer 17 of the 18 questions correctly. In the 2nd pair, E67 answers 15 of the 18 questions correctly, while A65 answers 11 correctly. As for the sequencing task, both children in the 1st pair sequence the pictures 100% correctly. In the 2nd pair, A65 gets only 50% of the pictures correct, while E67 scores 100%.

In conclusion, the pattern of results between the two pairs was similar, except for the mother's production of conventional time. That finding points to the possibility that while

father's increased use of conventional time language influences their child's conventional time use, the knowledge about time that the child displays otherwise may be more influenced by their mother's input than their father's. A longitudinal study would be necessary to further explore that option.

# Chapter IV: Discussion

Although some of the methodology used in this study was based on previous work, the research as a whole is unprecedented. Much of the literature that precedes this study concentrates either on the cognitive development of time or on the development of grammar and vocabulary that refers to time; both in terms of understanding what develops when. This study, on the other hand, focuses on the process of that development and finding how mechanisms interact with each other in telling the story. For that reason, there is little to be discussed in terms of previous findings.

This study examined in part how the complexities intrinsic to time are negotiated between young children and their parents at home. The abstract concepts of time that Inkeles and Smith (1974) claim the modern world has created to improve communication and efficiency have to be learned by children early in their lives. That is because, first, parents take those concepts for granted and include them in their daily conversations with little or no hesitation and, second, our lives are so bound and organized by temporal concepts that they cannot be *avoided* in discussions about past and future events (or in other kinds of conversations, for that matter).

The study also took into account the importance made salient by Wittgenstein (1953) that language is a means to discuss that which is absent. To that extent, I chose to focus on displaced time concepts, or those that refer to the absent past or future. The focus on the distinction between experiential and conventional temporal concepts was critical in differentiating the concepts that can be learned through experience with the world and with language, from those that need explicit teaching or guidance from a social partner. As

Nelson predicted, they did seem to show different paths of development, which validates that distinction (see discussion below).

Other questions addressed in this study include: How do time representations and negotiations at home, at school, and in language come together to explain children's development of temporal concepts? What contribution does each one make? And how do they relate to one another?

As pointed out in the analyses of the questionnaires and schedules, parents generally report that it is important for them to be on time, to have a regular schedule of bed and wake up times for their child, as well as TV time. They also use experiential time language when trying to tell their child to wait for something. Families do not, however, make systematic use of cultural tools that represent time: clocks and calendars. Although they report having the habit of reminiscing with their children, they do not see children as initiating it themselves.

In summary, the topic of time does not seem to take the center stage in these families' lives. A possible explanation for this is that they do not see their children as capable of understanding such concepts. If we look at their behavior at dinner, however, there seems to be a contradiction: parents initiate DT talk often, and they engage their children in discussion about complex temporal concepts. If that is the case, then, why is it that teaching temporal concepts is not done more formally – by using or modifying cultural tools (as a few parents reported doing), such as clocks and calendars?

Nonetheless, if we look at the families who reported more scheduling in their child's daily routine we see that they also showed more scaffolding by the mother during talk. Reported DT habits were related to children's knowledge about time (as measured by

the sequencing task), and to father's use of temporal words, more specifically, experiential time words. That is, there was consistency in the presence of time both in the form of scheduling and past and future talk habits and in dinner talk (scaffolding by mother and time language by father).

The data on school types frequented by children indicated that a school whose daily routine is highly structured has children who use more temporal language, more specifically, conventional time language. But high structure with low individual attention related to less knowledge about time and more help in the sequencing task of daily school activities, compared to high individual attention. Hence, the results in this study indicate that the development of temporal concepts is related both to the degree of structure of the activities and to the amount of individual attention given to children. Those findings echo Vygotsky's emphasis on the social nature of the development of word meaning as well as Nelson's ideas about the temporality embedded in event knowledge. That is, children in schools that emphasize structure will be able to form general event representations in which temporal sequence is embedded.

The results from the dinner conversations were the main substance of this study. Here the interest resided in finding differences in how conventional and experiential temporal words were used in conversations, in how families talked about the past and the future, in parental styles when negotiating temporal concepts, and finally, in how those styles related to children's knowledge about time.

The findings indicated that mothers play a central role in dinner talk. They speak more, they use more temporal language, their use of temporal language relates to children's use, their use of scaffolding relates to children's increased use of conventional time

language, and they initiate more displaced time talk, more specifically, future talk. In future talk, they use more scaffolding, they use more time language, and there is more negotiation. Fathers also played an important role, however. Their increased initiation of DT talk predicts their child's initiation of DT talk and higher LANGAGE. Furthermore, their increased use of conventional time language predicted children's performance on the sequencing task.

All participants used more experiential than conventional time, and parents used more of both than children, but only conventional time use was significantly different between parents and children. Children's use of experiential time words was higher for those who initiated more DT talk, gave more spontaneous contributions, and showed more temporal knowledge in the interview. Both children's use of experiential and conventional time language increased with PPVT-III and age. Mother's use of conventional time also increased with children's age. That agrees with Hudson's (2002) previous findings on the use of conventional time.

The important results on the use of temporal words were the different relationships found between the types of temporal words and the variables in the dinner conversations. On the one hand, experiential time words were best predicted by MLU, that is, by how expressive the child was in her language. Conventional time words use, on the other hand, was best explained by parents' use of conventional time words. That is, it was not the child's language development that predicted how much conventional time language they used at dinner, but rather how much of that language their parents used. This finding confirms Nelson's distinction about the nature of experiential and conventional temporal concepts, and confirms this study's prediction that conventional time use would be more

contingent on the parents' use than experiential time. Experiential temporal words, being the ones that are learned mostly through experience, are in fact related to the child's development of language; conventional time words, being the ones that are more arbitrary and detached from experience, are best learned through linguistic interactions with others.

In relation to past and future talk, there was twice as much talk dedicated to past events than there was to future events. The proportion of past talk instances increased with PPVT-III, compared with future instances, where there was no relationship at all. When I looked at age, however, the opposite was true: the one that increased was the proportion of future talk, and past talk showed no relationship. The latter finding agrees with what Benson, Talmi, and Haith (1999) found in their review of CHILDES (MacWhinney, 1993) transcripts; namely, that past talk remains constant and future talk increases. That points to the importance of looking at verbal age, rather than chronological age. Results can be strikingly different, and since age is a proxy for some other phenomenon, it not only does not elucidate much in terms of the present line of research, but it can also give misleading results.

In regard to speakers' choice to initiate DT talk, as expected, parents did most of the initiation of DT talk. It was initiated to a similar extent by mother and father, but, as already stated, mothers initiated more future talk in relation to fathers. Talk was longer when children initiated past talk than when they initiated future talk or when either parent initiated DT talk. In addition, children produced more temporal words when they initiated DT talk. In other words, the conversation about displaced events flowed better and children used more temporal words when the topic was initiated by them and when it was in the past. A possible explanation is that parents participate more when the child is

interested in the topic, and children participate more themselves when they have selected the topic of conversation. As for past talk, it evokes more conversation because it is about something that happened and that is being narrated from memory, as Hudson observed.

Parental styles were reduced to the use of conventional time and scaffolding of conventional concepts. Once children's knowledge about time was taken into account, that "style" was further reduced to the use of conventional time language. Hence, that takes us back to the central finding that parents' use of conventional time predicted children's use. Children who used more conventional time language also did better on the sequencing task. Thus, the conclusion that can be drawn is that increased use of conventional temporal concepts improves children's general knowledge about time. In other words, the social negotiation of those concepts scaffolds children's learning about time. Furthermore, father's use of conventional time language related to children's scores on the sequencing task. That finding agrees with the findings by Norton who, as explained in the introduction, observed that children with higher scores on the sequencing task heard more time statements at home. It raises the question, however, about why did mother's use of conventional time show no relationship to children's temporal knowledge? Are mothers the same everywhere, and are fathers the ones making the difference?

When looking at the data from the child's perspective, we found that children with higher MLUs made more spontaneous contributions to DT talk. Children also made more spontaneous contributions when the topic was relevant to them, when they initiated it, when there was negotiation, and when talk was about the past. Children who made more spontaneous contributions also used more temporal words, and showed more knowledge, both in the sequencing task scores and in the interview. Children's overall use of temporal

words, more specifically conventional time words, also was related to their sequencing task scores. Finally, children who used more experiential time words initiated more DT talk, gave more spontaneous contributions, and showed more knowledge in the interview.

The two assessments of children's knowledge about time aside from the dinner conversations were the sequencing task and the interview. Both tasks showed better performance by children with higher PPVT-III scores. Thus, the development of receptive vocabulary seems to be related to the development of temporal concepts. The two outcome measures also correlated with each other. Children's performance on the sequencing task was also related to more conventional time language from the father and more time spent on DT talk at dinner.

How does it all come together? This study suggests the following summary: Knowledge about time, as represented by both outcome measures and by children's use of temporal words, relates to the structuring of time and individual attention at school, to displaced time talk practices at home, to conventional time language use by parents, particularly by father, and to displaced time talk at dinner. Hence, the results converge in supporting the ideas proposed in the introduction by Lucariello and Nelson, Norton, and others, that the social, linguistic, and cultural representations of time work together in children's development of temporal concepts.

This summary relates to the qualitative analysis of some of the conversations. That analysis takes the above conclusion a step further. We saw that it does not suffice to simply associate conventional time use with children's knowledge; the quality of the negotiation of those concepts makes a difference. And the results bring the mothers back into the story, albeit the apparent influence fathers seem to have.

First, different parents tailor their language to their children to different extents, and use different strategies to different extents as well. That way, some parents showed more sensitivity to children's knowledge about time than others. When parents use strategies such as translation and explanation of concepts, or validation and correction of child's attempts, they encourage their child to negotiate the meanings they are struggling with; but when parents ignore or complicate the concepts even further, they discourage the child's pursuit of understanding.

Second, fathers' increased use of conventional time was associated with children's use of them, but it may have been mothers' use that was the important factor in differentiating levels of understanding and use of conventional temporal concepts. The fact that the second pair of children showed a difference in the sequencing task and interview scores which the first pair did not points to that possibility. Further investigation is needed to explore that possibility.

The qualitative analysis also indicates that further attention is to be given to the process of construction of the temporal concepts, which is evidenced in children's negotiations with their parents. Werner and Kaplan's suggestion is of relevance here, because that process encompasses increasing differentiation and exploitation of old means for novel functions; that is, the child learns a concept such as "tomorrow" as undifferentiated from, say, "location on a timeline" and as they use it and get feedback from their parents, that concept is modified into a new one which is more complex and closer to that of the adult.

In summary, there are two suggestions/concerns I would like to bring out for future research. First, when studying temporal concepts it is important to differentiate what kind

of concepts are being studied, since the nature of the learning process may differ. Experiential concepts are explained by language development; conventional concepts are explained by social (and cultural) factors. The central contribution this study makes to research on the development of time is to stress the role that social and cultural factors play in the learning of conventional time concepts. Future research should attend to this aspect, and approach it from a longitudinal perspective to study in more depth how the structuring of school and home daily routines, individual attention, and the quality of parental negotiation of temporal concepts impact on the process through which children are encultured into time.

Second, we must be more specific about defining displaced time talk or, as more commonly referred to, past and future talk. What is it, how will it be measured, and what will be included in the analyses. In past and future talk, the event being discussed can be either "absent" or "present"; that is, devices other than language may be available to a child who is discussing, say, whether she will have more pork or salad (i.e., physical referents). In other words, the *language* of past and future is often analyzed under the assumption that *past* and *future* are transparent concepts that translate directly into research. Under such assumption, tense and/or words that in fact do not obligate the child to transport her "self" into a different time frame will be included in the analyses. In this study, I arbitrarily chose to analyze events that occurred at least one hour before or after talk as a way to ensure that language would be the main, if not the only, means of negotiation available to the family. Other criteria may be used.

In conclusion, what we must attend to is defining as clearly as possible our object of study so as to avoid considering that, because time is "an abstract concept", then any

representation of future or any representation of past will inherently be characterizing a discussion about the abstract. But that is a whole new study.

# Appendix A

Picture board and training cards

# Appendix B

Interview questions for children (N of correct answers)

1) How old are you? (20)
2) Will you be bigger or smaller next week? (18)
3) When do you go to bed? (17)
4) Will you be bigger or smaller on your next birthday? (16)
5) Can you be a baby again? (15)
6) How old will you be on your next birthday? (15)
7) Is it morning or afternoon now? (15)
8) When do you have breakfast? In the morning, afternoon or evening/night? (13)
9) When do you have dinner? (13)
10) Do you know when your birthday is? Is it far or close from now? (12)
11) Do you know what a clock is? What is it for? (15)
12) what do you do in the morning when you wake up? (13)
13) What do you like to do on weekends? (14)
14) What do you like to do at night/ in the evening? (14)
15) When will you go to kindergarten? (8)
16) When do you have lunch? (8)
17) What day is today? (5)
18) Is it the same time here as it is at home? (9)

# Appendix C

Parent questionnaire

Parent name:_____ Child name: _____

Please use the space provided below to answer the questions. If you need to, use the back of the sheet for longer answers. Please make sure to indicate the question number. Thank you.

PARENTS' SCHEDULE

1. Your work schedule: (please check one)

- ❑ Stay at home
- ❑ Part time job at home
- ❑ Full time job outside the house
- ❑ Part time job outside the house

2. How many hours per week do you work?
3. Do you work on weekends?
4. Spouse's work schedule: (please check one)

- ❑ Stay at home
- ❑ Part time job at home
- ❑ Full time job outside the house
- ❑ Part time job outside the house

5. How many hours per week does your spouse work?
6. Does your spouse work on weekends?
7. Is there a definite time you must be at work? Or does it vary? How?

8. How important is “being on time” for you? Please rate on the 5 point scale below:

1----------2----------3----------4----------5

Always on time

9. How important is “being on time” for your spouse?

1----------2----------3----------4----------5

Always on time

CHILD’S SCHEDULE

10. Do you usually have dinner at the same time? Around what time?
11. Is your child expected to sit at dinner table on time?
12. On average, how many times a week does your child have dinner at home?
13. Do you plan the weekend with your child? Do you tell him/her what is going to happen? Do you let the child make suggestions?
14. At what time does your child go to sleep? Is it usually at the same time?
15. Describe your child’s “going to bed” routine.
16. At what time does your child wake up? Is it usually at the same time?
17. Describe your child’s “waking up” routine?
18. Does your child seem to anticipate regularly scheduled events before they are about to happen? Can you give an example?

TIME IN THE HOUSE

19. Does your child ever ask you about clocks, calendars or days of the week, or month? How?
20. Do you have clocks in the house? Do you use them with your child? How?

21. Are there calendars in the house? Do you use those with your child? How?

22. Is there a family calendar or do you each have your own?

TV VIEWING

23. Does your child watch TV?

24. What does your child like to watch on TV?

25. What time is his/her favorite program on?

26. Is there a sequence of programs your child watches? Does your child know that order?

27. Does your child know when his/her TV her show is about to start? If so, how does he/she ask for it? How does he/she keep track of it?

CHILD'S SCHOOL EXPERIENCE

28. How old was your child when he/she started preschool?

29. How often does your child go to preschool?

30. Is there a set time when your child must be at school?

31. Your child usually arrives at school…(please rate on the scale below)

1----------2----------3----------4----------5

at the same time

DISCIPLINE

32. How do you help your child wait, when his/her needs cannot be granted immediately? What do you say? How does your child respond?

33. Is time-out a form of discipline used in your house? If so, how does it work?

IMPORTANT EVENTS

34. How far ahead do you plan important events with your child? Can you give an example?
35. Do you engage in talk about the event once it has passed? Does your child enjoy doing that? Who usually initiates it?
36. How far ahead do you plan your child's birthday celebration with your child?
37. Does your child ask about his/her upcoming birthday? If you'd like, use the space in item 42 to provide an example of how that conversation might go.
38. Does your child enjoy reminiscing about his/her birthday once it's passed? Do you?
39. How far ahead do you plan a vacation, or a visit to relatives?
40. Does your child ask about the upcoming vacation?
41. Does your child enjoy reminiscing about the vacation once it's passed? Do you?

HYPOTHETICAL SCENARIO I

42. Imagine your child's birthday is next month. How would you talk to him/her and plan a birthday party? Write down how you think that imaginary dialogue would occur. (continue in the back if necessary)

Parent:

Child:

Parent:

Child:

Parent:

Child:

Parent:

Child:

HYPOTHETICAL SCENARIO II

43. Imagine your child asks to play with a toy right at dinner time. You're afraid the food will get cold, and want to explain to your child that he/she must wait until after dinner. How would you approach this dilemma? Write down how you think that imaginary dialogue would occur. (continue in the back if necessary)

Parent:

Child:

Parent:

Child:

Parent:

Child:

Parent:

Child:

Parent:

# Appendix D

List of questions asked to parents by theme

**a) Presence of time**

- Your work schedule: (please check one)
  - Stay at home
  - Part time job at home
  - Full time job outside the house
  - Part time job outside the house
- How many hours per week do you work?
- Do you work on weekends?
- Spouse's work schedule: (please check one)
  - Stay at home
  - Part time job at home
  - Full time job outside the house
  - Part time job outside the house
- How many hours per week does your spouse work?
- Does your spouse work on weekends?
- Is there a definite time you must be at work? Or does it vary? How?
- How important is "being on time" for you? Please rate on the 5 point scale below:
- 1----------2----------3----------4----------5
- Always on time never on time

- How important is "being on time" for your spouse?
- 1----------2----------3----------4----------5
- Always on time never on time

- Do you usually have dinner at the same time? Around what time?
- On average, how many times a week does your child have dinner at home?
- At what time does your child go to sleep? Is it usually at the same time?
- Describe your child's "going to bed" routine.
- At what time does your child wake up? Is it usually at the same time?
- Describe your child's "waking up" routine.
- Does your child ever ask you about clocks, calendars or days of the week, or month? How?
- Do you have clocks in the house? Do you use them with your child? How?
- Are there calendars in the house? Do you use those with your child? How?
- Is there a family calendar or do you each have your own?
- Does your child watch TV?
- What does your child like to watch on TV?
- What time is his/her favorite program on?
- Is there a sequence of programs your child watches?
- How old was your child when he/she started preschool?
- How often does your child go to preschool?
- Is there a set time when your child must be at school?

- Your child usually arrives at school…(please rate on the scale below)
- 1----------2----------3----------4----------5
- at the same time it varies a lot
- How do you help your child wait, when his/her needs cannot be granted immediately? What do you say?
- Is time-out a form of discipline used in your house? If so, how does it work?
- Imagine your child asks to play with a toy right at dinner time. You're afraid the food will get cold, and want to explain to your child that he/she must wait until after dinner. How would you approach this dilemma? Write down how you think that imaginary dialogue would occur.

**b) DT practices**

- Do you plan the weekend with your child? Do you tell him/her what is going to happen? Do you let the child make suggestions?
- How do you help your child wait, when his/her needs cannot be granted immediately? What do you say? How does your child respond?
- How far ahead do you plan important events with your child? Can you give an example?
- Do you engage in talk about the event once it has passed? Does your child enjoy doing that? Who usually initiates it? child?
- How far ahead do you plan your child's birthday celebration with your
- How far ahead do you plan a vacation, or a visit to relatives?
- Imagine your child's birthday is next month. How would you talk to him/her and plan a birthday party? Write down how you think that imaginary dialogue would occur.

**c) Parent's assessment of child's knowledge/familiarity with time**

- Does your child seem to anticipate regularly scheduled events before they are about to happen? Can you give an example?
- Do you have clocks in the house? Do you use them with your child? How?
- Are there calendars in the house? Do you use those with your child? How?
- Is there a sequence of programs your child watches? Does your child know that order?
- Does your child know when his/her TV her show is about to start? If so, how does he/she ask for it? How does he/she keep track of it?
- How do you help your child wait, when his/her needs cannot be granted immediately? What do you say? How does your child respond?
- Imagine your child asks to play with a toy right at dinner time. You're afraid the food will get cold, and want to explain to your child that he/she must wait until after dinner. How would you approach this dilemma? Write down how you think that imaginary dialogue would occur.

# Appendix E

List of temporal words

| **experiential** | **conventional** | | **overlap** |
|---|---|---|---|
| after | afternoon | new year | breakfast |
| already | afternoons | November | lunch |
| also | age | o'clock | lunchtime |
| always | ago | October | dinner |
| before | April | Saturday | dinnertime |
| during | august | second | night |
| earlier | Autumn | September | nights |
| early | birthday | snack | |
| finally | calendar | snack time | |
| first | calendars | Spring | |
| last | clock | springtime | |
| late | clocks | Summer | |
| lately | days | summertime | |
| later | December | Sunday | |
| meanwhile | evening | Thursday | |
| next | evenings | time | |
| now | Fall | today | |
| still | February | today's | |
| then | Friday | tomorrow | |
| till | hour | tomorrow's | |
| until | January | tonight | |
| usually | July | Tuesday | |
| when | June | vacation | |
| while | march | vacations | |
| yet | may | Wednesday | |
| | minute | Week | |
| | Monday | weekday | |
| | month | weekend | |
| | months | Weeks | |
| | morning | Xmas | |
| | | Young | |

# Appendix F

Coding manual

Definition of a DT instance:

It is the instance in which a speaker initiates talk about an event that happened in the past or will occur in the future, as long as it (will) happen(ed) at least one hour away from the present activity (dinner time). Thus, telling the child "you can play when you're done with your potatoes" is not a DT instance. But planning to go outside and play and then have a bath and go to bed is, since it already creates a distance from the present activity. Or, making plans for "tonight", or "before bed" where the time frame is somewhere in the future/past, then that is considered DT talk..

When in doubt about how far or near the event would be, use judgment and add a question mark next to it. A DT instance is to be defined as starting as past talk (PT) or future talk (FT), even if the time frame changes later on.

Tier delimitations for displaced time talk

Define where talk about an event begins and ends. Mark that on the transcript itself with a bracket and number the instance (1, 2, 3, etc and code it on the coding sheet). DT talk begins at the speaker turn that initiates the topic (e.g. "what did you do at school today?"), and ends at the speaker turn that concludes the topic right before a new topic is initiated (e.g., a pause or an interruption with change of topic).

When talk is about enumerating the various activities, without delving into any of them, those are not separate instances. Thus, when the sub-topics are contingent on the overarching topic, and do not deserve a whole discussion of its own, they are not coded separately. For example, if parents are talking about a show the child saw on TV and the sub-topics are merely describing the show, they do NOT constitute events in themselves, but blocks of description within the single instance.

If a speaker initiates a topic about an event displaced in time, and nobody follows up on it, that is still counted as a separate instance; even if it is one single utterance.

Notes:

When displaced time instance A starts, and is temporarily interrupted by talk about dinner or any other off-topic subject, that lasts 25 utterances or MORE, then the DT instance is coded EXCLUDING that off-topic interlude (i.e., exclude it from utterance count, time language count, and all other codes). If, however, the off-topic subject lasts LESS than 25 utterances, then it is coded as part of the overarching DT instance (and that includes ALL columns of the coding sheet).

When DT starts in the middle of talk about an event, the tier delimitation begins at the beginning of the topic and DT is counted normally (the person who initiates DT, not talk about the event, is credited).

Tier counting does not include act% tiers, or empty turns (laugh, sneeze, cough, etc.).

Off-topic does not include switches to general knowledge; only dinner talk, or other themes irrelevant to topic.

Descriptives

**Frame of displaced time talk**

*Past talk (PT)*

Instances where a speaker initiates talk about an event that occurred more than one hour before dinner.

E.g., *FAT: you didn't tell me about the swan boat ride yesterday .
*CHI: you know what I did ?
*FAT: no .

*Future talk (FT)*

Instances where a speaker initiates talk about an event that will occur more than one hour after dinner.

E.g., *CHI: will I see then when I go there # to Santa Barbara ?
*MOT: they-'re coming here in a couple of week-s .

**Who initiates displaced time talk (M, F, C)**

Determined based on the speaker who initiates the topic (mother, father or child).
Attention: Since children have not mastered time markers for initiating DT talk, they should be given extra credit for any attempt that seems to trigger DT talk.

For example, child says "I want sausage like Susie" and mom follows up on it with "you saw Susie eating sausage for lunch? When?", then the child has initiated a DT instance, even though the mom is the one who concretizes it in language (whether or not that was the child's intention).

**# of utterances per event**

Count how many utterances are part of each event, so as to give a sense of length of discussion per topic. Exclude utterances that are not topic relevant, such as temporary changes of topic. Note: do not include tiers with brackets (e.g., [noises], [laughs]) in length count.

**Topic**

Brief description (two or three words) of the topic being discussed.
E.g.,
child's day at school,
weekend plans,
remembering a vacation,
and so on.

**Relevance of topic to child (yes or no)**[11]

That will be judged based on whether or not the event being discussed includes the child, and/or the child provides meaningful contributions to the topic, thus making it relevant. The relevant topics will be used in remaining analyses.

E.g., *FAT: xxx maybe I'll xxx down there with him .
*MOT: you should .
*CHI: <where> [<] ?
*CHI: <where> [<] ?
*CHI: where ?
*FAT: this concert tonight .
*FAT: you know that [/] that big esplanade .
*FAT: that big shell where <we went to see th> [>] .
*CHI: <can I go there> [<] ?

In the example above, the father does not make an effort to include the child, but he is eager to participate nonetheless. So the child makes it relevant to himself.

**Distance of event (N, D)**

*Near (same day)*

Talk that refers to an event that happened earlier in the day, or will happen much later at night (such as going to bed).

E.g., *FAT: this concert tonight .
*FAT: you know that [/] that big esplanade .
*FAT: that big shell where <we went to see th> [>] .
*CHI: <can I go there> [<] ?

*Distant (another day)*

Talk that refers to an event that happened on the previous day and further away or will happen on the next day or further away.

E.g., *MOT: tell Dad where you're going tomorrow .
*CHI: to the science museum .

**Parent temporal fine-tuning – qualify codes with M for mother and F for father**

**Scaffolding conventional representation of time** (# of times it occurs and who did it. e.g., 2-M, 1-F) – to be MARKED ON TRANSCRIPT as well.

Rare occasions when the speaker scaffolds the conventional representation of time with an event as a time marker should be marked on the coding sheet. In the example above, "when you go to school next fall" , next fall is being scaffolded with "when you go to school".

[11] Look at each type separately in quantitative analyses; relevant events are the crucial ones for children's learning of temporal concepts.

Scaffolding includes all instances where a conventional time concept is explained or translated into simple terms. Not only events.

**Pursuing negotiation when occasion arises (yes or no)**

Negotiation constitutes any instance where there seems to be doubt or need for clarity, or the child expresses difficulty understanding, or there is a disagreement between parent and child about the topic – anything that requires further use of temporal words in conversation.
E.g., *MOT: which do you remember going to the zoo last it's been a whole year almost since we've been to the zoo.
*CHI: I wanna go to the zoo!
*MOT: I think we'll do that this summer.
*CHI: I don't go to any zoo I just wanna go to the zoo on Coney Island.
*MOT: it wasn't in Coney Island.
*MOT: where was it?
*MOT: do you remember?

The child prefers to talk about the future rather than the past, and rather than dropping the initial topic, the mother persists in negotiating the time frame they will discuss.

**Use of temporal language (# of times it occurs and who did it. e.g., 2-M, 1-F)**

Count of temporal words that represent concepts relevant to the timeline concept. See separate list of words considered temporal. Note: do not count repeated words/expressions when they are hesitations.

Temporal words are counted differently here than in CLAN, which counts single words. Here, count focuses on location of an event on timeline, or indications of duration, order and simultaneity. Location of an event can include a numeral and a time word, and that is counted as a single word/expression (e.g. "two hundred years"). It can also include two or more time words, such as "the day after tomorrow", and that too counts as ONE word, since it refers to a single point in time.

**Child temporal discourse**

**Spontaneous meaningful contributions (# of instances)**

Contributions that are not elicited by questions from either parent and contribute to the discussion at hand. Any statement with content that is topic relevant and not elicited is counted. Repetitions or paraphrases are not counted.
E.g.,
*FAT: again ?
*CHI: and you know what I +...
*CHI: the rest of the kids is going to um ## to beach .

**Use of temporal language**

Count of temporal words that represent concepts relevant to the timeline concept. See separate list of words considered temporal.

E.g., *CHI: now it's the afternoon .
*MOT: mmhm .
*CHI: is it ?
*FAT: what ?
*CHI: is it the afternoon ? total count: 3

# Appendix G

Summary of answers to the questions:

When asked about how they told their child to wait for something they wanted, seven families emphasized "when" the child could have what he/she wanted, and used temporal terms to explain that. Two of those parents reported being successful with their strategies. Examples of reports are: "tell her when she can have it", "after x then you can do y", "not now, after x", "tell child how long she will have to wait". The remaining 13 families used the strategy of telling the child to wait for its own sake. Examples of reports are: "be patient", "be a good listener", "please wait", "distract the child", "you have to wait", "you can't have what you want right away", explain why x can't be done right away. Of the 13 families, six claimed to be successful with their strategy.

Time out was used by 12 families only four of which made it contingent on time. Of those remaining, eight either made time out behavior contingent or used an intuitive time frame, that is, whenever the parent felt it had been long enough. The remaining eight families did not use time out as a form of discipline.

Finally, in the scenario where a child was asked to wait until after dinner to play with a toy, 15 families used time markers in helping them accomplish that; e.g., "after", "first", "then", "number of minutes", "it's time for", "not now", "when you're done", "while", "until". The other five families preferred to talk about rewards, emotions, the importance of food, threats, and so on. Of the 15 families who did use time markers, 11 of them provided a happy ending to the scenario in which the child came and sat at the table with little argument. Six of those 15 happened through negotiating the amount of minutes allowed for the activity or through establishing a rule (no toys at the table). Of the five families who did not use time markers, three reported being successful at

convincing their children: one because sitting at dinner was never a real problem and the other two had strict rules to be obeyed which were simply restated to the child.

Television and/or video viewing patterns varied. Two families did not allow TV but allowed videos; five allowed videos and TV, ten allowed restricted TV but did not mention use of video, and three allowed TV and the Disney channel (cable). Half of all families claimed that their child had a consistent weekly routine of TV/video viewing.

# Appendix H

Dear Parents,

My name is Zena Eisenberg and I am a graduate student in Developmental Psychology at the Graduate School and University Center at the City University of New York (CUNY). I would like to invite you and your child to participate in a study I am conducting for my dissertation. The study is about young children's learning about time sequence through interaction with his/her parents, and it is expected to enhance our understanding of the way in which parents' verbal interactions with their children promote both their linguistic and cognitive skills.

I am recruiting 3 to 5 year olds through the Child Development and Learning Center (at GSUC) as well as through personal acquaintances. In order to have grounds for comparison, all children in the study should be the **only child** living with both parents, and those three people should be the only ones who typically sit at the dinner table.

In order to carry out this study, I need your permission to interview you and your child, and to record the conversations you have at dinner in your house. The study involves a part that requires only your child's presence, and can be done at his/her day care center. Your child will perform two short tasks in which I will assess his/her understanding of temporal words (such as "after", "before", and "first") and one also short language task. In the first temporal task, your child will be asked to sequence a set of Polaroid pictures taken earlier in the day of his/her activities in the order in which they happened. In the second temporal task, I will play with the child for 15 minutes, during which I will embed several sentences that contain the idea of sequence (e.g., "would you like to play with the xxx before you play with the xxx?" or "what do you want to do first? Play with xxx or with xxx?"). Those interactions will be recorded in videotape for later coding. The language task assesses the extent of your child's understanding of temporal words.

For the dinner part of the study, I will need your collaboration in recording your conversations. In order to avoid having an observer present, who might distract the child and the conversation, I will be handing you a tape recorder and tapes so that you can do the recording yourself. The recordings are to be done during **three** consecutive weeks, at dinner only, and only on the Monday and Friday of each week. Finally, the last part of the study is a post-interview with you. In that interview, I will have had a chance to listen to the tapes and will be asking you questions in reference to the content of the conversations. The questions will in most part be for clarification and contextualization of what was talked about. That interview may be done by telephone, if you so prefer.

This study involves *no risk* to you or your child, and I hope it will be enjoyable for all of you. More importantly, your or your child's performances will ***not be*** evaluated in any way. The objective of the study is to look at children in general, and not your specific child. Furthermore, your child's day care center will have *no access* to any information that concerns your child in particular. Finally, you and your child may withdraw from the study at *any time* you wish to do so.

The audio and videotapes as well as all other information collected will be kept in a safe place at the Graduate Center (CUNY), and your names will remain confidential. The tapes will be labeled with a date, and the numbers I will assign to you. Transcripts of the tapes and other records will also be given numbers - so that there is no identifying information - and will remain at the university in secure files. No one, except for myself, and my advisor, Professor Katherine Nelson, will view the tapes. Also, you may review the tapes at any time, if you so desire. I may publish results of this study, but names of people, or any identifying characteristics, will not be used in any of the publications. If you would like a copy of the study, please provide me with your address and I sill send you a copy in the future.

If you have any questions at any time about your or your child's participation in this study, or about its purposes, please call me at 718-721-3123, zeisenberg@gc.cuny.edu. If you have any questions regarding your and your child's rights as participants in this study, you can contact Hilry Fisher, Office of Sponsored Research, Graduate School and University Center - The City University of New York, at 212-817-7523, hfisher@gc.cuny.edu.

Thank you for your participation in the study. Please take the bottom copy of this form for your own records.

If you agree to be part of the study, please sign below:

Your full name: _____

Signature_____ Date ___/___/___

Spouse's name: _____

Signature_____ Date ___/___/___

Your child's full name: _____Date of Birth:_____/_____/_____
Phone # : (  ) ____-_____ Mo. Day Year

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