ACQUISITION OF MODALITY IN TURKISH

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Thesis Abstract

Treysi Terziyan, “Acquisition of Modality in Turkish”

In this thesis, modality is explored from different perspectives such as semantics, typology and psycholinguistics. The aim of this thesis is to investigate how modality unfolds in the linguistic development of Turkish children and to find what factors affect this development. This aim is accomplished with a longitudinal and an experimental study. In the longitudinal study, two Turkish children’s production of modality between ages 1;3-2;0 and 1;6-2;10 is investigated. In the experimental study, children between ages 3 and 5 are tested on their ability to comprehend expressions of modality. Also, in these studies various influences on the acquisition of modality are investigated, such as child directed speech, multifunctionality of forms, morphological and lexical means of modal expressions, pragmatic functions and children’s theory of mind abilities. The results of the longitudinal study suggest that the first modal category to be acquired is dynamic modality and then soon after evidential modality. Lastly, epistemic and deontic modalities are acquired around the same time. This is corroborated by the findings of the experimental study. Moreover, the influences on the acquisition of modality found on either study were child directed speech, multifunctionality of forms, means of modalized expressions and theory of mind skills.

Tez Özeti

Treysi Terziyan, “Türkçe’de Kiplik Edinimi”

Bu tezde, kiplik anlambilim, tipoloji ve psikodilbilimi gibi açılardan incalenmiştir. Bu tezin amacı kipliğin Türk çocuklarının dil gelişiminde nasıl ortaya çıktığını incelemek ve bu gelişimi etkileyen unsurları tespit etmektir. Bu amaç bir boylamsal araştırma ve bir deneysel araştırma ile gerçekleştirilmiştir. Boylamsal araştırmasında iki Türk çocuğunun 1;3-2;0 ve 1;6-2;10 yaşları arasında kiplik üretimleri gözlemlenmiştir. Deneysel araştırmada 3 ile 5 yaş arasındaki çocukların kiplik kavrama becerileri test edilmiştir. Ayrıca bu araştırmalarda çocuğun duydukları, yapıların çok işlevliliği, kiplik belirten yapının türü, söz edimleri ve çocukların zihin kuramı becerileri gibi unsurların kiplik edinimini üstündeki etkisi incelenmiştir. Sonuçlar dinamik kipliğin ilk, kanıtsallık kipliğin ikinci edinildiğini göstermektetir. Son olarak aynı zamanda bilgisellik ve yükümlülük kiplikleri edinilmiştir. Çocuğun duydukları, yapıların çok işlevliliği, kiplik belirten yapının türü ve çocukların zihin kuramı becerileri gibi unsurların kiplik edinimini etkilediği gözlenmiştir. Ancak, söz edim kiplik edinimini etkilememiştir.

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CHAPTER 1

INTRODUCTION

This thesis aims to explore the acquisition of modality in Turkish and the various factors influencing it. To be specific, I am interested in the emergence of modal concepts and not about the time when modal concepts become fully developed and adult like (after preschool years). In order to accomplish this aim I start out by discussing different views on modality and its categorization (Chapter 2). Modality is the study of the expression of possibility and necessity (Lyons, 1977). Each modal category corresponds to one shade of possibility and necessity. For example, for epistemic modality, which is concerned with the speaker's commitment to the truth of the proposition, the shade of possibility is speculation and the shade of necessity is deduction. Modal categorization has been problematic and there are different theories that divide modality differently in semantics and linguistic typology. Perhaps, the disagreement over the categorization of modal concepts is the reason for the discrepancies in acquisition of modality studies.

I present a literature review and critic of acquisition of modality studies for other languages in Chapter 3. The acquisition of modality has been widely researched; as children acquire modality they start to convey complex thoughts such as drawing conclusions, assessing abilities or making up social conventions. English is one of the most researched languages in this area and there are a number of longitudinal studies on the acquisition of modality in English that have become classics (Kuczaj 1982; Pea et al., 1982; Wells, 1979 to name a few). Because of the

discrepancies in the way these studies divide modality, there is a trend among the reviewers of these classics works to divide modality into two categories regarding the linguistic development of children. As they put it, epistemic modality develops before deontic/non-epistemic/root modality (respectively Stephany, 1979; Shatz and Wilcox, 1991; Papafragou, 2000). Portner (2009) opposes dividing modality into the categories of epistemic and everything else. He argues that this distinction is arbitrary, and that clumping distinct modal categories under the name of "non-epistemic modality" undermines the fact that they are in fact different from one and other. Metaphorically speaking, he is against dividing the primary colors into red and non-red ones. Blue and yellow do not share anything special that they need to be differentiated from red. Blue, yellow and red are distinct colors all in their own rights. Non-epistemic modalities are not different shades of the same color but they are distinct primary colors. Dividing modality into two categories is an oversight because of the reasons Portner lists and because it leads to a slightly blurred view of acquisition of modality.

In this thesis I wanted to adopt a categorization of modality that emphasizes the uniqueness of modal notions and the uniqueness of expression of modality in Turkish, and Palmer's (2001) categorization does just that. According to Palmer there are four categories of modality and Table 1 below gives his categorizations with definitions.

Table 1 Palmer's Categorization of Modality

Proposition Modality	Evidential	the evidence the speaker provides for a proposition's factivity: hearsay and type of inference
	Epistemic	the speaker's judgment about the factivity of a proposition: speculation, assumption and deduction
Event Modality	Deontic	external factors that the speaker thinks govern a person's actions: permission and obligation
	Dynamic	internal factors that the speaker thinks govern a person's actions: volition and ability

To get rid of any inconsistencies in the acquisition of modality studies, I have reanalyzed their results according to Palmer's categorization. When reanalyzed with Palmer's categorization in mind, the classic "acquisition of modality in English" literature appears to tell a slightly different story. The first modal category to be acquired appears to be dynamic. The next acquired modal category is not always clear. Deontic and epistemic modalities appear to be acquired around the same time, though epistemic modality generally has notably lower frequency than the other two modalities. Chapter 3 provides an overview of the major longitudinal studies on the acquisition of modality and their findings according to Palmer's categorization.

The explanation for the later emergence and the lower frequency of children's epistemic modality production in comparison to their deontic modality production warrants the discussion of various factors that might be influencing the acquisition of modality. A possible factor is the means modality is expressed with (such as the use of the modal auxiliary *must* or the modal adverb *possibly*). Most of these studies focus on modal auxiliary verbs and if they had included modal adjectives, adverbs and predicates, they might have gotten different results. Other factors considered in this literature are the role of the communicative context (Givón, 2009), theory of mind (Papafragou, 2002), child directed speech (Wells,

1979) and multifunctionality of forms (Kuczaj, 1982). Moreover, Chapter 3 provides a review of acquisition of modality studies for other languages, namely Greek, Dutch and Korean.

Acquisition of modality in Turkish has been studied mostly through evidential modality (Aksu-Koç, 1988; Öztürk & Papafragou, 2007, 2008 among others). However, the acquisition of different modal categories has not been looked at and contrasted in early childhood. In Chapter 4, I explain how modality is characterized in Turkish and I review various prominent studies on acquisition of Turkish.

The rest of this thesis explores the emergence of the expression of modality in Turkish and various factors that might be influencing it. I present two studies, a longitudinal study (Chapter 5) and an experimental study (Chapter 6), to provide a complete picture. In the longitudinal study I look at longitudinal data from two young children between the ages 1;3-2;10 and examine the production of all types of modality; I investigate child directed speech, pragmatic functions, means of modalized expressions, multi-functionality as possible influences for the acquisition of modality. Under the experimental study I discuss the cross-sectional experiment I carried out for children between ages 3 and 5 to investigate the comprehension of deontic and epistemic modalities and to consider theory of mind skills as a possible influence for the ability to understand epistemic and deontic modality. In the last chapter I discuss the findings of these studies and what they mean in the bigger picture of the literature mentioned above.

CHAPTER 2

MODALITY

2.1 Definition

According to Lyons (1977) modality, or "modal logic" as he often calls it, deals with the notions necessity and possibility. He says there are three types of modalities: alethic, epistemic and deontic. Alethic modality is the impartial truth value of a statement. Epistemic modality is the truth value of a statement the speaker commits herself to. Deontic modality is the potential force on a person to carry a certain course of action. All these modality types are related to the notions necessity and possibility. Alethically necessary propositions are automatically true sentences. For example, "If Alfred is a bachelor, he must be unmarried" (Lyons 1977 p788). Alethically possible propositions are sentences that are not necessarily false. He also notes that all alethically necessary propositions are alethically possible but not the other way around. Epistemically necessary propositions are utterances the speaker believes to be true. Epistemically possible propositions are utterances the speaker thinks might be true. Deontically necessary propositions are obligations. Deontically possible propositions are permissions.

A difference between these three types of modality is that alethic modality is objective, whereas as Lyons demonstrates both epistemic and deontic utterances can be subjective or objective. Since epistemic modality is the speaker's judgment on his/her utterance, its being subjective can be grasped easily. An example for

subjective epistemic modality would be “My sister must be asleep already since she always sleeps before 11PM”. Lyons indicates that objective epistemic utterances are conclusions the speaker arrives at by logic or math. For example, “If a seahorse looks pregnant, it must be male”. Objective deontic utterances are statements about existing factors of the world (like obligations) that the speaker is not committed to. Such an example would be “If you want to drive in a constant speed, your acceleration must be zero.” Subjective deontic utterances are statement that the speaker obligates someone, such as “You must be home by dinner because I say so”. (For a detailed discussion of the subjectivity and the objectivity of modal types see Verstraete 2001).

The examples above for epistemic and deontic modalities have one thing in common. They all include the modal verb “must”. In other words, “must” can come to mean deduction or obligation. This double meaning exists for other English modal verbs as well. Lyons draws attention to this ambiguity and makes a meaningful and interesting point that the ambiguity can also be seen in many other languages. In fact Turkish can be categorized as one of those languages.

Lyons, who concentrates on the semantics of modality, notes that his discussions on modality might not always relate to natural language. For example, the objective epistemic sentences don’t occur in natural language very often. Therefore, when studying the acquisition of modality, it would be better to look into the semantics of modality with real examples from languages.

Papafragou (2000) elaborates on the observation Lyons makes about the ambiguity in the modal verbs in English. She illustrates with examples that same

situation holds in other languages such as German, Modern Greek, Gaelic, Tamil and Colloquial Cairene Arabic (Papafragou 2000, page 5). Then she discusses the three accounts for how the same morpheme can have epistemic and deontic meanings, namely the ambiguity view, the polysemy view and the monosemy view. The ambiguity view argues that there is ambiguity between unrelated meanings like "ball" meaning a round object and a dance. However, as Papafragou points out that epistemic and deontic meanings are not completely unrelated; therefore, the ambiguity view cannot be an account for modal verbs. The polysemy view, on the other hand, says that each modal verb has a set of related meanings. Just like "crane" can mean the bird or the construction equipment (which got its name because it looked liked the bird), "may" can mean deontic permission or epistemic possibility. Papafragou points out that there are indeterminate examples of modal verbs in which one cannot designate a clear-cut modal meaning to the modal verb. An example for that would be "Can I help you". In this example "can" does not really mean permission or ability. Moreover, this view fails to explain how only some of the modal verbs have both epistemic and deontic meanings but not all. Papafragou's perspective is closest to the monosemy view, which she claims avoids the problems of previous views. In the monosemy view each modal verb has an abstract core meaning and the modal meanings are derived from the core meaning. That is to say "can" has the core meaning of possibility that one can derive the meanings deontic permission and dynamic ability from this core meaning.

Lyons and Papafragou not only differ on how to handle the various meanings of English modals but also on how they categorize modality. Papafragou divides

modality into two categories: epistemic and root. She claims that there is no precise distinction between knowledge and belief. She aligns alethic modality with epistemic modality and defines epistemic modality as the possibility or necessity of an inference to be true. This is parallel to the traditional views on epistemic modality. In her classification system, root modality consists of two subcategories: deontic and dynamic modality. She defines deontic modality as a moral agent's necessity or possibility to act and dynamic modality as an agent's ability or willingness to act. She draws a distinction between epistemic and root modality by emphasizing that epistemic modality is about 'the speaker's beliefs' whereas root modality is about 'the states of affairs'. Furthermore, resemblances between epistemic modality and evidentials are also pointed out. According to Papafragou evidential expressions are similar to epistemic statements because they convey details about where the speaker gets his knowledge from and/or how certain he is about the statement. However, she does not enlarge the family epistemic modality to include evidentials. This might be due to how she defines modality. She says that "Modal expressions allow us to talk (and modal concepts allow us to think) about states of affairs which are not present in the current situation and may never occur in the actual world" (Papafragou 2000, page 3). The reason she might be excluding evidentiality is because it does not fit into this definition. Evidentials could be "present in the current situation" or could not be. For example, hearsay is not "present in the current situation; however, a blind person touching ice and saying "Soğukmuş." ('It's cold.') is an evidential utterance based on tactile evidence.

Papafragou (2000) is not alone to define modality in such a way that evidentiality is left out. Portner defines modality in a similar fashion, who says that "(M)odality is the linguistic phenomenon whereby grammar allows one to say things about, or on the basis of, situations which need not be real" (Portner 2009 page). However, the similarity between them more or less ends there.

Portner opposes dividing modality into epistemic and root modalities. He says that clustering all non-epistemic modalities under a single roof is arbitrary. He reckons that non-epistemic modalities do not share anything special that they need to be distinguished from epistemic modality. Moreover, he says this undermines the distinctions between non-epistemic modalities. Portner also disagrees with using the term "deontic" as a general category name, since it has a restricted meaning having to do with ethical, moral and legal norms. Another term Portner uses differently is the term "dynamic". Dynamic modality, usually defined as expressing ability and desire, encompasses meanings such as ability, opportunity, disposition and quantification for Porter.

Portner divides modality into three "equal" categories: epistemic, priority and dynamic. He designates epistemic modality as reflecting speaker's knowledge. Alethic modality does not occur in natural language conventionally but it is a part of epistemic modality. Deontic modality is a part of priority modality, which also contains other kinds of modalities such as bouletic and teleological. In other words, priority modality includes obligations, permissions, desires and goals. Statements that are examples of priority modality display a priority for choice of action. According to Portner, dynamic modality has to do with displaying generalizations

for actions or circumstances affecting a possible action. More specifically, dynamic modality is composed of ability, opportunity, disposition, and existential and universal quantifications.

All these mentioned researchers have worked on English or a related language like German. Still, they have yet to agree on categorizing modality. To be able to critically analyze the acquisition of modality in Turkish, a completely different language from Germanic languages, I decided to consider a different approach. I looked into two typological studies on modality that are significantly different from one and other and tried to choose the one that fits Turkish the best.

2.2 Typological Categories of Modality

Bybee, Perkins and Pagliuca (1994) and Palmer (2001) look into numerous languages and try to come up with categorizations that appeal to all languages. They go about it in distinct ways. I will go over both studies and then give my reasons for choosing the categorization of modality I have adopted.

Bybee, Perkins and Pagliuca (1994) find that traditional ways of categorizing modality does not hold well when doing cross-linguistic work. Therefore, they divide modality into four unconventional categories: epistemic, agent oriented, speaker oriented and subordinating moods. Their epistemic modality is analogous to classic epistemic modality. They define it as the speaker's commitment to the truth of the statement. They ranked epistemic senses from the lowest commitment to highest commitment as possibility, probability and inferred certainty; total commitment is modally unmarked. They mention that some senses of evidentiality

are encompassed under epistemic modality. For example, inference entails partial commitment. Agent oriented modality is defined as internal and external drives that an agent has. These drives are obligation, ability and desire. This definition entails that agent oriented modality can be uttered by the person concerned (i.e. "I will come to your class today") or by a third party (i.e. "He has to come to class today"). Speaker oriented modality, on the other hand, is defined as the speaker's giving directives and permissions to someone. This category is composed of commands, demands, requests, recommendations, warnings and permissions. An important point here is that they have divided up the classical deontic modality between agent oriented modality and speaker oriented modality by delegating obligation and permission respectively. The category subordinating moods can have epistemic meaning or speaker oriented meaning. This category is differentiated from the other categories so that the other categories only involve main clauses. Any modality in a subordinate clause is put under this category. This way of categorizing modality is very different than the ones mentioned above, which might be the reason it is not very widespread. However, it draws attention to the fact that the traditional categorizations of modality are not adequate to fit all languages.

Palmer (2001), on the contrary, instead of coming up with alternative terms he expands on the traditional categories epistemic, deontic and dynamic, to correspond to the typological categories of modality. Palmer's definition "Modality is concerned with the status of the proposition that describes the event" (Palmer 2001 page 1) is vague enough to include evidentiality but still gives a sense of what modality is. He attempts to acknowledge the observations mentioned above by

dividing modality into two overarching categories: propositional and event modalities. He groups evidentiality and epistemic modality together under "propositional modality", which he describes as expressing the speaker's attitude about the truth/factivity of the proposition. He also groups deontic and dynamic modality together under "event modality". The general description he gives to event modality is that it is about a not yet actualized but prospective events.

Within propositional modality the difference between epistemic modality and evidentials is that the former is concerned with the speaker's judgment about the factivity of a proposition, whereas the latter is concerned with the evidence the speaker provides for its factivity. He, then, divides epistemic modality into three typological kinds: speculative, assumptive and deductive. With each kind of epistemic modality the speaker communicates his/her judgment, which respectively is "a possible conclusion", "a reasonable conclusion", and "the only possible conclusion" (Palmer 2000 page 6). He shows that evidentiality, on the other hand, has diverse kinds in various languages, such as inference, auditory evidence, visual evidence and hearsay.

Within event modality the difference between deontic modality and dynamic modality is that the former is concerned with external factors governing the person's actions, whereas the latter is concerned with internal factors. The factors relevant for deontic modality are obligation and permission in line with the traditional view on deontic modality. The factors relevant for dynamic modality are ability and willingness.

I have chosen to adopt Palmer's categorization of modality for the current study because it is close to traditional categorizations and cherishes all the features of Turkish modality, in particular the evidentials. Table 2 is a reflection of Palmer's categorization of modality from a traditionalist point of view.

Table 2 Palmer's Categorization of Modality Sorted into a Spectrum from Possibility to Necessity

	Propositional Modality		Event Modality	
	Epistemic	Evidential	Deontic	Dynamic
Necessity	Deduction	Inference	Obligation	Volition
	Assumption	Surprise	Commissive	
Possibility	Speculation	Hearsay	Permission	Ability

As I have indicated above the terminology for modality is not universal in the literature of semantical and typological approaches. This is most problematic especially when researchers use the same terms to mean different things. Asimilar situation exists in the literature of psycholinguistics, which I go into in the next chapter. To avoid confusions and misunderstandings from now on I only use Palmer's terminology. However, I provide footnotes for every time I reword an author's terminology.

CHAPTER 3

ACQUISITION OF MODALITY

In this chapter, I discuss some of the literature on the acquisition of modality in typologically different languages, such as English (a classically studied language), Dutch (a Germanic language like English but with some important differences on the subject of modality), Italian (an inflecting language that exhibits interesting similarities to Turkish especially syntactically), Greek (a language with a rich verbal morphology system that has been in close contact with Turkish for hundreds of years) and Korean (a language that bears so many similarities to Turkish that some researchers think they belong to the same language family). I also cover the possible influences of the acquisition of modality such as child-directed speech, pragmatic functions, cognitive abilities, multifunctionality and means of language.

3.1 English

On the topic of acquisition of modality one of the most studied languages is English. Over the last 40 years the acquisition of modality in English has been thoroughly explored especially with respect to the order of acquired modal categories and the factors that might play a role in children's acquiring modality.

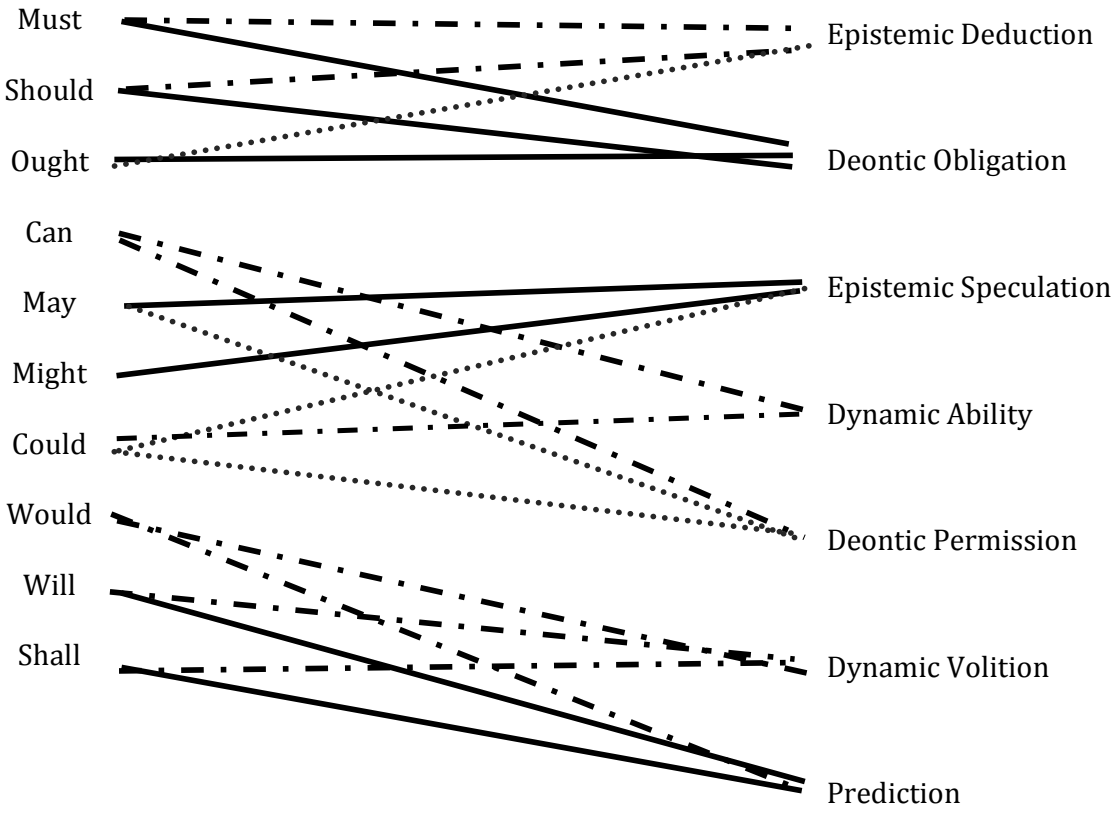
In English modality can be expressed with modal verbs, adjectives, adverbs, nouns, derivational suffixes and verbs taking sentential complements (examples are provided in Table 3). However, in children's language mostly modal verbs are

present (Stephany, 1979). Consequently, most of the research on acquisition is about the modal verbs.

Table 3 Examples of Various Ways of Expressing Modality ‘n English Taken from Stephany (1979)

	Examples
Modal verbs	may, can, must, will
Adjectives	possible, likely, certainly
Adverbs	possibly, perhaps, maybe
Nouns	possibility, likelihood
Derivational suffixes	-Able in controllable, governable
Verbs taking sentential complements	believe, doubt

As mentioned above English modal verbs have many modal meanings. Therefore, considering their meanings might be useful before investigating how children acquire them. Coates (1983), among others, provided a natural palette of meanings used for each modal verb. These meanings are based on adults’ language and not children’s language. However, it is a good reference point for what children hear modal verbs are being used for. Coates has looked into written and spoken corpus and extrapolated the different meanings English modal verbs have and also the potency of each meaning, as can be seen in Figure 1. Coates found that “must”, “should” and “ought” are mostly used to denote deontic obligation but they can also be used to denote epistemic deduction. “Can” is used for dynamic ability and deontic permission somewhat equally. “Could” is used for epistemic speculation and deontic permission to a similar degree and for dynamic ability to a larger degree. “May” and “might” are mostly used for epistemic speculation and “may” is also occasionally used for deontic permission. “Would”, “will” and “shall” are used for dynamic volition, epistemic assumption and deontic commisive.



Plain line: Primary use
Broken line: Secondary use
Dotted line: Rare use

Fig. 1 Interrelation of English auxiliary verbs and modal meanings (adapted from Coates, 1983)[1]

Coates (1983) has demonstrated the range of meanings each modal verb has in adult speech. To have a sense of when a meaning of a modal verb emerges in children's speech and what factors affect it, I refer to naturalistic (i.e. longitudinal and cross-sectional) studies below. To have a sense of when children become

[1] In order to fit this figure into Palmer's categorizations, I have excluded some meanings and changed some names. Coates' Prediction category is made up of Palmer's epistemic assumption and deontic commisive.

capable of understanding modal meanings and what factors affect it, I refer to experimental studies below.

3.1.1 Longitudinal and Cross-Sectional Studies

Wells (1979) has examined the data of 60 children from the Bristol corpus between the ages 1;3 to 3;9. These children were recorded every 3 months. Wells investigated the occurrences of all auxiliaries in his study. He looked at how many times an auxiliary was used and by how many children. He also came up with a criterion to distinguish the age at which an auxiliary has been acquired. The criterion was that an auxiliary has to appear at least once in half of the children's samples. The first modal auxiliaries children acquire were "can" (ability) and "will" (intention). By the time the children were 3;0, they were using "can" to convey dynamic and deontic modalities and "will" to convey dynamic and epistemic modalities[2]. Other modal auxiliaries that reached Wells criterion during the time of the study were deontic readings of "have got to" and "shall" and 'prediction' meaning of "will". The order of modal category acquisition in his study was dynamic, deontic and then epistemic. However, the time between their acquisitions was only a couple of months. A thing to note here is that these children were recorded every 3 months so the time between the acquisitions of modal categories might be even slimmer. An important point in the findings of Wells' study was the number of utterances with epistemic meanings was a lot less than the other two modalities.

[2] He actually had five categories: inference, likelihood, potential, constraint and performative. I tried to find their corresponding modal category with Palmer's definitions. I came up with epistemic (inference and likelihood), dynamic (potential) and deontic (constraint and performative).

The numbers of modal auxiliaries denoting dynamic, deontic and epistemic modalities were respectively 1228, 1230 and 260. A conclusion that can be drawn from this study is that acquisition of different modal categories is only a couple of months apart (with the order: dynamic, deontic and epistemic) but their frequencies are not equivalent at all.

Shepherd (1982) explored how an individual child, Nina, used modal verbs. She found that overall deontic and dynamic notions[3] were acquired before epistemic notions. She observed that modal verbs, which conveyed deontic and epistemic notions somewhat equally in adult speech, were first used to convey deontic notions. For example, "must" was used to mean obligation before it was used to mean deduction. Shepherd noticed that later on when Nina started using modal verbs to denote epistemic modality, she did so by using the modal verbs which adults mostly used to mean epistemic notions. However, Nina first used these modal verbs to express deontic notions. In short, Nina used modal verbs first deontically then epistemically no matter how adults used them but she started using some specific modal verbs epistemically earlier because these ones were mostly used epistemically by adults.

Pea et al. (1982) looked into how modal auxiliaries surfaced in the speech of a single child from 1;11 to 3;3. They found that until 2;4 the modality she used was mostly dynamic but after 2;4 this changed and she started using all types of modality more evenly. They also saw that she initially used modal verbs for

[3] She did not differentiate between deontic and dynamic modalities. She described deontic modality as including notions such as obligation, permission and volition. I use the term "deontic and dynamic" for every time she did not specify the specific notions. When she specified the notion as obligation or permission, I simply reported as "deontic".

utterances about here-and-now and they mainly referred to her capacities and intentions. They found that she rarely used modal verbs other than "will" to denote epistemic modality. However, they did note that she expressed certainty and possibility in other ways, for example with "I think" (p10), but they did not look into them. In this study the pattern of acquisition of modality was dynamic modality first and then deontic and epistemic modalities around the same time.

Kuczaj (1982) investigated acquisition of modality by looking at which modal notions emerged at which developmental point in the speech of a child between the ages 2;5 to 5;0[4]. He collected data from a child every week in between, except a month from 4;0 to 4;1. An interesting point about his analysis was that he did not constrain himself to modal auxiliaries but he also included modal adverbs such as "maybe" and modal predicates like "know". He found that first modal meanings that surfaced were epistemic assumption, dynamic intention, dynamic ability and deontic permission. For assumption and intention the child used "gonna" and for ability and permission the child used "can", "can't" and "don't". By 2;6 the child started saying utterances with epistemic speculation and "necessity" (he did not illuminate whether it was in deontic or epistemic sense). Within two months of the beginning of data collection, the child was using all notions of epistemic, deontic and dynamic modalities. However, Kuczaj did not report frequencies of each modal

[4] He uses slightly different names for modal meanings. Here are the names he uses and what I think would be the Palmer versions: Future of present intent (dynamic intention), Future of present cause (epistemic assumption), future of prediction (epistemic assumption), ability (dynamic ability), permission (deontic permission), possibility (epistemic speculation), willingness (dynamic intention), obligation-necessity (deontic obligation and epistemic deduction) and hypothetical (epistemic assumption).

meaning. Hence, one cannot be sure whether these instances were flukes or the child had developed an understanding of the modal notions.

Bliss (1988) did a cross sectional study that provides the frequencies of modality types for four age groups. She collected an hour-long spontaneous speech data from 2, 3, 4 and 5 year olds. There were 18 children in each age group. She looked for all utterances containing "may", "must", "might", "can", "could", "will", "would", "shall" and "should". She categorized the utterances containing those modal verbs into 6 modality types: assumption and speculation, deduction, ability, intention, permission and obligation.[5] The mean number of utterances for each age group was 66.75 and there was no significant difference between the ages. She found that 2-year-old children used significantly less number of modal verbs, while there was no difference between 3, 4 and 5 year olds. In all age groups all types of modalized utterances were expressed. However, overall dynamic modality was the most expressed modality type and epistemic modality was the least. This was a very enlightening study not on modality but on modal verbs. These results tell a lot about children's usage of modal verbs but children sometimes use other means to express modality such as adverbs as mentioned below. The next two longitudinal studies mentioned have narrow scopes but unique perspectives because they focus on the modality expressed by more than the usual modal verbs.

O'Neill and Atance (2000) investigated how uncertainty, in Palmer's terms epistemic speculation, manifested in children's speech. They scoured the transcripts of 10 children between ages 2;0 and 4;11 from the CHILDES database for modal

[5] Bliss actually used the names "probability or possibility" for what I call "assumption and speculation" and "certainty" for "deduction".

terms conveying uncertainty, in particular “maybe”, “possibly”, “probably” and “might”. They found that the term “possibly” was not present in these transcriptions at all. All of the children acquired speculative modality between ages 2;1 and 3;2. An interesting point was that only three of them used the modal verb “might” as their first epistemic speculative term, whereas the rest of the children used the modal adverbs “maybe” and “probably”. Between ages 2;0 and 2;5 the total number of utterances were over 35 thousand and there were only 11 instances of utterances with uncertainty terms. Between ages 2;6 and 2;11 the total number of utterances were over 45 thousand and there were 75 instances of utterances with uncertainty terms. Until the children reached the age 3;0, they only used uncertainty for present and future. Between ages 3;0-3;5 the percentage of utterances with uncertainty terms over total number of utterances was double the amount in the previous 6 month interval. After the age of 3;6 the percentage pretty much stayed the same, which was around 0.47%. Another related interesting point was that 72% of the uses of the modal verb “might” were after the age of 3;6. In sum, the children expressed epistemic modality with lexical items, such as “maybe”, before they could competently use the epistemic modal verb; however the percentage of epistemically modal utterances was still very low.

Givón (2009) did a noteworthy study that looks beyond modal verbs in the acquisition of modality in English. He inquired into children’s usage of verbal predicates with complements. He analyzed how these verbal predicates are used modally. His data was the longitudinal collected speech of 3 children from the CHILDES database. The children were between the ages 1;9-2;0, 1;10-2;3 and 1;11-

2;10. He divided each child's data into three developmental stages. Givón observed that in stages 1 and 2 children's utterances were mostly elliptic and they were not grammatically marked. Other differences between stages were that children in the 3rd stage asked more questions and talked more about non-present times. There were consistencies among stages also. In all stages the children tended to use 1st and 2nd person almost exclusively in utterances with event (deontic and dynamic) and also to a lesser extent in utterances with epistemic modality. Moreover, in each stage both the caretakers and the children were likely to start a modal interaction. He saw that both the caretakers and the children expressed more utterances with event modality than propositional modality (epistemic and evidential)[6].

3.1.2 Experimental Studies

One of the earliest and most prominent experimental studies on acquisition of modality was done by Hirst and Weil (1982). In their study they had almost 55 children between the ages 3;0 and 6;6. They tested the children on their understanding of epistemic modality by giving them two options on where a peanut could be and each choice was endorsed by a puppet. The puppets either both voiced epistemic utterance with different strengths or one voiced an epistemic utterance and the other a non-modal utterance. The possible auxiliary pairs for the endorsements were *must/should, must/may, must/is, should/may, should/is* and *may/is*. Moreover, they tested the children on their understanding of deontic

[6] He actually divided modality into to two categories deontic and epistemic. His definition of deontic modality included Palmer's dynamic modality and his definition of epistemic modality included Palmer's evidential modality.

modality by having them choose which teacher should a puppet listen to when given two different directives by two different teachers. The deontically modal directives the teachers gave the puppet were not equally strong. The possible auxiliary pairs for the choices given by the teachers were *must/should*, *must/may* and *should/may*. They found that in the epistemic test the youngest children answered only *is/may* questions higher than chance level. The second youngest age group displayed a knowledge of non-modal utterances being stronger than modalized utterances. They could also differentiate between *must* and *may*, which was the only pair contrasting strong necessity and weak possibility (i.e. the pair with strongest opposition). The children between the ages 5;6-6;0 were significantly better than chance at answering all of the questions. On the other hand, they found that in the deontic test the children could not give the right answer significantly better than chance before the age of 5;6. The late development of the children's understanding of deontically modal verbs was controversial since the longitudinal studies tended to include dynamic modality (which is acquired pretty early) in deontic modality.

Brynes and Duff (1989) set out to revise Hirst and Weil's study (1982) acknowledging the issues they raised. Brynes and Duff tested 55 children between the ages 2;10 and 6;3. They used more colloquial modal verbs such as *can* and *have to*. They included negated forms of modal verbs in their tests. Unlike Hirst and Weil's study, they did not only give children contrasting clues by which the children were expected to figure out the strengths of the modal verbs in the clues. Additionally, they included single sentence clues and synonym sentence clues to the epistemic modality tests. The modal verbs they used for the epistemic modality tests

were *has to, can't, might* and *might not*. In all epistemic modality tests there were two cups, a red one and a blue one, with a penny under one of them. In the first test the puppet gave the children a clue with one of the modal verbs. The fact that they included negated modal verbs ensured that right answers were not just the children pointing to the cup mentioned in the clue. The second test was similar to Hirst and Weil's study in that the children were given two contrasting clues with different strengths by two puppets. In the third test the children were again given two clues but this time both clues indicated the same cup (e.g. *The penny has to be under the red cup* vs. *The penny can't be under blue cup*). In the single sentence clue test all children did equally well. In the contrasting clues test all children answered right significantly better than chance; however, the 3 year olds did worse than the older children. In the synonymous clues test all children answered right significantly better than chance; however, the 5 year olds did better than the younger children.

For the deontic modality tests, too, Brynes and Duff took a different approach from Hirst and Weil. Trying to make these tests more interesting and realistic, they came up with four stories, which had two parents either contradicting or confirming each other on the issue of their child doing something. The children were asked to predict the child's consequent behavior. The modal verbs involved were *have to*, *can* and their negated forms. Brynes and Duff noted that overall children of all ages did satisfactory on these tests. They did however point out that the 5 year olds did significantly better than the younger children. Their study showed that young children are capable of understanding both deontic modality and epistemic modality.

3.1.3 Influences on the Acquisition of Modality

Naturalistic and experimental studies on the acquisition of modality in English can be summed up as: the first modal category to emerge is dynamic modality and then around the same time deontic and epistemic modalities emerge though children's production of epistemic modality is considerably lower than their production of deontic modality. The reasons behind this developmental pattern have been investigated from different perspectives. Below are some of the influences on the acquisition of modality.

3.1.3.1 Child Directed Speech/Input

It is well established that what the child hears affects his/her emerging language. Hoff-Ginsberg and Shatz (1982) provide a review on the early literature about the effects of input on various aspects of children's speech such as syntax acquisition. Hart (1991) gives evidence that first words children learn are the most frequent ones in child directed speech (CDS). The effect of child directed speech on the acquisition of modality has been explored by Wells (1979) who compared auxiliaries in children's speech and CDS and found that the auxiliaries that were the most frequent in CDS were the ones children acquired first and used the most. Shatz and Wilcox (1991) investigated possible constraints on children acquiring modal verbs in English by reviewing numerous studies in the literature. They came to the conclusion that input was one of the factors that influenced the acquisition of modality.

3.1.3.2 Communicative Context/Pragmatic Functions

CDS is a part of a larger notion, namely the communicative context between a child and the caregiver. Understanding why people (in this case, caregivers and children) communicate might give us a better understanding for the patterns of acquisition. As Ninio and Snow (1988) put it "Language needs to be understood in terms of the way it is used, and a satisfactory theory of language acquisition will account for children's learning the linguistic system by explaining how they learn to use the system" (Ninio & Snow, page 27). Some evidence for the influence of communicative context and pragmatic functions on acquisition of modality is provided by studies mentioned above. When looked at modal verb usage in a girl's speech, Pea et al. (1982) saw that initially the child predominantly used modals for utterances about here-and-now and these were mainly assertions. She used modals to talk about her capacities and intentions. Pea et al. argued that this girl was using language to build and display her identity. Givon (2009) analyzed the speech of three children and their caregivers according to modal notions and discursive purposes. He found that the communicative context between a mother and her child was the 'here-and-now' and 'getting this done' in early childhood (Givón, p350). In this context, children made factive statements, labeled objects, complained, offered and requested things. The children and their mothers did not really talk about possibilities or made predictions of future events. In other words, the communicative context of children's interaction with their caregivers is not inducive of epistemic modality.

3.1.3.3 Theory of Mind/Cognitive Capacities

Theory of mind (ToM) ability is the ability to understand people's mental states such as desires, emotions, knowledge and beliefs (Wellman & Liu, 2004). Before a child develops theory of mind, he/she projects his/her mental state upon others. Moore, Pure and Furrow (1990) recognized that the pattern of epistemic modality acquisition was similar to the acquisition of mental verbs. They figured these acquisitional patterns might be explained by the development of ToM around the age of 4. Moore, Pure and Furrow took inspiration from Hirst and Weil's study (1982) and carried out experiments with children on their ability to understand epistemic modality by using the contrastive clues test. However, unlike Hirst and Weil they tested understanding of epistemic modality not only through modal verbs (must, might and could) but also through modal adverbs (probably, possibly and maybe) and mental verbs (know and think). They also carried out theory of mind experiments to find whether there was a correlation between ToM capacities and understanding of epistemic modality. They found that children's ability to differentiate between modal verbs and modal adverbs improved significantly between the ages 3 and 6. They saw that 3 year old children only answered half of the questions about modal verbs and adverbs correctly. Moreover, they discovered that children's understanding of modal verbs and mental verbs were correlated and both of them were related to ToM capacities.

Papafragou (2002) argued that the reason for the late acquisition of epistemic modality lied in the cognitive abilities of children. Experiments like the Moore, Pure and Furrow's study (1990) mentioned above demonstrated that there

was a connection between understanding of epistemic modality and cognitive abilities. She concluded that the reason epistemic modality emerged later was because it required a higher level of thinking, which very young children were not capable of.

The influence of theory of mind and cognitive capacities is not restricted to epistemic modality. Wellman and Miller (2008) argued that there was a relationship between ToM and deontic modality also. They pointed out that deontic modality and ToM abilities follow the same developmental trajectory; they supported their claims with the results of various developmental studies. Below are a few examples of the studies they quoted.

- Children consider a person's intentions when judging a person's inability to comply with an obligation (Nunez & Harris, 1998).
- Children often explained the cause of someone's actions by considering social conventions together with his/her mental state (Hickling & Wellman, 2001).
- Children who develop ToM early are better at following rules at school (Lalonde & Chandler, 1995).

If Wellman and Miller's claims are accurate, this would explain why deontic modality is also acquired later than dynamic modality and along with epistemic modality and ToM.

3.1.3.4 Uni vs Multifunctionality/Form-Function Mapping/Multiple Meanings

When children first start to learn language, they rely on various word-learning biases, social cues, syntactic cues. These biases and cues are tools that help them assign meaning to novel words (for a review, see Golinkoff et al., 2000). Markman (1994) proposed that one tool children use is the mutual exclusivity bias, the

assumption that an object has only one name in the absence of substantial additional information to the contrary. Mutual exclusivity bias, or form-function mapping, helps children learn new words rapidly by constraining possible meanings for new words. Investigating how children learn multiple meanings of words, Nerlich et al. (2003) carried out a cross-sectional study on the acquisition of polysemous "get". They found that 4 year olds were able to produce sentences with only a couple of different shades of the word "get" and they significantly favored 'obtain' as the main meaning of "get". 7 and 8 year old children were able to produce sentences with many meanings of "get" and had no specific preference for the main meaning. It could be deduced from these results that children acquiring modality might not be using modal verbs for epistemic modality because they like to use a word for a single meaning (sometimes this meaning could be dynamic and other times deontic). Kuczaj (1982) provides evidence for this deduction. He found that children used form-function mappings when they initially learnt modal verbs; however, as they became more proficient language users and their mean length of utterances increased the form-function mappings disappeared (i.e. forms became multifunctional).

3.1.3.5 Category of Word/Means of Language

There is a trend among children's language acquisition: nouns are acquired before verbs (Gentner 1982, 1991, 2006) and adjectives (Klibanoff & Waxman, 2000; Waxman & Lidz, 2006). This trend suggests that the category of a word plays an important role in language acquisition. In the literature of modality acquisition in

English, especially in the early literature, researchers have zeroed in on one category of word, namely modal auxiliary. As Pea et al. (1982) made a note but did not investigate further, the child in their study used epistemic modal auxiliaries minimally but used modal predicates such as "think" instead. O'Neill and Atance (2000) showed that all the children in their study acquired epistemic modality pretty early but most of them used means other than modal auxiliaries. These two studies suggest that if one looks at all means of modalized expressions, one might find that epistemic utterances are plenty.

3.2 Dutch

Even though Dutch is quite similar to English, I would like to mention it because of three noteworthy studies. Two of them look into acquisition of modality by means lacking in English: modal particles and root infinitives. Root infinitives, which have the infinitival marker unlike in English, are used for modal expressions (namely, obligations, wishes and speculations (Blom, 2002). Blom looked into the longitudinal data from 6 Dutch-speaking children. From age 2 to (almost) 3 Blom found that children mostly expressed non-modal utterances without a verb or with a finite verb and modal utterances with root infinitives. Modal particles (i.e. discourse markers) can have various meanings according to the context (de Beijer, 2009). Utilizing the CHILDES database, de Beijer (2009) looked into the first 30 utterances including modal and aspectual particles of Dutch speaking children around the age one and a half. The results showed that the children acquired all of the particles being studied around 2;7.

The last Dutch study I would like to mention is related to influences on acquisition of modality. Watzema (2009) tested autistic children on their epistemic modality skills (similar to Hirst & Weil, 1982) and their theory of mind abilities. She found that autistic children who passed ToM tests did significantly better on the epistemic modality task.

These Dutch studies suggest that one should take into account that children may use various means of modalized expressions. Moreover, they provide further support for the relationship between theory of mind and epistemic modality.

3.3 Italian

Calleri (1995) provided a comprehensive account of acquisition of modality in Italian. She looked at the longitudinal data from five Italian speaking children around ages 1 to 3. Of the three modal verbs, *volere* 'want' and *potere* 'can' were usually the first ones to emerge. *Dovere* 'must' usually was acquired later by the children. In other words, volition and ability (i.e. dynamic modality) emerged before obligation (i.e. deontic modality). Epistemic modality emerged around the time obligation did. Children's first uses of epistemic modality were not the epistemic meanings of already acquired deontic modal verbs. Children first start to use epistemic modality with combinations of modal predicates and mood suffixes such as *essere* 'be' with future or *pensare* 'think' with imperfect.

The first of the Italian moods children used was the imperative, which was evident in their longitudinal data since the beginning. Subjunctive mood (which conveys unreal statements such as wishes, possibility, judgment and necessity)

appeared in the data rather late and only in two children's data. One child used subjunctive mood only for volition and the other mostly for volition. Conditional mood appeared fewer and also later in children's data (except for one child). Hypothetical sentences emerged only in two of the children's data and around the time obligation (*dovere*) was acquired. The imperfect marker in Italian is said to distance the speaker from a statement and some uses include talking about dreams, playing make believe, being polite, planning and making epistemic conclusions. The imperfect marker emerged in the children's data fairly early. Interestingly, first uses of imperfect marker, which include surprise and narration, corresponds to the uses of evidential marker in various languages including Turkish.

One thing to note is that there were individual differences between the children. Especially, the differences between two subjects stood out because these subjects were siblings and hence would get similar input. Calleri noted that the differences between the siblings might understate the influence of input.

Bascelli and Barbieri (2002) carried out an experimental study on the acquisition of epistemic and deontic meanings of two Italian modal verbs *potere* 'can' and *dovere* 'must'. They tested 3 to 9 year olds and adults. To test the comprehension of epistemic modality they employed tasks similar to Hirst and Weil (1982). To test the comprehension of deontic modality they created a game for collecting prizes and had one or two puppets giving directions (obligatory or permissive). Sometimes the directions of the puppet contradicted the success of the child (e.g. the puppet gave a directive that led to the child not get the prize but the children were still ask to follow the puppet's directions). They found that 3 year olds

were at chance level when given two contradictory clues/directions with various shades of modality by puppets. Five year olds showed the most awareness when they were given two ends of the spectrum (i.e. *deve* 'must' vs. *può* 'may' for epistemic modality and *devi* 'must' vs. *puoi* 'may' for deontic modality). The percentages of correct answers in these conditions were 75% for epistemic modality and 77% for deontic modality. At age six the children were just able to comprehend the finer distinctions in epistemic modality. On the other hand, five-year-old children started to comprehend the finer distinctions in deontic modality. These results might suggest that Italian children acquire deontic modality before epistemic modality. However, it might also be the case that children learn the deontic senses of modal verbs and use other means to denote epistemic modality as Calleri's (1995) longitudinal study suggests.

These Italian studies suggest that the development trajectory for modality is dynamic modality first and then deontic and epistemic modalities around the same time. Also, some senses of evidentiality emerge quite early in children's speech. Another point of these studies is that children initially assign a single modal function to a modal verb, which can denote at least two functions, and use that modal verb only for that function. In other words, Italian children do not use modal verbs multifunctionally when they first acquire them even if they are capable of expressing different kinds of modality. Lastly, there was some evidence that suggest child directed speech and children's acquisition might not be related.

3.4 Greek

Stephany (1986, 2011) painted a clear picture of how Greek children acquired modality. Main means of modalized expressions in Greek are verbal predicates, modal verbs and verbal morphology, namely subjunctive mood, imperative mood and future tense. The verbal predicates and modal verbs can denote deontic, dynamic and epistemic modalities[7]. The subjunctive, imperative and future markers alone or combined can denote various meanings such as intention, obligation and probability. According to Stephany (2011) over 60% of the children's utterances were modalized between 1;8 and 2;0 (period I). In period II (2;3-2;5) the percentage of their modalized utterances decreased and in period III (2;9-2;11) it decreased even further. In period I, the most used means of modalized expressions were the subjunctive mood and the future tense (which were often combined) expressing prediction, permission and volition (Stephany 1986, 2011). The next used means of modalized expressions was the imperative. Even in period I children seemed to show an understanding of the difference between subjunctive mood and imperative mood: imperative mood should be used for commands and subjunctive mood for polite directives. Children used imperatives towards people from the same or lower social rank or for urgent matters and subjunctives toward people from higher social rank. The only modal verb present in period I was *boró* 'can, may' and it was used to denote ability not permission. The modal verb *prépi* 'must', used to denote obligation, emerged in period II and was rare overall. Stephany (1986) assumed that

[7] Stephany (1986, 2011) divided modality into two major categories: deontic and epistemic. She defined deontic modality as to include obligation, permission, volition and ability. In other words, Stephany's classification combined Palmer's deontic and dynamic categories under deontic modality.

the reason behind late acquisition and infrequency of *prépi* was its syntactic complexity. Of the various modal predicates denoting wish, capability and permission, only the one denoting wish *θelo* was very frequent (Stephany, 2011). She also pointed out that event (deontic+dynamic) modality developed before epistemic modality (Stephany, 2011). In conclusion, Greek children used various means of modalized expressions for dynamic, then deontic and finally epistemic modalities.

On a note related to influences on acquisition of modality, Stephany (2011) explored modal use in child-directed speech (CDS). She found that the percentage of modal utterances in normal adult speech was around 20%; however, in CDS it was around 50%. In other words, just like children's speech CDS was highly modalized too. The pattern of means of modalized expressions was slightly different though. Caretakers used imperative mood more than subjunctive mood, opposite of what children did. This was expected since CDS is directed at someone lower in social rank. The lexical means of modalized expressions in CDS was analogous to child speech's. The most used lexical means of modalized expressions were *boró* 'can, may' and *θelo* 'want' and to a much lesser extent *prépi* 'must'. An interesting point was that in all the CDS data there were only four instances of epistemic utterances.

On a similar note, Ifantidou (2009) executed a study exploring the relationship between acquisition of lexical items denoting propositional modality[8] and development of cognitive abilities. First, Ifantidou looked into the longitudinal data from two children between ages 3;6 and 5;10 for evidential and epistemic

[8] Ifantidou called it evidentials; however, the definition of evidentials in this study was so vast that it encompasses Palmer's evidential and epistemic modalities.

utterances and grouped them into three stages. In the first stage (between ages 3;6 and 4;0), children used verbal predicates with simple syntax to express propositional modality. In the next stage (between ages 4;1-4;9) children were talking about the "wrong" thoughts and beliefs of other people, which were "wrong" because the child believed so or knew so. In the last stage (between ages 4;10-5;10) the children were able to talk about others' beliefs and thoughts in a teasing or ironic way. In the stages 2 and 3 children were utilizing more complex sentences for the expression of propositional modality and were producing utterances that would rely on more advanced theory of mind abilities (i.e. talking about others' thoughts that differed from their own) than children in stage 1.

Ifantidou also carried out experiments to complement the longitudinal study. In one experiment Ifantidou tested 4- and 5-year old children's ability to comprehend propositional modality similar to Hirst and Weil's study (1982). The results showed that older children performed significantly better than younger children. In another experiment, Ifantidou tested 3-, 4- and 5- year old children's source monitoring skills with short stories and pictures. Source monitoring skills are involved in remembering the source of a piece of information (i.e. seeing something or hearing about it from someone). Children overall did quite well on these tasks. Moreover, age did not seem to be a factor for most of these tasks. Since age was a significant factor for comprehending propositional modality but not for monitoring the sources of information Ifantidou concluded that these cognitive skills were available for children and they just needed to acquire the linguistic tools to express propositional modality.

To sum these Greek studies up, Greek children learn dynamic modality first, then deontic and finally epistemic modality, which is slightly different than developmental trajectories in English and Italian mentioned above. Stephany has found evidence for the relationship between the modal expressions in child directed speech and the acquisition of modality by Greek children. On the other hand, Ifantidou's results imply that Greek children already have some cognitive skills to express modality but their linguistics capacities lag behind. However, Ifantidou's longitudinal study on the production of propositional modality suggests that expressions of complex propositional modality require the development of theory of mind.

3.5 Korean

Exploring acquisition of mood in Korean, Lee (2009) and Choi (1995) observed that Korean children's acquisition of modality did not follow the same pattern as English children's. Table 4 shows the age of emergence for various modal terms and their meanings in the speech of the children from the above mentioned studies. For the purposes of this I have simplified their data adhering to the main points and tried to translate them into Palmer's terminology. By doing so I have overshadowed the beautiful uniqueness of Korean modality; however, from the table one can now see the essence of the order of acquisition of modal categories in Korean. These Korean children seem to develop non-modal assertion and evidential first. Then months later they develop dynamic and epistemic modalities and finally a couple of months later deontic modality.

Choi (1991, 1995) looked into some different explanations for this interesting pattern. She (1991) investigated a possible influence on the acquisition of modality: child directed speech (CDS). She found that the frequency of a modal marker in CDS was not correlated with the order children acquired that marker. Choi (1995) reasoned that the early and prominent emergence of propositional modality might be due to a number of reasons. First of all, the mood markers denoting propositional meanings are very important in Korean conversational interaction. Second, they are very salient forms right at the end of a sentence. Finally, these mood markers are mandatory and not optional.

Papafragou et al. (2007) looked into whether Korean children's early acquisition of evidential markers was related to their cognitive skills. They carried out two very interesting comprehension experiments. Results showed that the performance of all children was at chance level in these experiments. They also carried out a production experiment with 3, 4 and 5 year olds, which yielded significant results. In this experiment they elicited utterances with *-e* (direct evidence marker) and *-tay* (hearsay marker) and they tested the children on their source monitoring abilities. They did not find age differences in the usage of *-e*, all children performed above chance. They reasoned that this might be due to the fact that *-e* was very frequently used in Korean and it was almost "the default declarative marker" (Papafragou et al., 2007 page 262). They did, however, find that age was a factor in the production of *-tay*. Moreover, their results indicated that the children's source monitoring abilities were correlated with their production of *-tay*. This

finding provides further evidence for the influence of cognitive capacities on the acquisition of modality.

The order of modal notions acquired in Korean is evidential, dynamic, epistemic and deontic. This developmental trajectory is very different from the ones in the languages mentioned above. The early acquisition of evidentiality might be due to the fact that Korean has similar means of expressions of all four modal categories (i.e. sentence ending markers and modal auxiliaries) whereas in the other languages evidentiality was expressed with verbal predicates, adverbs or adjectives and the others were expressed with modal auxiliaries and/or verbal morphology. Moreover, the fact that evidential and epistemic modalities are related might explain the early acquisition of epistemic modality. Two points about the influences on the acquisition of modality is noteworthy. One, like Italian but unlike English and Greek child directed speech does not seem to be an influence. Two, unlike Greek the source monitoring skills of children seem to be an influence. Source monitoring skills are important for evidentially modalized utterances because if children cannot keep track of how they know something, they would not know when to use evidentiality. Another way of looking at the second point is both Greek and Korean children develop source monitoring skills quite early; however, Korean children are able to express evidentiality as they develop source monitoring skills, whereas Greek children express evidentiality later on. This difference between the Korean and Greek speaking children might me due to the means of evidentially modalized expressions. Both languages have a rich verbal morphology system but only Korean

expresses evidentiality with verbal morphology. This emphasizes the importance of means of modalized expressions on the acquisition of modality.

Table 4 The Emergence of Korean Modality[9]

Lee (2009)					
SK		CK		YJ	
1;3	non-modal assertion	1;0	non-modal assertion	before 1;2 non-modal assertion	
1;4	evidential new info.	1;4	evidential new info.	1;2	evidential new info.
1;11	dynamic volition	1;8	dynamic volition	1;5	epistemic speculation
2;0	evidential new info.	1;10	evidential new info.	1;6	epistemic assumption
2;0	epistemic speculation	2;0	evidential new info.	1;6	dynamic volition
2;0	epistemic(assumption) & dynamic (volition)	2;0	epistemic speculation	1;7	epistemic(assumption) & dynamic (volition)
2;0	dynamic volition	2;1	dynamic volition	2;0	evidential new info.
2;2	evidential new info.	2;1	epistemic(assumption) & dynamic (volition)	2;2	deontic obligation
2;2	epistemic assumption	2;1	epistemic assumption	2;3	evidential report
2;5	deontic+epistemic	2;1	dynamic ability		
2;6	dynamic ability	2;3	evidential report		
3;2	deontic obligation	2;3	deontic obligation		
		2;3	epistemic deduction		
		2;6	dynamic ability		
Choi (1995)					
HS		PL		TJ	
1;10	evidential new info.	1;8	evidential new info.	1;9	evidential new info.
1;10	non-modal assertion	1;9	non-modal assertion	1;11	non-modal assertion
2;1	epistemic deduction	1;11	epistemic deduction	2;2	epistemic deduction
2;1	epistemic(assumption) & dynamic (volition)	2;0	dynamic volition	2;3	evidential report
2;3	dynamic volition	2;1	evidential report	2;6	dynamic volition
2;4	dynamic ability	2;1	epistemic(assumption) & dynamic (volition)	2;7	epistemic(assumption) & dynamic (volition)
2;5	evidential report	2;3	deontic (both types)	2;9	dynamic ability
2;5	dynamic volition	2;6	deontic obligation	3;0	evidential inference
2;6	deontic obligation	2;6	deontic permission	3;1	deontic obligation
2;7	deontic permission	2;6	dynamic ability	3;1	deontic permission
2;7	deontic (both types)	2;6	dynamic ability	3;1	deontic (both types)
				3;4	dynamic volition
				3;6	dynamic ability

[9] Lee (2009) and Choi (1995) both have 2 modality categories: epistemic and deontic. They both include dynamic modality within deontic modality. Lee (2009) separates evidentiality from other modality types. He actually does not call these terms evidentials. Choi (1995), on the other hand, incorporates evidentials into epistemic modality. The terms that I have categorized as evidential have the following meanings: surprise, exclamatory, quotation, unassimilated information, reported speech and new information.

CHAPTER 4

MODALITY IN TURKISH AND ACQUISITION OF TURKISH

4.1 Modality in Turkish

4.1.1 Means of Modalized Expressions

In Turkish these modal categories are conveyed through lexical and morphological means.

4.1.1.1 Lexical Means

The typical ways to express modality with lexical means in predicate or modifier function are adverbs, adjectives and modal verbs. Examples for lexical means of modalized expressions taken from my longitudinal data are provided below.

1. Verbal predicate - CS: Konuşmak *istemiyorum*. (dynamic volition)
   talk.infinitive want.negation.Iyor.1st person sg
   "I don't want to talk"

2. Non-verbal predicate - CDS: Çok kalın giyinmek *lazım*. (deontic obligation)
   very thick wear.infinitive necessary
   "One needs to dress warmly"

3. Modifier - CS: *Belki* sevmedim. (epistemic speculation)
   maybe like.negation.DI.1st person sg
   "Maybe I didn't like it"

Ruhi et al. (1997) investigated the epistemically modal adverbs in Turkish. They have categorized the epistemic modal adverbs according to strength (weak to strong) and basis (knowledge or belief) as can be seen in Table 5. They established the difference between knowledge based and belief based adverbs by noting that

knowledge has to be supported by facts or general information, whereas belief need not be founded on anything.

Table 5 The Epistemic Modal Adverbs in Turkish (Adapted from Corcu, 2009 who Adopted It from Ruhi et al., 1997: 313)

	Assertion (confidence)		Non-Assertion (weak confidence, lack of confidence)
Knowledge-based	MUTLAKA (absolutely)	HERHALDE (perhaps)	BELKİ (maybe)
	MUHAKKAK (certainly)		
Belief-based	KESİNLİKLE (definitely)	BENCE (in my opinion)	GALİBA (probably)
	ELBETTE (surely)		SANIRIM (I guess)

These adverbs can be used with or without verbal predicates to give epistemic meanings to an utterance. Of all the adverbs above only assertion ones can denote deontic modality. The assertion adverbs denote obligation. However, unlike their epistemic usages, they cannot denote deontic modality without a verbal predicate.

Adjectives, on the other hand, can be used with non-finite clauses to express modality. Some modal adjectives in Turkish are *zorunda, zorunlu, mecbur, lazım, gerek, muhtemel, olası* and *mümkün*. Each adjective requires a particular subordinating suffix on the non-finite verb as can be seen in the examples.

1. 'Ali is obliged to drop by our house tonight' (deontic obligation)
    a. Ali bu akşam bize uğramak zorunda.
    b. Ali'nin bu akşam bize uğraması zorunlu.
    c. Ali bu akşam bize uğramaya mecbur.
    d. Ali'nin bu akşam bize uğraması lazım.

e. Ali'nin bu akşam bize uğraması gerek.

2. 'Ali must be at home right now' (epistemic deduction)
    a. Şu anda Ali'nin evde olması lazım.
    b. Şu anda Ali'nin evde olması gerek.
3. 'Ali might drop by our house tonight' (epistemic speculation)
    a. Ali'nin bu akşam bize uğraması muhtemel.
    b. Ali'nin bu akşam bize uğraması olası.
    c. Ali'nin bu akşam bize uğraması mümkün.
4. 'Ali may come in' (deontic permission)
    a. Ali'nin içeri girmesi mümkün.

Verbs in Turkish can be lexically modal (i.e. they do not need verbal morphology to denote modality). Some modal verbal predicates are *gerekmek, bırakmak, becermek, istemek, düşünmek, inanmak, sanmak* and *demek*. Some of such verbs require a subordinate clause, while others do not.

5. a. Ali'nin bize uğraması gerekiyor.
    'Ali needs to do drop by our house' (deontic obligation)
    b. Ali oğlunu geç saatte dışarı bırakıyor.
    'Ali let's his son be out at late hours' (deontic permission)
    c. Ali kek yapmasını beceriyor.
    'Ali can bake a cake' (dynamic ability)
    d. Ali'nin bize uğramasını istiyorum.
    'I want Ali to drop by our house' (dynamic volition)
    e. Şu anda Ali'nin evde olduğunu düşünüyorum.

'I think Ali is at home right now' (epistemic assumption)

f. Şu anda Ali'nin evde olduğuna inananıyorum.

'I believe Ali is at home right now' (epistemic deduction)

g. Şu anda Ali'nin evde olduğunu sanıyorum.

'I think Ali is at home right now' (epistemic speculation)

h. Bana Ali ofisinde dendi.

'I was told that Ali was in his office' (evidential hearsay)

4.1.1.2 Morphological Means

Morphological means of expressing modality is through tense-aspect-modality markers. These markers are shown in the Table 6 with their traditional labels/functions in the order they attach to the verb. The finite verb of a main clause has to have a TAM I marker; this means *-Abil* will always precede a TAM I marker and TAM II markers will always follow a TAM I marker.

Table 6 Tense-Aspect-Modality in Turkish Adapted from Taylan (Class Notes 2012).

Modal Affix		TAM I affixes		TAM II clitics		Clitic	
Form	Function	Form	Function	Form	Function	Form	Function
-Abil	Ability	*-DI*	Direct Past	*-IDI*	Past	*-DIr*	Generalizing
		-mIş	Evidential	*-ImIş*	Evidential		
		-Iyor	Imperfective	*-IsA*	Conditional		
		-Ar/Ir	Aorist				
		-AcAk	Future				
		-A	Optative				
		-sA	Conditional				
		-mAlI	Necesitative				
		Ø	Imperative				

The modality affix *-Abil* is separated from TAM markers in that it cannot appear on a verb alone. It always occurs with a TAM marker. The TAM markers are depicted as such and not divided into three different categories because these inflections can have a sense of a mixture of tense, aspect and modality. The TAM1 markers differ from TAM2 markers and *-DIr* because they are not enclitics. TAM1 markers are obligatory. Every verbal predicate in Turkish has a TAM1 marker. TAM2 markers and *-DIr*, on the other hand, are optional. Moreover, they cannot appear on a verb without a TAM1 suffix. TAM2 markers and *-DIr* are enclitics. An enclitic is a particle that attaches to a phrase; in other words, it can attach to a verb or a noun. Not every TAM2 marker can appear with each TAM1 marker. The same goes for *-DIr*.

4.1.1.3 Multifunctionality of the Means of Modal Expression

Among the lexical means of modalized expressions the verbal predicates do not have multiple meanings. However, adverbs and adjectives can denote multiple modal notions as shown above.

The case with morphological means of modalized expressions is more complicated. Not only can individual TAM markers have multiple meanings but combinations of TAM markers can also have new meanings. The modal functions of TAM markers are exemplified below in Table 7. A point to note here is that Palmer does not incorporate conditionals and imperatives under specific modalities, I have included conditionals under epistemic modality and imperatives under dynamic modality for the following reasons. Epistemic modality expresses a speaker's degree of commitment to a statement and conditionals are a speaker's commitment to a

statement in a hypothetical circumstance. Imperatives, on the other hand, are more like speaker's wishes than obligated commands, especially in the communicative context between a child and a caretaker. This seems to be true for Turkish and maybe other languages as well.

Table 7 Examples for Tense-Aspect-Modality Markers' Modal Functions[10]

<table>
<tr><th colspan="2">Propositional Modality</th><th colspan="2">Event Modality</th></tr>
<tr><th>Evidential[11]</th><th>Epistemic</th><th>Deontic</th><th>Dynamic</th></tr>
<tr>
<td>-mIş
Ali eve dün gelmiş.
'Ali came home yesterday apparently'</td>
<td>Speculation
-Abil
Ali orada olabilir.
'Ali might be there'
-Ar/Ir
Ali de gelir.
'Ali may come too'</td>
<td>Permission
-Abil
İçeri girebilirsin.
'You may come in'
Passive+Ar/Ir +3rdsg
Burada sigara içilir.
'You may smoke here'</td>
<td>Ability
-Abil
Takla atabilirim.
'I can do a somersault'</td>
</tr>
<tr>
<td>-ImIş
Ali yarın gelirmiş.
'Ali will come tomorrow so I have heard'</td>
<td>Assumption
-AcAk
Kapıdaki Ali olacak.
'It should be Ali at the door'
-DIr
Ali ofisindedir.
'Ali should be at his office'</td>
<td>Obligation
-AcAk+2nd/3rdperson
Hemen geleceksin.
'You must come immediately'
-mAlI
Ali ofisime gelmeli.
'Ali must come to my office'</td>
<td>Volition
-Ar/Ir
Ben boyarım.
'I will paint it'
-AcAk+1stperson
Uyuyacağım.
'I will sleep'
-A
Kitap okuyalım.
"Let's read a book"</td>
</tr>
<tr>
<td></td>
<td>Deduction
-mAlI
Ali ofisinde olmalı.
'Ali must be at his office'</td>
<td></td>
<td>Imperative
Ø
Trenleri ver.
'Give me the trains'</td>
</tr>
<tr>
<td></td>
<td>Conditional
-sA
Düşünsen anlarsın.
'You'll get it if you think about it'
-IsA
O duyarsa yandık.
'If she hears about it, we are screwed'</td>
<td></td>
<td></td>
</tr>
</table>

[10] This is not an exhaustive list of examples. These markers may have other meanings according to the context. Such marked usages have been left out.

[11] Both of the evidentiality markers can express various meanings, including hearsay, surprise and inference.

Since the focus of this study is acquisition of modality, TAM markers have been divided into two categories according to the number of modal functions they have. Unifunctional markers are the ones that are always non-modal or express one modal category. Multifunctional markers are the ones that denote more than one modal category. The modal functions of the TAM markers are presented in Table 8.

Table 8 Modal Functions of TAM Makers

		Non-Modal	Epistemic	Evidentiality	Deontic	Dynamic
Unifunctional	*-DI*	X				
	-IDI	X				
	-Iyor	X				
	-sA		X (Cond.)			
	-IsA		X (Cond.)			
	-mIş			X (Evid.)		
	-ImIş			X (Evid.)		
	-A					X (Vol.)
	ø					X (Imp.)
Multifunctional	*-DIr*	X	X (Assm.)			
	-Ar/Ir	X	X (Spec.)		+Passive X (Per.)	X (Vol.)
	-AcAk	X	X (Assm.)		X (Obl.)	X (Vol.)
	-Abil		X (Spec.)		X (Per.)	X (Abl.)
	-mAlI		X (Dedc.)		X (Obl.)	

4.2 Acquisition of Turkish

4.2.1 Acquisition of Verbal Morphology

Turkish children display a competence at verbal morphology from a very early age (Aksu-Koç & Slobin, 1985). This is even evident with children with language disorders (Acarlar and Johnston, 2011). Acarlar and Johnston looked at the rates of

morphological errors in three groups of a total of 30 children: a group with atypical language development (ALD) and two comparison groups with normal language development. One of the comparison group included children around 5.5 years of age same as the ALD group and the other included children with similar mean length of utterances, who were two years younger. Spontaneous speech was collected from each child in an unstructured play session and their first 100 utterances were analyzed for omission errors. Acarlar and Johnston found that the children in normal language development groups rarely ever omitted an obligatory nominal or verbal suffix (2% of the time). The ALD group had significantly higher rates of error on nominal and verbal morphology; however, they made few errors with verbal morphology (4%) while they made more errors with nominal morphology (15%). Their study indicates that 3-year-old normal developing children had an almost nonexistent error rate of morphology and that the children with language disorders might be behind on other areas of language but they are not very behind on verbal morphology.

One explanation for Turkish children's early acquisition and competence of verbal morphology could be its richness. Xanthos et al. (2011) tested whether there was a relationship between the morphological richness in CDS and the pace of acquisition of CS. In their study, they gathered speech data from 9 children (around 1;3-3;0) in CHILDES with 9 typologically different language backgrounds ranging from weakly inflecting languages like French to strongly inflecting languages like Greek to agglutinative languages like Turkish. They found that in all languages the morphological richness of verbs were a lot higher than of nouns. They also found

that the morphological richness in CDS and the pace of acquisition of CS were positively and strongly correlated, and that the morphological richness of verbs in CS increased more rapidly than of nouns in CS.

Studies below demonstrate how the rich verbal morphology of Turkish is acquired.

Ekmekçi (1982) investigated the order of the emergence of verbal inflections in a single child's (Didem) speech. She found that the first form of TAM markers that Didem used was the *-Abil* modality marker when she was 1;3. Interestingly, she used it without any other TAM marker; in other words, her usage was erroneous. When she first started using the *-Abil* modality marker, she apparently used it most with negation to express dynamic inability. An example of her using *-Abil* would be when her mother called her over, Didem said *gelemi* (come.ABILITY.NEGATION) 'cannot come'. Around that time she also tried to use *-A* 'optative', first only with 1st singular and plural forms. By the time she was 1;9, she had gained full grasp of the suffix and by the time she was 1;11, she used it with other personal forms. The next inflection Didem picked up appeared to be the *-Iyor* 'imperfective' suffix at age 1;5. Then the aorist surfaced in Didem's speech at age 1;6. Ekmekçi noted that even though Didem started using the aorist, this was not very often. She also pointed out that she usually used it with negation and especially to reject the caretaker's requests or statements. When Didem was around 1;7 years old, she began using the *-AcAk* (future) marker and *-DI* (past) marker. Her usage of these suffixes increased considerably in two months. The *-mIş* (evidential) suffix appeared in her speech around 1;5 but these instances were only imitations of the caretaker. At age 1;10 she

began using the *-mIş* (evidential) suffix productively. In the next couple of months her use of it increased substantially, which according to Ekmekçi was due to her love of narrating stories.

Of the rest of the inflections the negative marker -mE was the first used at age 1;3. She also started using the personal markers around that age; however, she misused them frequently. The question particle -mI appeared in her speech around 1;5; however it did not become fully productive until 1;11. She also started using the causative marker at 1;5. Ekmekçi pointed out that even though Didem rarely used the causative marker, she never left it out by mistake or used it in a wrong way. Around the age of 1;7 she started using the passive marker. Her first instance of using it was with the aorist and she was expressing an epistemic possibility.

Ekmekçi concluded that there were three developmental stages in Didem's acquisition of Turkish verbal inflections. In the first stage she just imitated adults. In the second stage, when adults used an inflection, she was able to attach that inflection to another verb in her response. In the last stage she became proficient at using verbal inflections. Moreover, Ekmekçi noticed that the first inflections Didem acquired were *-Abil* and *-A,* and they expressed dynamic ability and their temporality were here and now. The temporally distant inflections were acquired about 4 months later.

Çapan (1988) analyzed the speech of a Turkish child from age 1;3 to age 2;2. The first two months the child used bare verbs for present tense, past tense and imperative mood. When the child was 1;5, she started using the marker *-DI* for observed and immediately completed actions. However, she was not competent on

its usage for several months, as she failed to use it when necessary and used it when unnecessary. Right before she was 2, she started using *-DI* for remote past actions. When the child was one and a half, she started using *-Iyor* for an action going on at that moment and also for habitual actions. Çapan pointed that one of the uses of *-Iyor* in adult speech was future reference but the child in her study did not utilize this use. The traditional future tense marker *-AcAk* appeared in the child's data when she was 1;8. At first she paired *-AcAk* with volition and then around age 2 she also started to pair it with immediate future actions. She used the evidential marker *-mIş* only twice throughout the data and she used it in narratives. She did not use the aorist *-Ar/Ir* at all. Until she was 1;8, no person marker appeared in her speech, and plural person markers did not appear in her speech at all. The negative marker -mA occurred in her speech around age 1;10. The question marker -mI appeared in her speech with verbs when she was two years old. However, she was able to ask questions with rising intonations and use -mI with nominals long before that. One of the observation Çapan made was that the child might have omitted suffixes but she never mixed up the order of the suffixes. Another is that the child initially used past and future tenses for immediate past/future actions and then later developed the ability to refer to temporally remote events and actions.

In a series of studies Dönmez and colleagues followed the linguistic development of 8 age groups of children for half a year (Acarlar & Dönmez, 1992; Dönmez & Arı, 1992; Güleryüz & Dönmez, 1992). The groups were 6 months apart from each other and ranged from 1 to 4.5 year old. They investigated a wide range of aspects of linguistics development in children's speech; however, I only focused on

the usage of TAM I markers here. Before one and a half year old, children in their study only used *-DI* and *Ø* 'imperative' with verbs. In the next six months children also demonstrated the use of first *-Iyor* and then *-AcAk*. The ages between 2 and 2;6 marked the acquisition of most of the TAM I markers (namely, *-mIş*, *-Ar/Ir*, *-A* and *-sA*). The first appearance of *-mAlI* was after age 2 and a half. The TAM I markers in the speeches of 2.5 to 4 year olds from highest frequency to the lowest were *-Iyor*, *-DI*, *-mIş*, imperative, *-Ar/Ir*, *-A*, *-sA* and *-mAlI*. The frequencies of the TAM I markers in the speech of 4 to 5 year olds were slightly different: *-Iyor*, *-mIş*, *-DI*, *-Ar/Ir*, *-AcAk*, *-A*, imperative, *-mAlI*. This difference between 3 and 4 year olds might be due to the fact that 4 year olds were more competent at using these markers and were able to use them more creatively.

Aksu-Koç (1998) took four TAM markers that have various meanings, namely *-DI*, *-Iyor*, *-Ar/Ir* and *-mIş*, and looked at when the different meanings first surfaced, when they became unrestricted and in what environments they appeared. Her results were quite compelling because they showed that children's speech (CS) was highly influenced by CDS; furthermore, the differences between CS and CDS revealed children's cognitive capacities. She found that the first TAM marker used in her data was the *-DI* marker. However, in CDS *-Iyor* occurred more frequently. Aksu-Koç reasoned that this might be due to the fact that *-Iyor* had many functions and some of those functions could be expressed by other markers too. The child's usage of *-DI* was mostly aspectual and not really temporal. The next TAM marker that appeared in the data was *-Iyor*. Then around the same time *-mIş* and *-Ar/Ir* emerged. Both these suffixes were initially used for modality and not for tense or aspect. The

evidential *-mIş* was used to depict new information or to narrate a story and the aorist *-Ar/Ir* was used for intentions.

Upon looking at longitudinal data of four Turkish children, Ketrez (1999) observed that Turkish children go through three stages while acquiring verbs. In the first stage, there were no verbs in children's speech, in fact, there were no words, syntactic categories or structure at all except onomatopoeic words. In the second stage verbs started to appear in children's speech but there was no evidence of these verbs' being classified as verbs in the adult sense. They either appeared alone or as frozen forms with unproductive suffixes and they never appeared with person agreement markers. They seemed to not have a grammatical function (i.e. it was not clear whether they were commands, descriptions). For example, one of the kids used *attı* 'threw' (throw-PAST.3rdsg) for balls and also for the act of throwing. Assigning a grammatical function is especially hard in this stage because the children usually produced one word utterances. The third stage marked the development of the verb category. When verbs in children's speech became productive, productive verbal morphology (voice suffixes and tense-*A*spect-modality markers) appeared. Only three of the children's data exhibited this stage. Azra acquired *-DI* first, *-AcAk* second, *-Ar/Ir* third and finally *-Iyor* and *-mIş*. Mine acquired *-DI*, *-Iyor* and *-AcAk* initially, and then acquired *-mIş*, *-A* and *-Ar/Ir* sequentially. Deniz acquired TAM markers in the order of *-DI*, *-Iyor*, *-A*, *-AcAk* and eventually around the same time *-mIş* and *-Ar/Ir*. In this stage the children also started using person agreement markers. There was also support for children's understanding and usage of argument structures, which was apparent because

children were mostly using multiple words in an utterance. After the third stage of acquisition of verbs, children could use verbs in an adult-like manner.

Koyuncuoğlu (2002) executed a cross-sectional study investigating verb and verbal morphology usage in the language production of 2 to 6 year olds. The language production was elicited through structured play and storytelling (both by looking at a picture and by making it up). Since her subjects were really young and still influenceable by input at home, Koyuncuoğlu controlled for mother's education level by equally dividing each age group into children with mothers from various education backgrounds. Children in all age groups used *-Iyor* but rarely ever used *-Ar/Ir*, *-AcAk*, *-A*. Children in all age groups almost never used *-sA*, *-mAlI*, *-IDI*, *-IsA*. All children used *-DI*, and the imperative but younger children used them more frequently. All children used *-mIş* but younger children used it less frequently. Older children used *-ImIş* but younger children almost never used it. The youngest group mostly used *-Iyor*, *-DI* and imperative. Koyuncuoğlu stated that the type of activities used to elicit speech in this study might have influenced which markers were used.

In an effort to adapt MacArthur-Bates Communicative Development Inventory to Turkish, a group of researchers have initiated a long research project called Turkish Communicative Development Inventory (TİGE). Acarlar et al. (2009) outlined the first phase of this research project. Through personal communication with Aksu-Koç I obtained the data they have collected about verbal morphology. They asked mothers from three different educational backgrounds to complete questionnaires about their children's language development. These questionnaires asked whether the child was not yet using a form, occasionally using it or frequently

using it. I took the criterion for "acquisition" as being 50% of the children frequently using a certain form. According to this criterion Turkish children acquire *-DI* at 24 months, *-Iyor* at 26, *-AcAk* at 28, *-mIş* at 29, and *-Ar/Ir* at 32.

The studies mentioned above on the acquisition of verbal morphology in Turkish indicate that children go through six stages. In the initial stage children acquire *-DI* and imperative. In the second and third stages children acquire *-Iyor* and *-AcAk* respectively. In the fourth stage children acquire *-A*, *-mIş* and *-Ar/Ir*. Finally, in stages 5 and 6 children acquire *-sA* and *-mAlI* respectively. Even though there are individual differences, this order seems to be the general pattern of acquisition. These studies, however, mostly focused on the general usage of these markers or specifically tense and aspect facets and failed to capture the acquisition of modal facet of these markers. That is not to say, the acquisition of modality as a category has not been researched. There is a considerable literature on the acquisition of evidentiality.

4.2.2 Acquisition of Modality

Acquisition of modality in Turkish has been studied mostly from the evidential point of view. Researchers have looked into the order of acquisition of evidential markers and the relationship between evidential markers and cognitive skills. Aksu-Koç and Alıcı (2000) also looked into the acquisition of *-DIr*. Boeschoten (1987) investigates the usage of modal senses of the TAM markers in the speech of children between ages 4 and 8.

Boeschoten (1987) has conducted a study on acquisition of Turkish modality. He looked into the speech of bilingual Turkish speaking children living in Netherlands and of monolingual Turkish speaking children living in Turkey. The children were between ages 4 and 8. He elicited speech from children by asking them what was going on in three different pictures. In all these pictures there was an unactualized event, namely a rabbit trying to catch a butterfly, a girl trying to catch her hat and a dog trying to bite a man. The bilingual children used in his study were part of a longitudinal research project so he included spontaneous speech from the bilingual children in his analysis as well. In order to study acquisition of modality in Turkish, he assessed the various meanings Turkish modality markers could have and he came up with Figure 2. He, then, analyzed what types of

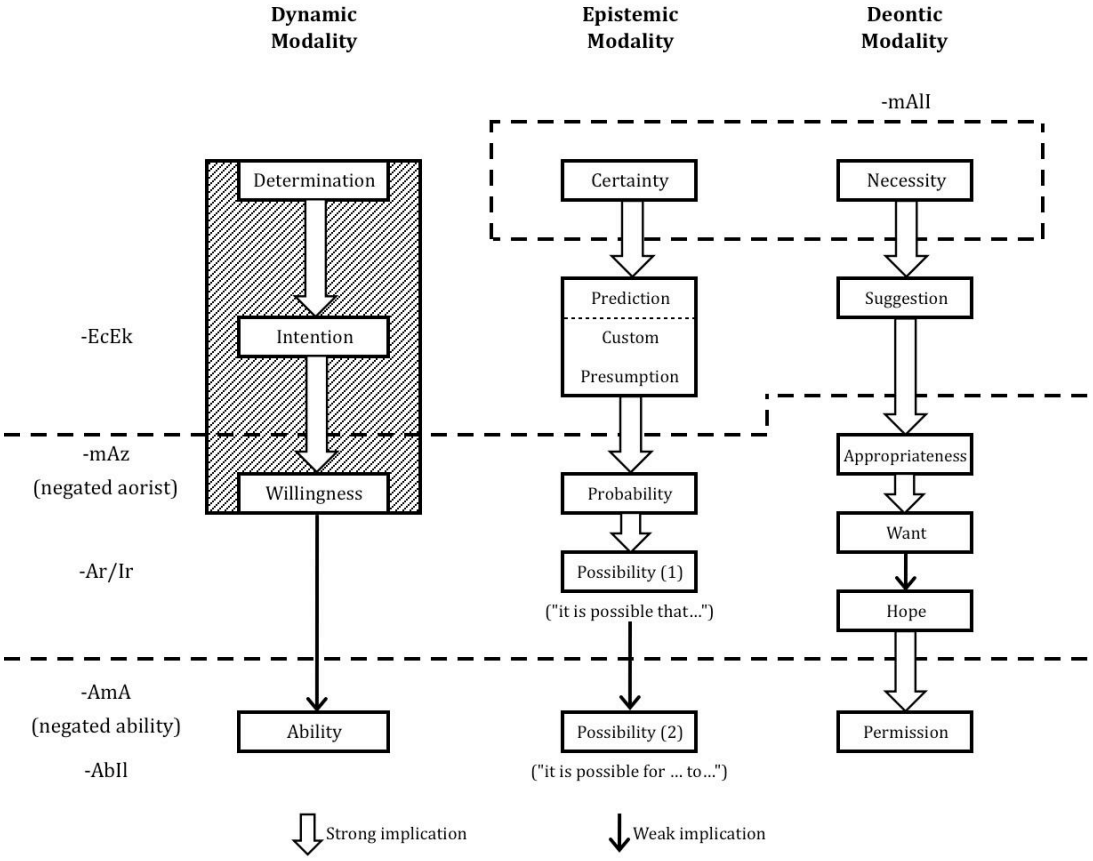


Fig. 2 The various meanings and modality types Turkish mood markers have (adapted from Boeschoten who adapted the categorization of Hermerén 1978)

modalities were present in children's speech and with what forms these types of modalities appeared. He found that the younger children in the study did not express any "strong" modal notions such as deontic necessity (obligation) or epistemic certainty (deduction). However, this might not be a developmental pattern but just what the pictures elicited from the children. There was no obligation in these pictures to speak of; moreover, since the event is not actualized there is no certainty. He also found that the predominantly used modality marker of children between ages 4 and 5 was the *-AcAk* marker. This fact might also be due to

the story of the pictures where event is non-actualized. A compelling finding of their study was that the children as young as four years old could use complex verbal predicates to convey modal meanings.

Aksu-Koç (1988) carried out a longitudinal study and an experimental study in order to investigate the acquisition of the two past markers *-DI* and *-mIş*. She observed that children acquired *-DI* before *-mIş* and it was used to express directly experienced (relatively) past events. Few months later children started to use *-mIş* for existing states, which constituted new information for the child. The next usages of *-mIş* were for resultant states both witnessed and non-witnessed or inferential past. The last features of *-mIş* acquired were associating it with non-witnessed events and hearsay.

Aksu-Koç and Alıcı (2000) explored the modal implications of *-DIr* and its connection to theory of mind (namely, personal representational change and false belief) in the speech of 3-, 4-, 5- and 6-year-olds. They found that children who passed the false belief test were more likely to produce modal forms than children who failed. On the other hand, they did not observe a difference in age groups or theory of mind skills in regards to knowing why *-DI* or *-DIr* was used (i.e. source of information). Interestingly, their results suggested that just because children understood what source of information each marker entailed did not mean that they could differentiate between the levels of certainty between *-DI* and *-DIr*. Finally, they found that children did better on comprehension questions involving *-DI* than on those involving *-DIr*. Their results showed that the production of modality was linked to theory of mind; at age three children were able to comprehend the modal

suffix -*DIr*; and a suffix depicting certainty (-*DI*) was easier to acquire than a suffix depicting uncertainty (-*DIr*).

Özturk and Papafragou (2008) have studied Turkish children's production of evidentiality and their source monitoring abilities. They elicited speech from children between ages 5;4-8;0, whom they divided into three age groups. They had children watch an animation in which the children either saw something happen, listen to a character tell something that happened or saw hints from which they could infer that something happened. In the first part of the experiment after each scene the experimenter started saying the sentence that described the scene and asked the children to finish it. As Turkish is a verb final language, the choice of appropriate verbal inflection was left to the child. This way they ensured the usage of the verbal inflections and prevented children from using lexical means of modalized expressions. They found out that all children could reliably use -*DI* marker for direct experience, i.e. when they saw something happened. Moreover, they found that children older than 6 could use -*mIş* for hearsay at above chance level. However, overall children in all age groups were at chance level at using -*mIş* for inference. In other words, children acquired the hearsay function of -*mIş* before its inference function. In the second part of the experiment they were seeking to find out whether children could monitor their sources. The children were shown, told or alluded to some piece of information and then were asked about this information, more specifically they were asked how they knew this information. Children almost always could identify the source when the information was shown (i.e. direct experience). Children overall could not identify the source when the information

was told (i.e. hearsay). Six and seven year olds were able to identify the source when the information was alluded (i.e. inference). According Özturk and Papafragou the fact that children are able to identify the source of knowledge as inference before using *-mIş* for inference suggests that the concept of inference was developed before children's linguistic evidentiality abilities.

Aksu-Koç, Ögel-Balaban and Alp (2009) looked into the relationship between 3, 4, 5 and 6 year old children's production of evidentials and their ability to monitor sources. They elicited productions of *-DI* by having the children describe an event they just witnessed, *-mIş* by changing the states of toys the children just played with while they were not looking and *-ImIş* by asking them to retell a story they just heard. They tested children's source monitoring abilities in two ways. First, they had children discover the contents of some boxes in various ways, namely looking at them, inferring from physical evidence and being told, and then reporting how they found out (mode of knowledge acquisition task). Second, they had children listen to an experimenter and a puppet give pieces information and then a week later they called back the children and asked them who gave which piece of information (source memory task). They found that there was an age difference in the production of inferential *-mIş* and hearsay *-ImIş*: younger children produced significantly less correct utterances with these markers. They also found that younger children were better at using inferential *-mIş* than they were at hearsay *-ImIş*. In the source monitoring tasks, the older children performed significantly better than the younger children. Younger children performed best when the mode of knowledge was perception and they performed worst when the mode of

knowledge was hearsay (their performance when the mode of knowledge was inference was in the middle). Note that the findings of language production task and the mode of knowledge acquisition task are analogous. They also found that the ability to produce hearsay *-ImIş* predicted children's scores on the source memory task. Their results suggest that there is a strong relationship between language and cognitive skills, at least in the case of evidentials and source monitoring.

Studies above look into children's understanding of the sources of *-mIş* or *-DIr* being inference or hearsay. Aydın and Ceci (2009), on the other hand, look into a more subtle difference between *-DI* and *-mIş*. They studied which marker children regarded more trustworthy, *-DI* or *-mIş*. They presented children a scenario from the direct observer's perspective or the hearsayer's perspective. Then, they presented children a slightly different version from the direct observer's perspective or the hearsayer's perspective. In the end they asked children to choose one of the versions. They found that even children as young as 4 year olds trusted the direct observer's perspective over the hearsayer's perspective. The results of Aydın and Ceci suggest that even if children cannot express the source of the information when it comes to utterances featuring evidentials, they still know that it is not as reliable as utterances with-*DI*.

The studies mentioned above on the subject of acquisition of modality constitute a good start into understanding how children acquire modality in Turkish. Not only they looked into modal markers and concepts they express but also their relationship with cognitive skills. However, there are two limitations on previous studies that I want to address in my thesis. One, the focus of almost all of

these studies is quite narrow; in my thesis I look at the means of modalized expressions as a whole (i.e. lexical and TAM markers). Two, the ages of the children in these studies are older than they need to be since before age 3 Turkish children become pretty confident at using TAM markers as the literature of acquisition of Turkish suggests. In this thesis I would like to show that children use and understand modality from a quite early age onwards.

CHAPTER 5

LONGITUDINAL STUDY

In the longitudinal study I wanted to observe the emergence of the expression of modality and modal notions in Turkish children's speech just as studies mentioned above have done so for other languages. Moreover, I investigated what some influences on the acquisition of modality are. I examined longitudinal data from two young children between the ages 1;3-2;10 and tested the following hypothesis:

I. The first two modal categories that emerge in children's speech should be dynamic modality (as in English) and epistemic modality (as in Korean). Deontic and epistemic modalities should be acquired later around the same time (as in Italian).

II. Morphological means of modalized expressions should emerge earlier in the data than lexical means because Turkish children become competent at using verbal morphology before the age modality is acquired in other languages. However, they might show a preference for one means over the other for certain modal categories just as English speaking children usually used modal auxiliaries for deontic modality and other means (such as verbal predicates and adverbs) for epistemic modality.

III. Children should acquire forms with fewer meanings first. When they acquire forms with multiple meanings, they should make one to one mappings with each form and a modal category and as they get older start to use these forms multifunctionally.

IV. Children should have a need to acquire modal notions in order to express certain pragmatic functions. The modal notions in their speech should emerge to express the pragmatic functions that cannot be expressed non-modally.
V. There should be a correlation between the modality production in children's speech and their care givers' speech.

5.1 Method

5.1.1 Participants

The participants consisted of two Turkish girls, Deniz and Mine, and their caregivers. Both girls had similar backgrounds except Deniz was an only child and Mine had an older brother. They both came from upper middle class families, lived in Istanbul, the education level of their parents were university graduates and all the parents talked Standard Modern Turkish. Deniz's caregiver was her mother and sometimes her grandmother joined them. Mine's caregivers were alternatingly her mother, her father, her brother, her babysitter and an unidentified houseguest. The data were collected from Deniz between ages 1;3-2;0 and from Mine between ages 1;6-2;10. The data consisted of conversations between the children and their caregivers. Recordings were done every couple of weeks for over a year during playtime. Average recording time was half an hour. The data, which were collected by Ayhan Aksu-Koç between the years 1994 and 1998, is a part of a larger research project.

5.1.2 Coding

The coding was formatted as specified by the CHILDES project (MacWhinney 2000). Every utterance was coded as three tiers. In the first tier the constituents of the utterance were divided into their morphemes and their functions specified. In the second tier the modality of the utterance was assigned. In the third tier the pragmatic function of the utterance was determined. Two examples of coding are given below.

1. Child:	topumu da alıyım. (Deniz, 2;0)
Morphology:	N|top-POSS&1S-ACC CONJ|da V|al-OPT-1S.
Modality:	Modal:Dynamic:Volition
Pragmatic function:	Directive:Offer
2. Mother:	hiç okumuyosun. (Mine, 1;11)
Morphology:	ADV|hiç V|oku-NEG-IPFV-2S
Modality:	Non-Modal
Pragmatic function:	Assertion:Factive

The modality tier captures Palmer's (2001) categories of modality, to which conditional (as a subcategory of epistemic) and imperative (as a subcategory of dynamic) have been added. The categories and subcategories of modality coded in this tier are given in Table 9. Note that I have only coded an utterance as modal if it included an overt modal form.

Table 9 The Details of the Modality Tier

	Category of Modality	Subcategory of Modality
Non-Modal		
Modal	Epistemic	Speculation
		Assumption
		Deduction
		Conditional
	Evidential	New Information
		Inferential
		Reported
	Deontic	Obligation
		Permission
	Dynamic	Abilitative
		Volitional
		Imperative

The pragmatic function tier coded the pragmatic function category (such as assertion, question, directive, narrative and response) with its particular subcategory. They are illustrated below in Table 10.

Table 10 The Coding of Pragmatic Function Categories and Their Subcategories

Categories	Subcategories
Assertion	Fact, Norm, Surprise, Confirmation, Intention, Possibility, Predict, Descriptive, Label
Question	Information, Clarification, Confirmation, Rhetorical
Directive	Request for Action, Request for Attention, Request for Permission, Offer, Obligation, Prohibition
Narrative	*
Response	*

Note that the first three acts (assertion, question and directive) have specified subcategories, whereas narrative and response do not. This is because subcategories of narrative and response overlap with the subcategories of the first three.

5.2 Results

5.2.1 Developmental Stages

The results of the coding pointed to four developmental stages in both children. Each stage marks differences in mean length of utterance (MLU), syntactic complexity (mean verbs per utterance), percentage of productive verbs (i.e. verbs that appear with more than one TAM marker) and distribution of modalized utterances in terms of type and frequency. The information for each stage of the children is provided in Table 11. The slight differences between the children might be due to the amount of data the children have in each stage are not balanced or due to the kind of activities the children do in these stages.

Table 11 Age Range, Mean Length of Utterance, Mean Number of Verb per Utterance and the Percentage of Productive Verbs of the Four Stages for Each Child

Child	Age-range	MLU	Mean Verbs/ Utterance	% of Productive Verbs	% of Modal Utterances
Deniz					
Stage 1	1;3-1;6	<1.75	0.067	0	3.49
Stage 2	1;7-1;8	<3.00	0.513	38.33	36.10
Stage 3	1;9-1;10	<4.00	0.778	54.22	53.54
Stage 4	1;11- 2;0	>4.00	0.788	53.66	41.75
Mine					
Stage 1	1;6-1;7	<1.75	0.295	0	5.41
Stage 2	1;8-1;10	<3.00	0.523	21.88	12.77
Stage 3	1;11-2;4	<3.50	0.48	51.32	19.72
Stage 4	2;5-2;10	>4.00	0.625	44.12	27.78

In Stage1 the children mostly used single word utterances. In their speech verbs were very rare. There was a clear split among verbs: *-DI* for non-modal and *Ø* for modal meanings. There were no modal lexical items. In Stage 2 the children's use of

verbs increased and became productive with the appearance of *-A*, *-AcAk*, *-Ar/Ir* and *-Iyor* inflections. There was still a clear split among verbs: while the children used *-DI* and *-Iyor* for non-modal expressions, they used *Ø*, *-A*, *-AcAk* and *-Ar/Ir* for modal expressions. In this stage, the children also started using modal lexical items. In Stage 3 the children used around half of the verbs productively. The TAM markers, flourished in number and were observed to be used in novel ways. The number of modal lexical items increased. Stage 4 was similar to Stage 3 in terms of production of modality except the children started to combine TAMI and TAMII suffixes to express complex modal meanings.

5.2.2 Modality Categories

The first modal category acquired by Deniz and Mine is dynamic modality, which is already being used in the first stage. Next children acquire evidential modality in the second stage. The last two modalities acquired are epistemic and deontic modalities. Deniz appears to express epistemic modality earlier; right at the end of the second stage whereas Mine does so in the third stage. The percentages of each modal categories in Deniz and Mine's speech are presented in Figure 3 and this pattern of acquisition can be observed in Figure 3. One thing to note here is that Mine has a greater rate of epistemic modality, which is probably a result of the kind of activities Mine and her caregiver did during recording.

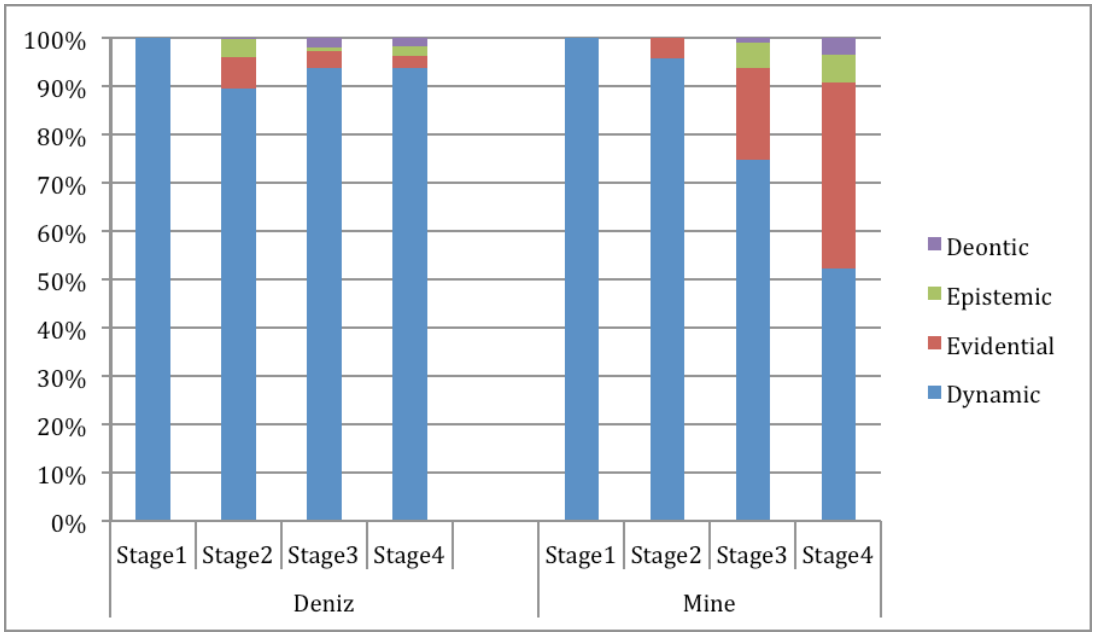


Fig. 3 Percent distribution of modality types by stage for each child

Going into more detail, Figure 4 provides the two kind of information: the frequencies of modal categories and the frequencies of their subcategories. The utterances denoting dynamic modality in the first stage was mostly comprised of imperatives. Mine is a bit more advanced than Deniz and is able to produce utterances denoting volition in this stage. Also, in the next stage Mine starts to produce utterances denoting ability, whereas Deniz is unable to do so until the third stage. The ratio of imperative and volition within dynamic modality becomes more even as children grow older. Ability always stays minimal when compared to other subcategories of dynamic modality. Dynamic modality is the predominant modality throughout all stages of Deniz and Mine. Evidential modality is the second category of modality to be acquired and it is also the second most frequent. Unlike the subcategories of dynamic modality, the subcategories of evidentiality are all present

from the stage evidentiality emerges. This also seems to be the case with epistemic modality (i.e. all subcategories of epistemic modality emerge in the same stage). However, within deontic modality children tend to use permission before and more than obligation. Epistemic modality and deontic modality are acquired around the same time but epistemic modality is produced more frequently by both Deniz and Mine.

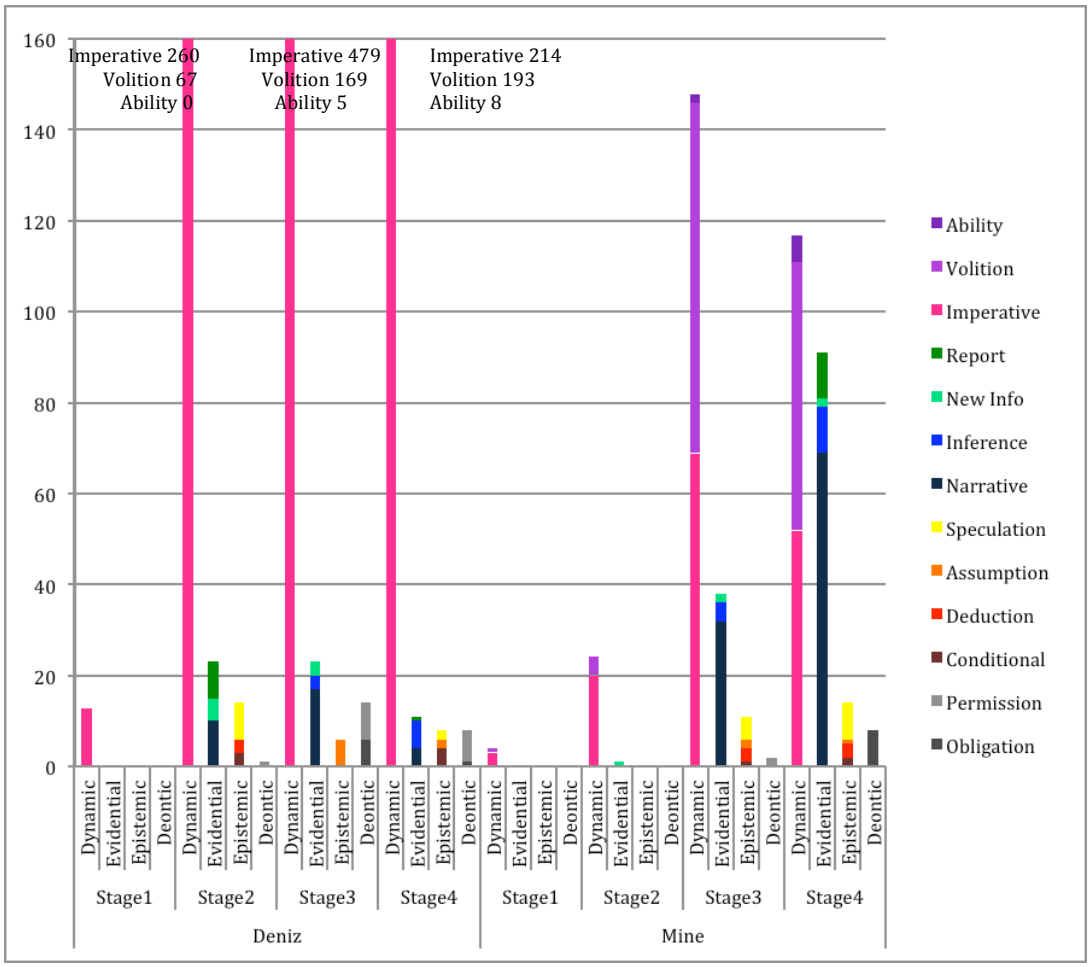


Fig. 4 Frequency distribution of modality types and their subcategories by stage by child

5.2.3 Means for Modality (Lexical vs. Morphological)

In the first stage children only express dynamic modality, and they solely use morphological means as can be observed from Figure 5. In the subsequent stages although children use modal lexical items to convey dynamic modality more and more; the proportion of lexical items used for this modality stays minimal. In the second stage evidentiality emerges exclusively through morphological means. Throughout the rest of the stages its expression remains almost exclusively morphological. Interestingly children use both lexical and morphological means for epistemic and deontic modality from the start. For epistemic and deontic modality children do not chose one means over the other.

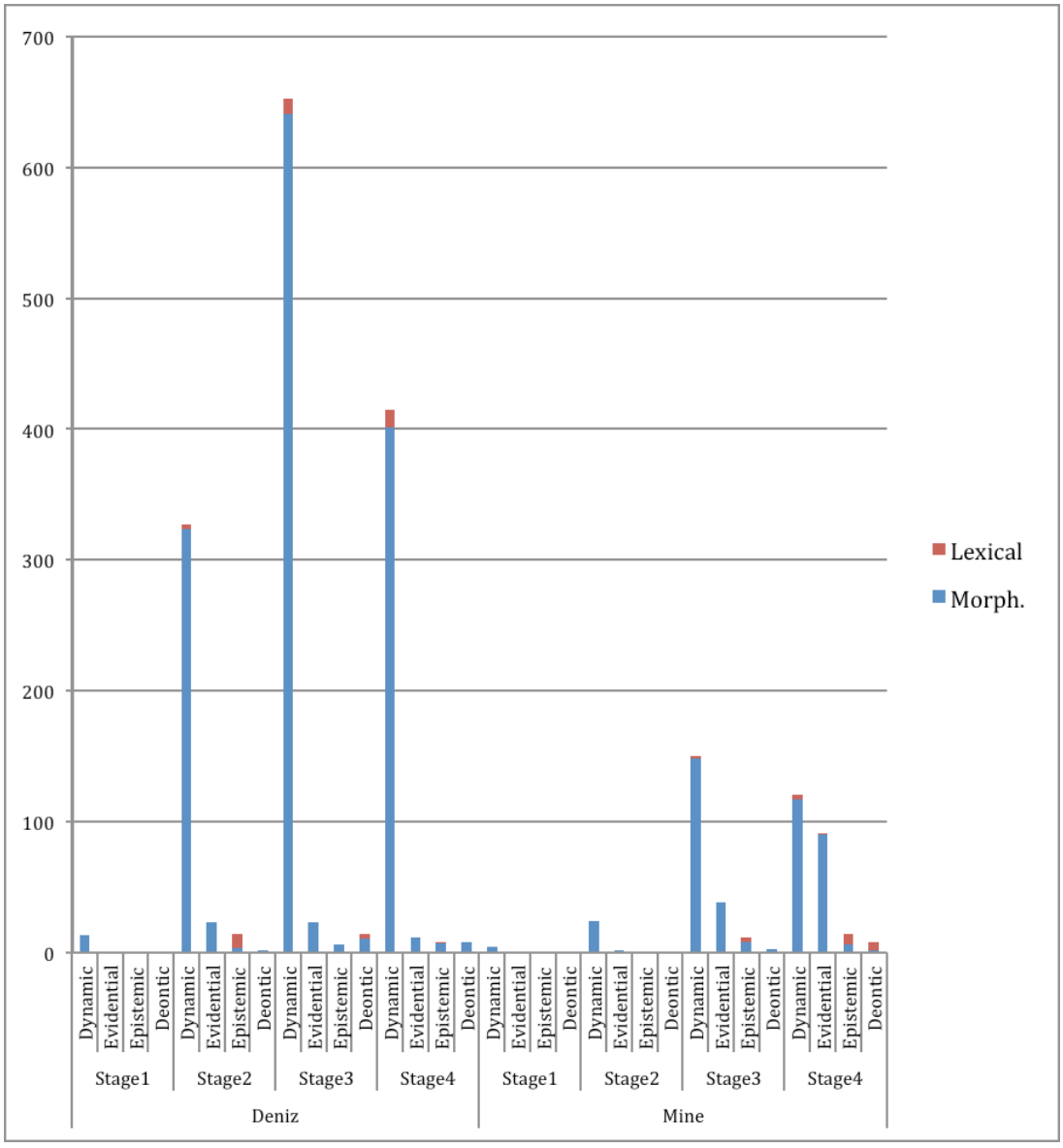


Fig. 5 Frequency distribution of lexical and morphological forms by type of modality for Deniz and Mine

The lexical modal items that are used to attain modality by both children are provided in Table 12 below. For epistemic modality both children only use modifiers and for the other three modalities they use predicates. The most used modifier for epistemic modality is the adverb *acaba* 'I wonder'. The most used

predicate for deontic modality is the adjective *lazım* 'necessary' and for dynamic modality the verb *istemek* 'to want'. The morphological means of modalized expressions is discussed in the next section.

Table 12 The Distribution of Modal Lexical Items in Deniz and Mine's Speech by Each Stage

		Stage2	Stage3	Stage4
Epistemic	Deniz	*gerçekten* "really" 1 *hakikaten* "truly" 2 *acaba* "I wonder" 8	0	*acaba* "I wonder" 1
	Mine	0	*acaba* "I wonder" 1 *belki* "maybe" 2	*acaba* "I wonder" 6 *yoksa* "if not" 1 *sence* "in your opinion" 1
Deontic	Deniz	0	*yok* "do not" 2 *gerekmek* "need" 2	0
	Mine	0	0	*lazım* "necessary" 7
Dynamic	Deniz	*istemek* "to want" 4	*yok* "do not" 6 *istemek* "to want" 5	*yok* "do not" 1 *istemek* "to want" 13
	Mine	0	*istemek* "to want" 2	*istemek* "to want" 3
Evidential	Deniz	0	0	0
	Mine	0	0	*demek* "to say" 1

5.2.4 Modally Unifunctional vs. Multifunctional Verbal Morphology

In the first stage both children only use unifunctional tense-aspect-modality markers to express modal and non-modal meanings, as can be seen in Figures 6 and 7. The first TAM markers Deniz acquires are *-DI*, *-Iyor* and *Ø*[12]. In the next stage Deniz acquires more TAM markers both unifunctional and multifunctional; however, she uses the multifunctional markers for a single function. For instance

[12] Acquisition of Ø marks the point when children start using the bare verb as imperative and contrasting it –DI and –Iyor.

she uses *-AcAk* only for dynamic modality. Finally, in the third stage Deniz learns to use the multifunctional markers to convey various modal functions. Mine demonstrates a similar pattern; in her case this pattern is a little bit more accelerated, which could be due to her being slightly older. However, she exhibits an exception to this pattern, her usage of *-DIr* (see conclusion).

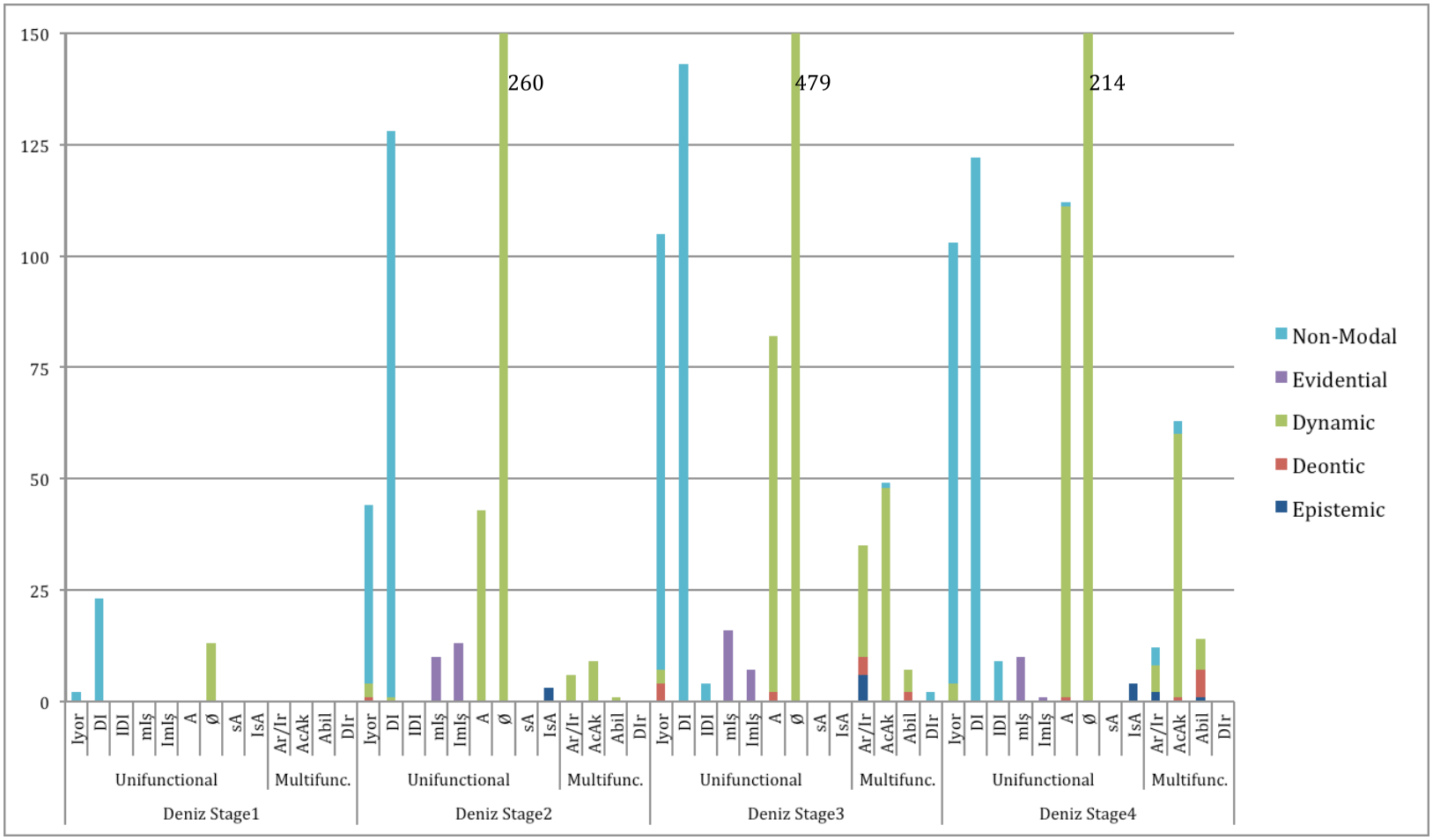


Fig. 6 Frequency distribution of unifunctional and multifunctional suffixes according to types of modality by stage for Deniz

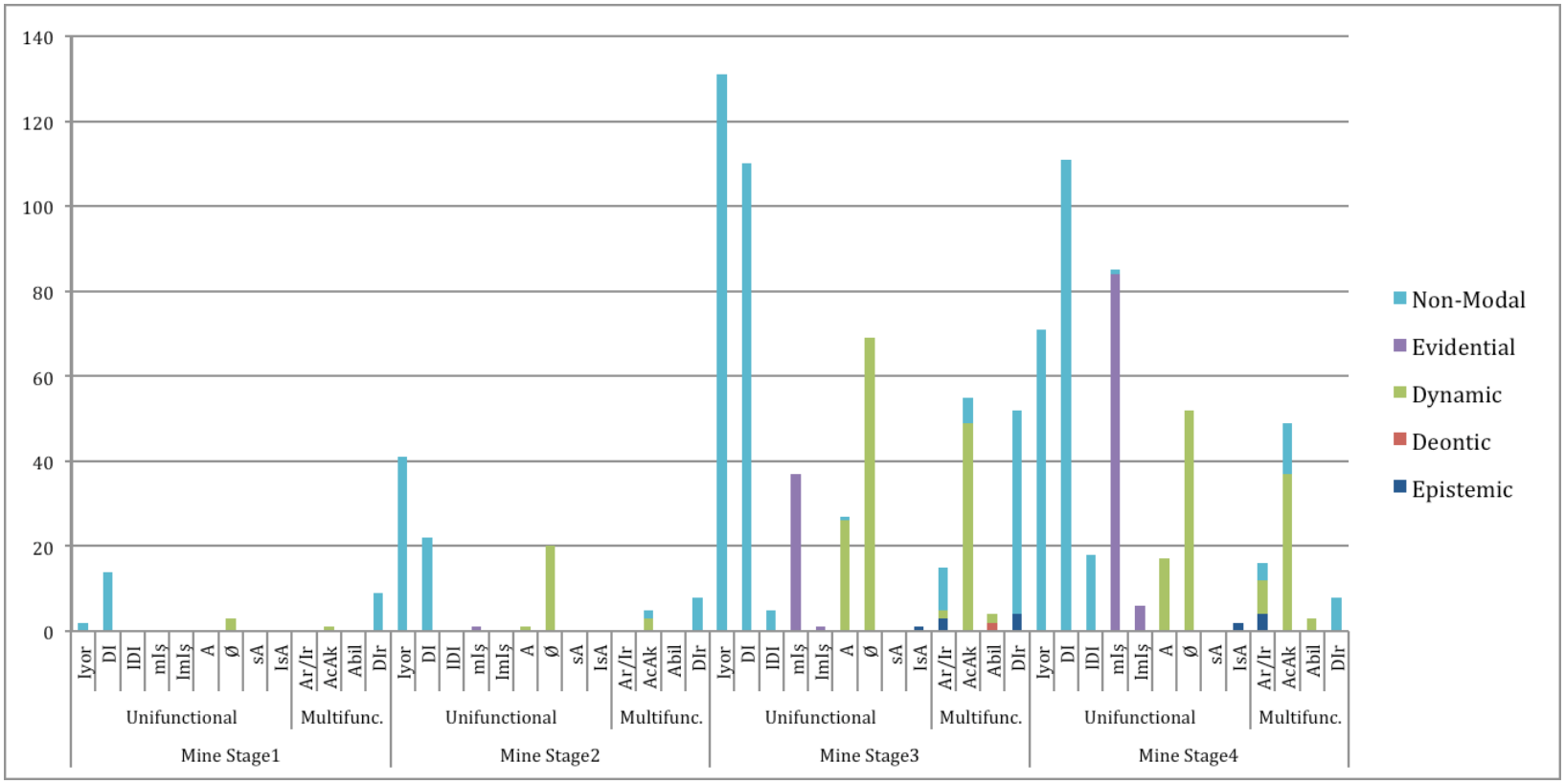


Fig. 7 Frequency distribution of unifunctional and multifunctional suffixes according to types of modality by stage for Mine

5.2.5 Pragmatic Functions and Modality

Child discourse is interactional and pragmatic functions reflect a combinative context. The utterances of the first stage are overall non-modal except for a few instances of modal directives (in the form of imperative verbs) as can be seen in Figures 8 and 9. In this stage children are able use language for all types of pragmatic functions with non-modal utterances.

In the second stage the number of directives increases notably. This increase in directives corresponds to an increase in dynamic modality and imperative verb form. Almost all of the directives in this stage are modally marked. This stage also marks the emergence of the optative *-A* which is used to express directives or assertions of intention. Also, assertions are observed to denote evidential modality in this stage (e.g. surprise). Deniz is more diverse in terms of modal pragmatic functions in this stage than Mine. Mine shows the same diversity in the third stage. Deniz uses epistemic modality to express directives in the second stage, see example below.

(1) İste-r-se-n bu-nu da tak.
want-AOR-COND-2S this-ACC also attach.IMP
"You may attach this also if you want"

Moreover, she uses questions in new ways too, namely with expressions of evidential and epistemic modalities. In the second stage she also starts to use evidential modality to express narratives. The third stage for Mine is very similar to Deniz's second stage in terms of what has been described above. Deniz's third stage

marks a new way to express questions and directives: deontic modality. The third stage, for both kids, also introduces questions that are dynamic in modality, such as asking someone's intentions. The fourth stage does not show any new variation for Deniz. Mine, on the other hand, acquires deontic modality as a new way to express directives.

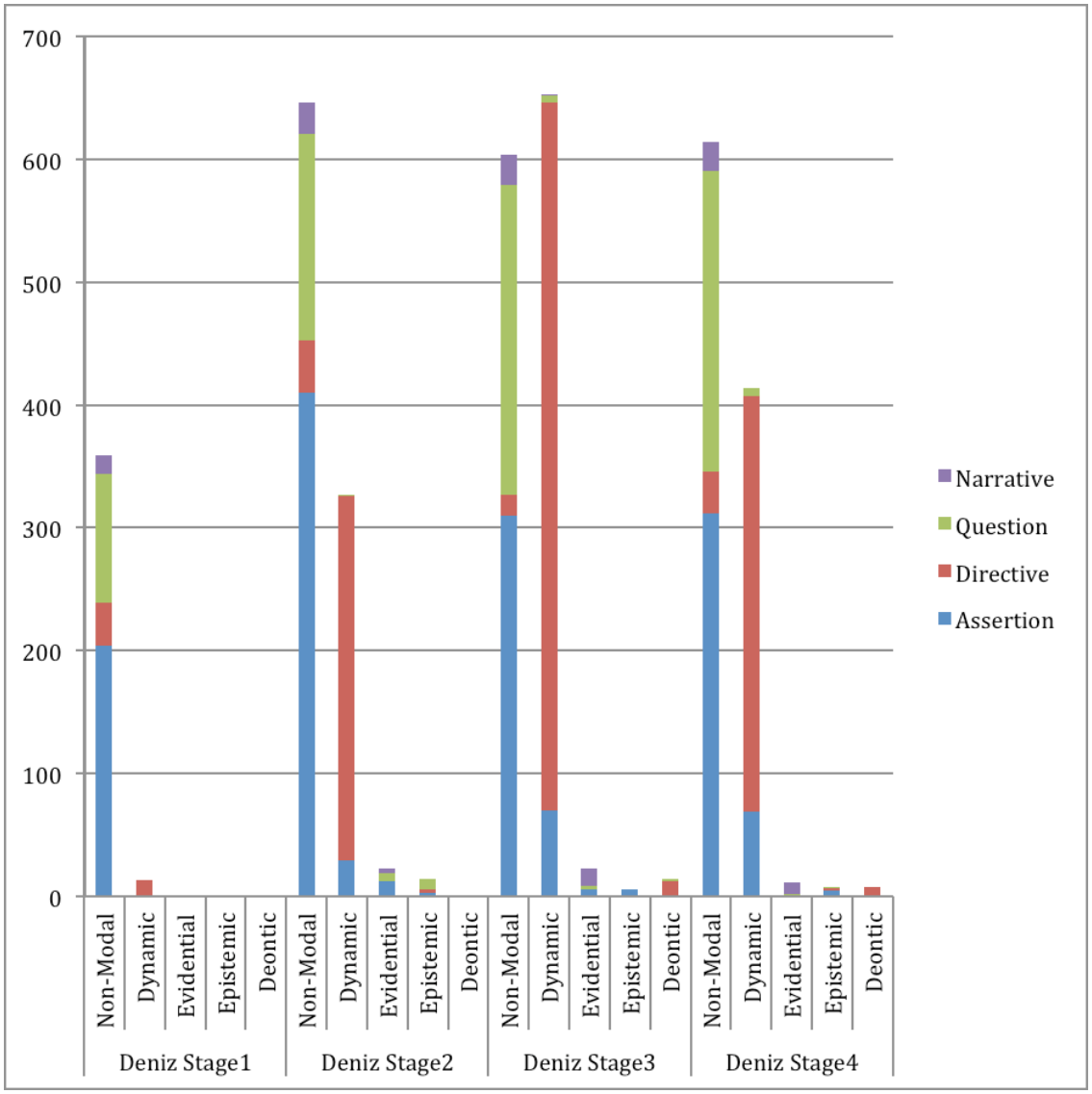


Fig. 8 Frequency distribution of pragmatic functions by modal types for Deniz

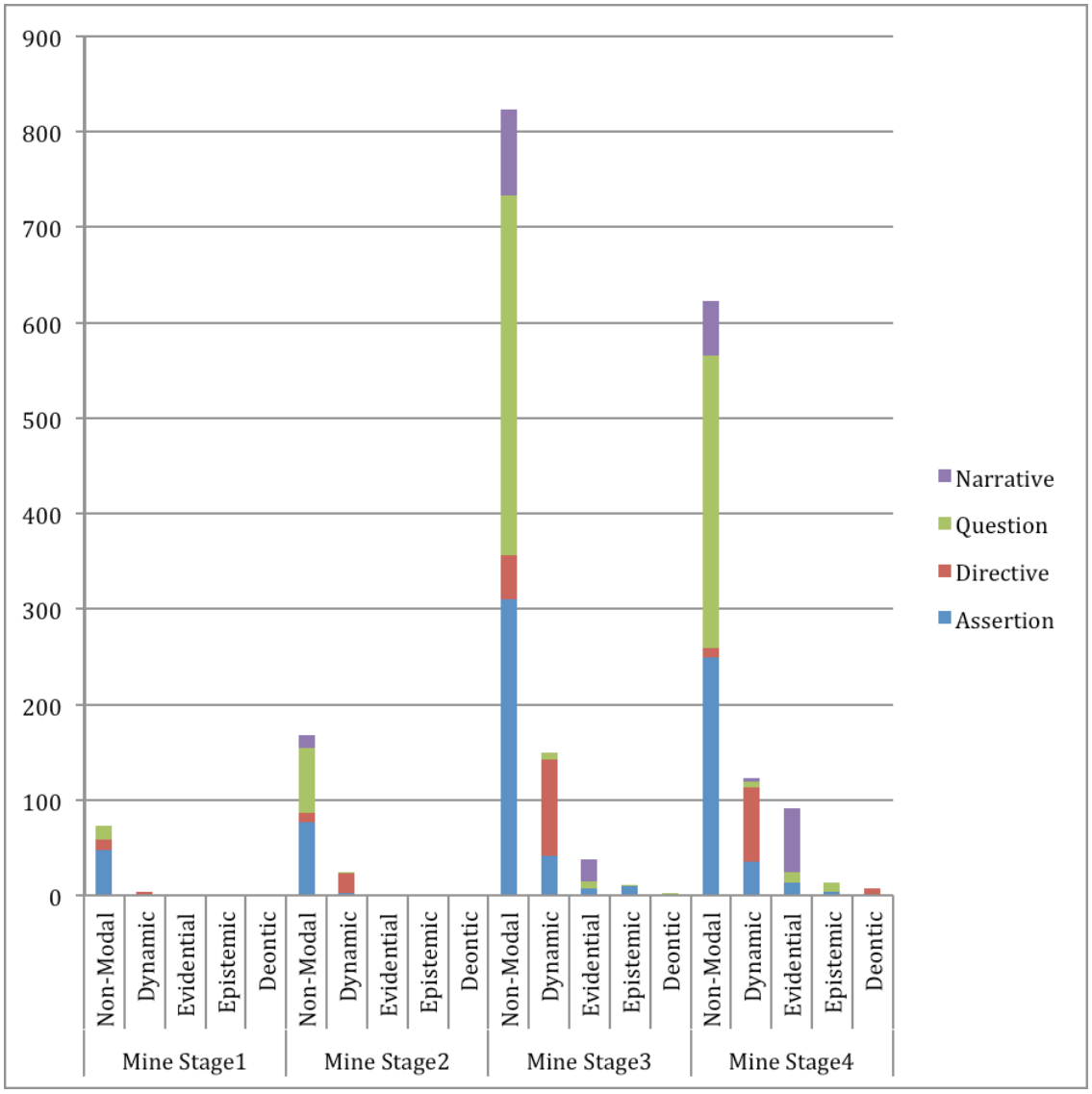


Fig. 9 Frequency distribution of pragmatic functions by modal types for Mine

Looking at this from a different point of view, the Tables 13 through 20 display which subcategories of pragmatic functions do the children express with their modal utterances. Deniz uses dynamically modalized utterances to express request for action and attention (directives) at first. In stage 2, she starts using them for stating her intentions (assertion) and for novel types of directives. In stages 3 and 4

she also uses dynamic modality for making predictions and stating abilities (assertions). Mine, on the other hand, is slightly more advanced than Deniz in Stage 1. Mine uses expressions of dynamic modality to express request for action (directive) and to make predictions and state abilities (assertions). As she grows older, she learns newer ways to express directives using dynamic modality.

Table 13 Pragmatic Function Subcategories of Deniz's Utterances with Dynamic Modality

Deniz Stage 1	Request for Action, Request for Attention
Deniz Stage 2	Request for Action, Request for Attention, Offer, Prohibition, Intention
Deniz Stage 3	Request for Action, Request for Attention, Offer, Prohibition, Intention, Prediction, Ability
Deniz Stage 4	Request for Action, Request for Attention, Offer, Prohibition, Intention, Prediction, Ability

Table 14 Pragmatic Function Subcategories of Mine's Utterances with Dynamic Modality

Mine Stage 1	Request for Action, Intention, Ability
Mine Stage 2	Request for Action, Request for Attention, Offer, Prohibition, Intention
Mine Stage 3	Request for Action, Request for Attention, Offer, Intention, Prediction
Mine Stage 4	Request for Action, Request for Attention, Offer, Prohibition, Intention, Ability

The usage of evidential modality does not reveal a pattern. Children arbitrarily use evidentially modalized utterances for various meanings, such as narratives, hearsay, inferred facts and surprising facts.

Table 15 Pragmatic Function Subcategories of Deniz's Utterances with Evidential Modality

Deniz Stage 2	Narrative, Report
Deniz Stage 3	Narrative, Inferred Fact
Deniz Stage 4	Narrative, Report, Inferred Fact

Table 16 Pragmatic Function Subcategories of Mine's Utterances with Evidential Modality

Mine Stage 2	Inferred Fact
Mine Stage 3	Narrative, Inferred Fact, Surprise
Mine Stage 4	Narrative, Report, Inferred Fact

Both children use expressions of epistemic modality for posing their attitudes toward a subject (i.e. Epistemic necessities and possibilities) when they first acquire it. Mine also uses expressions of epistemic modality for making predictions from the start; however, Deniz acquires this usage later.

Table 17 Pragmatic Function Subcategories of Deniz's Utterances with Epistemic Modality

Deniz Stage 2	Necessity, Possibility
Deniz Stage 3	Prediction
Deniz Stage 4	Possibility, Prediction

Table 18 Pragmatic Function Subcategories of Mine's Utterances with Epistemic Modality

Mine Stage 3	Possibility, Prediction
Mine Stage 4	Possibility, Prediction

Deniz uses deontically modalized utterances for a range of purposes from the start. Mine, on the other hand, at first uses them for requesting permission and then moves on to stating requirements and requesting actions.

Table 19 Pragmatic Function Subcategories of Deniz's Utterances with Deontic Modality

Deniz Stage 3	Requirement, Request for Action, Request/Give Permission
Deniz Stage 4	Requirement, Request Permission, Give Permission

Table 20 Pragmatic Function Subcategories of Mine's Utterances with Deontic Modality

Mine Stage 3	Request Permission
Mine Stage 4	Requirement, Request for Action

5.2.6 Modally Unifunctional vs. Multifunctional Verbal Morphology in CDS

We have analyzed the child-directed speech in terms of modal functions of the verbal morphology according to the four developmental stages of the children. With regard to the modal functions of verbal morphology CDS does not show any changes between stages as can be observed in Figures 10 and 11. From the first stage on all multifunctional markers are used for their various functions. The frequency of multifunctional markers is less than the frequency of unifunctional markers. Interestingly, both of these previous observations are also true for the last stage of the children.

Another relationship between CDS and CS is that the acquisition of these markers in CS appears to be influenced by their frequencies in CDS. The most used markers in CDS are *-Iyor*, *-DI* and *Ø*, and these are the first markers children acquire. Secondary most used markers in CDS are *-A*, *-mIş* , *-Ar/Ir* and *-AcAk*, which turn out to be the succeeding markers that children acquire. Finally, the markers that appear in CDS the least, namely *-IDI*, *-ImIş* and *-Abil*, are acquired the latest by the children. This pattern is apparent in Figure 12.

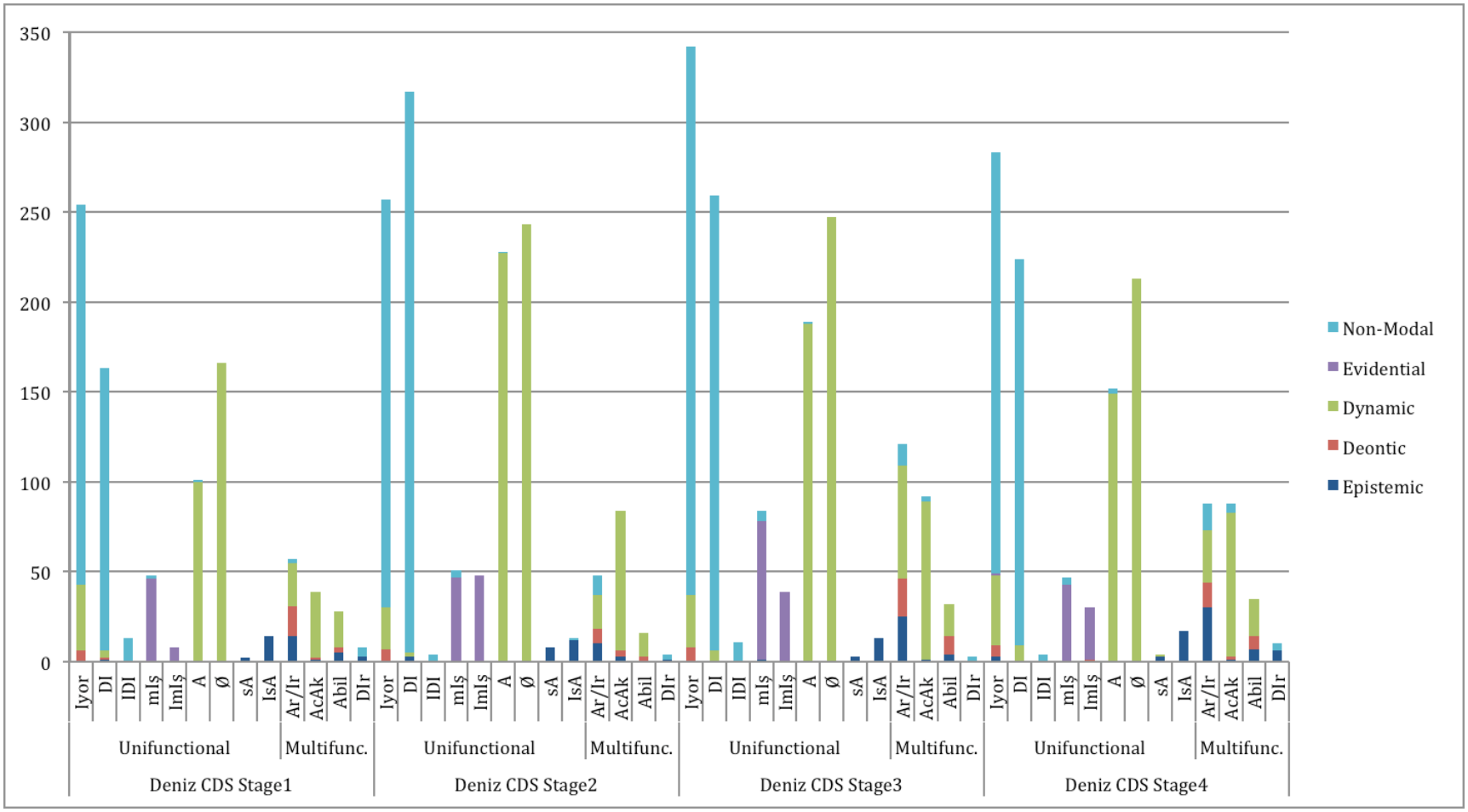


Fig. 10 Frequency distribution of unifunctional and multifunctional suffixes according to types of modality by stage for Deniz's CDS

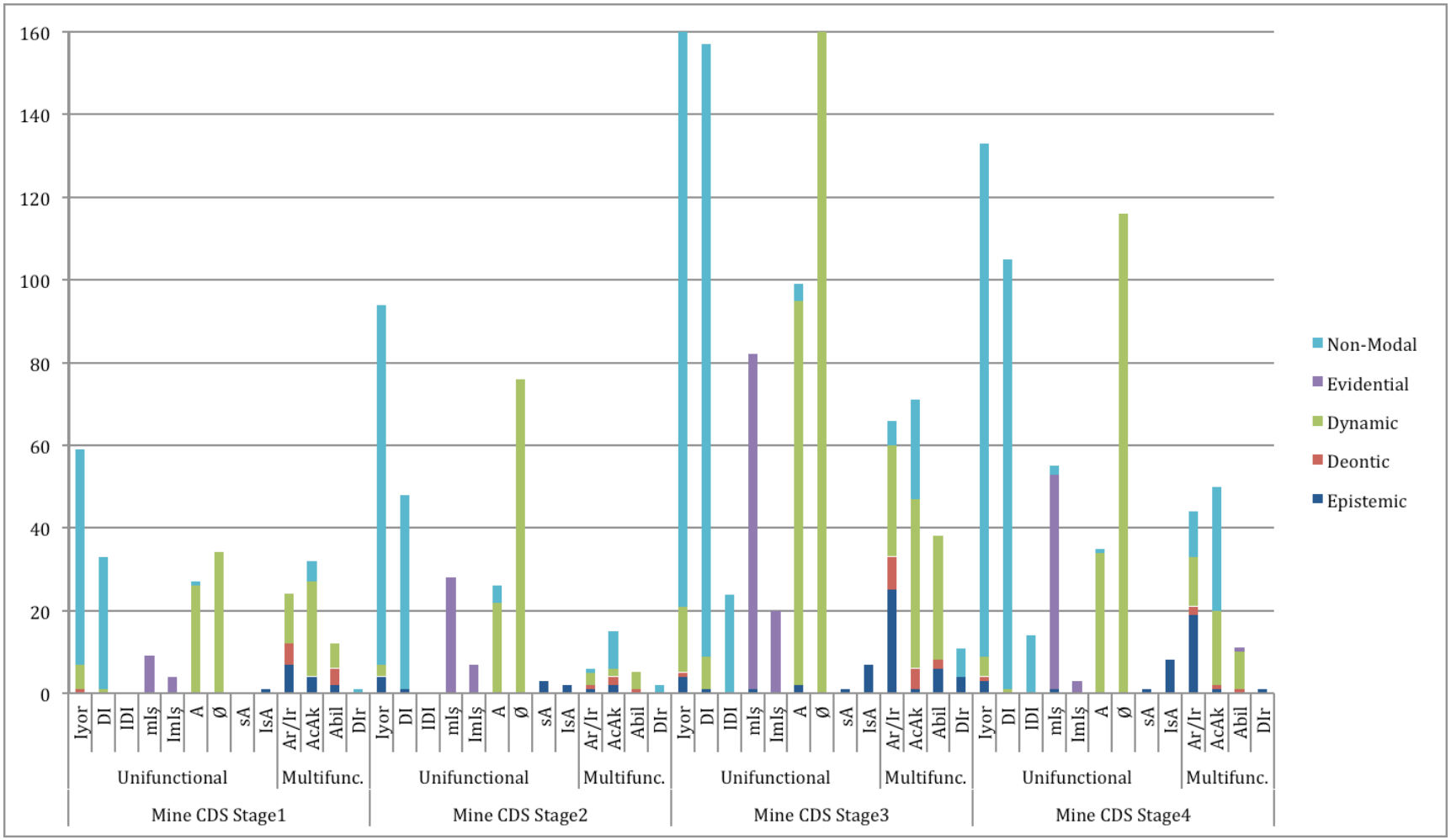


Fig. 11 Frequency distribution of unifunctional and multifunctional suffixes according to types of modality by stage for Mine's CDS

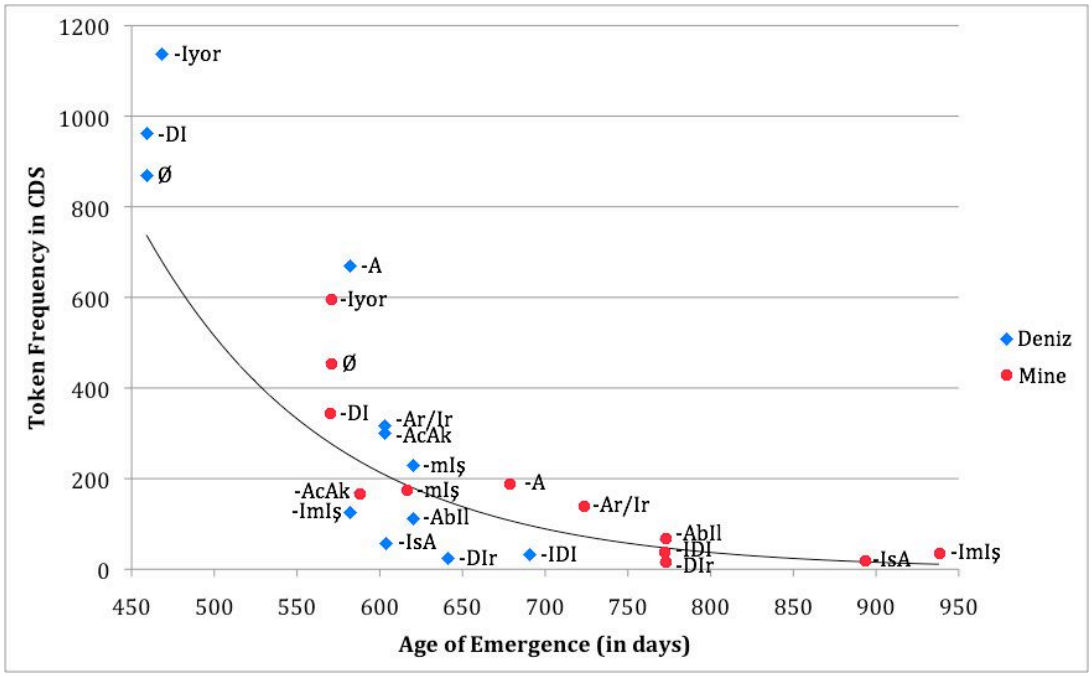


Fig. 12 The frequencies of all TAM markers in CDS and their age of emergence in child speech for Deniz and Mine

5.3 Discussion

My initial question was about the order of acquisition of types of modality. The longitudinal study revealed that first type of modality that emerges in children's speech was dynamic modality and it was expressed with morphological means. The next modality that appears was evidential modality again through morphological means. Epistemic and deontic modalities were acquired around the same time and both were conveyed through lexical and morphological means equally. That epistemic and deontic modality were acquired at the same time is a controversial finding; previous literature on longitudinal studies on English usually state that deontic modality is acquired before epistemic modality.

Shephard (1982), Pea et al. (1982) and Givón (2009) all suggest that in English deontic modality emerges before epistemic modality or the frequency of epistemic modality is significantly lower. In order to claim that the acquisition of modality in Turkish and English are different, one needs to be cautious of two features of these studies done on English. First of all, other than Givón, these researchers only looked into modal auxiliaries. Pea et al. even makes the comment that in their data children do use modal verbs such as "think" to denote epistemic modality but these are not included in their analysis. Second of all, they usually do not differentiate between deontic and dynamic modalities as in Palmer's system but combine them under the roof of "deontic modality". For example when Sheperd makes the general statement "(c)hildren learn to express deontic notions … long before they begin to express epistemic notions" (Sheperd, 321), what she implies is children express the kind of modality which includes "obligation, permission and volition" before epistemic modality. Keeping the two features in mind, these researchers provide specific examples of children using a modal item, such as "must" for obligation first and then for deduction. So it might be true that children acquire deontic modality before epistemic modality in English.

Studies on Korean, a language that resembles Turkish in many ways, find that evidential modality markers emerge first among all modal markers (Choi, 1995 & Lee, 2009). When I reanalyzed their data according to Palmer's categorizations, I found that actually Korean children acquire deontic modality after epistemic modality. More work on the acquisition of modality needs to be done, especially on

typologically different languages, to see what the general tendencies in acquisition are.

As mentioned above the children tended to use morphological means to denote modality in the data except epistemic and deontic modality for which they used both morphological and lexical means. There are two interesting issues here. First, in the expression of deontic modality children seem to have preferred to use lexical predicates (i.e. *lazım* and *gerek*) instead of the TAM marker *-mAlI* which denotes a similar meaning; *-mAlI* occurred only once in the data. Second, all of the adverbs (23 tokens) used for epistemic modality, including *acaba* (16 tokens) but excluding *belki* (2 tokens) have something in common: they are all based on the speaker's belief rather than knowledge, following Ruhi et al.'s (1997) categorization of Turkish epistemic adverbs. If one divides the epistemic adverbs used by the children in the data according to their tests, one finds that belief-based adverbs emerge first.

Another research question was whether the number of modal functions a TAM marker had affected its acquisition. That was the case in my data. Children first picked up unifunctional markers. When they did learn multifunctional markers, they used them for only one function first. Eventually various functions of multifunctional markers appeared in children's speech. The only marker that did not fit into this pattern was *-DIr*. Even though I assumed that *-DIr* has non-modal and modal (epistemic assumption) functions, one of the children acquired it quite early. She started to use *-DIr* in the first stage and used it only non-modally until the third stage. I think early acquisition of *-DIr* might be due to the fact that *-DIr* is actually not a TAM marker but a speech-act marker as Kaya (2010) suggests. She

argues that unlike a TAM marker, which only modifies the verb, *-DIr* modifies the whole sentence. She makes the point that without other lexical items or markers *-DIr* cannot, by itself, give the assumption meaning. She suggests that *-DIr* gets added to the whole sentence as the final marker and gives the meaning of the speaker's commitment to to the truth of the statement he/she is making. This is an interesting claim since it puts forward that *-DIr* is not on a par with the other verbal modal markers functionally and distributionally and therefore, it remains outside of the pattern mentioned above.

Until now I have talked about the TAM markers which were observed in the data; the ones lacking in the data also have important implications. The neccesitive suffix *-mAlI* and the unreal conditional suffix *-sA* are completely missing in the childrens' speech except for one instance of *-mAlI*. There might be three reasons contributing to *-mAlI*'s late acquisition. One, it has many modal meanings but no non-modal meaning. It might be difficult for children to differentiate between its modal meanings. Two, it also did not appear in the child-directed speech either. So it might be that children did not hear it being used. Three, as mentioned above children used many lexical items denoting same meanings in deontic modality as *-mAlI*. It might be that when given the choice, the children tend to use the lexical means to denote modality.

The other suffix not detected in the children's speech is the unreal conditional suffix, *-sA*; however, the conditional clitic, *-IsA*, is present in their speech. In other words the children are capable of making conditional statements with *-IsA* but not with *-sA*. The difference between these two markers is that the clitic form is typically

used for real conditionals, whereas *-sA* for unreal conditionals (more specifically counterfactuals). This demonstrates the fact that children learn real conditionals before unreal conditionals.

The last research question was about exploring the influence the pragmatic context had on the acquisition of modality. I found that in terms of modal morphology child-directed speech was not simplified in children's earlier stages. The pattern of modal morphology in CDS stayed the same throughout the stages of development observed. An interesting relationship between CDS and CS was that the order of morphology acquisition in CS was influenced by the frequency of the markers in CDS.

The current study does have some limitations. The recordings were collected during "play time"; therefore, the context of the children's speech is rather fixed. Also, the data stops before the children reach age 3. It would be interesting to observe the development of patterns of modality types and means in older children. Moreover, it should not be forgotten that the number of participants in this study is only two and that production is only one face of the coin of language acquisition.

CHAPTER 6

EXPERIMENTAL STUDY

The most apparent result of the longitudinal study was that the first category of modality observed in Turkish children's speech was dynamic modality. Dynamic modality emerged months before the other types of modalities; moreover, it had the highest frequency among the other modal categories throughout the developmental stages. The next type of modality, which also emerged early and had considerably high frequency, was the evidential. . Both of these categories of modality were expressed with verbal morphology long before they were expressed with lexical items.

While the longitudinal study illustrated the acquisition and production of dynamic and evidential modalities clearly, the production of deontic and epistemic modalities were so scarce that to thoroughly, understand their acquisition I thought an experiment was in order. Since the production of deontic and epistemic modalities was observed towards the end of the period of data collection of the longitudinal study and the number of epistemically and deontically modalized utterances was limited, I aimed to capture ensuing development by testing children older than the longitudinal subjects but of the youngest age that could participate in the experiment. I tested their comprehension with two experiments (testing epistemic and deontic modalities separately) in order to observe the initial stages of acquisition during which children are likely to understand the meanings of deontic and epistemic expressions even if they are not yet competent enough to frequently

use these kinds of expressions in their spontaneous speech. For these reasons, children between 3 to 5 years of age were included in the study.

As noted above, it was observed in the longitudinal study that utterances expressing epistemic and deontic modalities emerge around the same time and with almost equal frequency. I therefore expect the pace of development for the expression of the two types of modality to be similar. Furthermore, epistemically and deontically modalized utterances were expressed equally with lexical items and verbal morphology in the longitudinal study. I therefore did not expect any difference in the comprehension of morphologically versus lexically expressed deontically and epistemically modalized utterances.

In order to investigate when children understand the different modal implications of the morphological forms that can express epistemic or deontic meanings depending on context, I aimed to contrast *-AbIl*, *-AcAk* and *-mAlI* (see Chapter 4, Table 7, p. 46).The verbal maker *-Abil* (along with the aorist) denotes epistemic speculation and deontic permission and is frequently used by children. The marker *-mAlI* was chosen because it is only a modality maker without tense or aspect functions and it denotes epistemic deduction and also deontic obligation. However, the children did not produce *-mAlI* at all in the longitudinal study so I included a frequent marker that was used both for deontic obligation and denoted a higher degree of epistemic certainty than *-Abil*: the future marker *-AcAk*.

An additional purpose of this experimental study was to look into another factor, namely theory of mind skills that might be influencing the acquisition of modality. Since the data for the longitudinal study was collected years ago for a

larger research project[13], I did not have any records for the children's theory of mind skills. Previous research indicated that development of theory of mind (ToM) might be connected to acquisition of modality as mentioned in Chapters 2 and 3 (Moore, Pure & Furrow, 1990; Nunez & Harris, 1998; Aksu-Koç & Alıcı, 2000 to name a few). Therefore, this experiment was designed to test children's ToM skills as well as their comprehension of deontic and epistemic modalities. There are different ways of getting at ToM skills. Development of theory of mind skills marks the child's ability to understand others' mental states such as desires, emotions, knowledge and beliefs that are different from his/her own. Wellman and Liu (2004) found that not all aspects of ToM are acquired at the same time and that using different ToM tests yields more reliable results than only testing a specific aspect (e.g. only testing children's ability to understand others' emotions). Wellman and Liu found the general trend for the development of different aspects of ToM for English speaking children, which is listed below from the first developed to the last.

1. Other people can want different things (diverse desires)
2. Other people can believe different things (diverse beliefs)
3. Other people may not know what I know (knowledge access)
4. Other people can believe something that I have seen to be false (content false belief)
5. Other people can believe something that I have been told is false (explicit false belief)
6. Other people can feel a certain way because of their beliefs (belief emotion)
7. Other people can look one way but feel the opposite way (real-apparent emotion)

Ünlütabak (2012) provided evidence for the developmental ordering of these different aspects of ToM for Turkish speaking children. Ünlütabak ranked the ability of Turkish children to complete the ToM tasks from difficult to easy as follows:

[13] Some studies done on this data are Aksu-Koç (1998), Ketrez (1999) and Xanthos et al. (2011).

explicit false belief, diverse beliefs, real-apparent emotion, unexpected contents, belief-emotion, knowledge access, diverse desires. For my study I have chosen two easy tasks (diverse desires and knowledge access) and a more difficult one (diverse beliefs) so that even three year olds can complete some of the tasks but there is still variability among the age groups. Also, these tasks appear to be the most related to epistemic and deontic modalities. Epistemic modality requires the child to understand that the world is not black and white and to accept that people do not have to know about the real states of the world (knowledge access) but can make a best guess by taking in the evidence available. The child will then have to recognize that people can make different guesses about the same situation given the same evidence (diverse beliefs). Regarding deontic modality, children have to learn to ask for permission because others may not want what he/she wants for himself/herself (diverse desires).

On the basis of the consideration above, I aimed to test the following hypotheses.

1. Children's comprehension of modal expressions will change with age; older children will obtain higher comprehension scores than younger children.

2. There will be no difference in children's comprehension of modal utterances on the epistemic versus the deontic modality tasks.

3. There will be no difference in children's comprehension of modalized utterances with morphological versus lexical means.

4. Children's theory of mind skills will change with age; older children's performance on the ToM test will be higher than that of younger children.

5. Children's theory of mind abilities will be related to how well they comprehend modal utterances; those children who get high a score on the ToM test will also get high a score on the modality tasks.

6.1 Method

6.1.1 Participants

The participants were 45 Turkish monolingual children ranging in age between 3;0 and 6;0. There were 15 children in each age group, the mean age and age range for each group are provided in Table 21. The children were recruited from three preschools which catered to children from lower middle to upper middle class backgrounds. All of the participants were tested in their preschools.

Table 21 Mean Age, Age Range and Numbers of Females and Males for Each Age Group

Age Group	Mean	Range	Female	Male
3	3;7	3;1-3;11	8	7
4	4;7	4;0-4;11	6	9
5	5;6	5;0-6;0	8	7

6.1.2 Materials and Procedure

There were two modality tasks (epistemic and deontic) and a theory of mind test. The children were tested in a quiet room at their preschool. The children were told they were going to play some games with the Experimenter and at the end they were going to get a sticker as a reward. The order of presentation of the epistemic and the deontic tasks was counter-balanced.

The Epistemic Task was a game-like iPad application developed on Adobe Flash. It was about a bunny trying to find a treasure chest. The children were told that there was a rabbit who was after a treasure chest. They were asked if they wanted to help the rabbit. The children were then told that the treasure chest was very well hidden in a place like a labyrinth but they should not worry because there were little friends who were going to help along the way. They had to listen to the clues the friends gave and choose which way to go accordingly. After the instructions, the game started.

The rabbit walked while singing until it reached a fork in the road with three options and there was a cute monster in front of the each route. Alternations of this scene included the rabbit arriving in front of a mountain with three caves, the rabbit coming across a river, which has three bridges, and the rabbit runs into a wall with three doors. The child was first asked to click on the rabbit who upon clicking said *Hazine hangi yolun sonunda*? 'Which road is the one with the treasure chest at the end?'. Then the child was asked to click on each of the cute monsters to listen their clues. After the children heard what each of the cute monster had to say, they were asked to choose between the routes. Two of the cute monsters gave the bunny contrasting clues on which option to take, while the third one just stated a fact (e.g. *Bu yol taştan yapılmış* 'This road was made up of bricks'). The contrasting clues expressed different degrees of confidence in the truth of the statement asserted. For example, the purple monster would say *Hazine sağdaki yolun sonunda olmalı* 'The treasure must be at the end of the road on the right' and the green monster would say *Hazine soldaki yolun sonunda olabilir* 'The treasure may be at the end of the road

on the left'. The means of conveying epistemic modality were the modal inflections -*Abil* 'speculation', -*AcAk* 'assumption' and -*mAlI* 'deduction', and the modal adverbs *kesinlikle* 'definitely' and *galiba* 'probably'. The clue-giving monsters both used modal inflections or they both used modal adverbs. All pairs of clues given by the cute monsters are provided in Table 22.

Table 22 Pairs of Verbal Inflections and Adverbs That Constituted Clues on the Epistemic Task

Modal Inflection Pairs		Modal Adverb Pairs
-Abil vs. *-AcAk*	*-Abil* vs. *-mAlI*	*Kesinlikle* vs. *Galiba*
Speculation vs. Assumption	Speculation vs. Deduction	Definitely vs. Probably

During the game each pair of clues were presented three times. This meant that the game had a total of nine forks with three routes. The sequence of the pairs of clues and which monster gave the strongest clue was randomized. No matter what the children's choices were the rabbit always found the treasure at the end and the child was congratulated.

The Deontic Task was also a game-like iPad application developed on Adobe Flash and it was about a family getting ready to go to an amusement park. The children were told there was this family that was going to the amusement park but before they could go, they had things to do. The children were asked if they would like to help this family and with their answer the game was started. This game had 10 chapters. In each chapter, there is a video of the family accomplishing their chores or doing daily activities. The video always ended with a situation that required a character to state an obligation or give permission. After children watched the video, the black screen with two pictures of a character appeared. The

experimenter told the children the gist of what happened in the video. Children were then asked to click on each picture of the character and listen to what is said. When clicked on one of the pictures, the character stated an obligation about something and when clicked on the other picture, the character gave permission for something. Children were asked to figure out whether the situation in the video warranted an obligation or a permission. An example chapter would be:

> Chapter 1
> Part 1: The video
> The mother comes in to her son's room. He is still sleeping.
> Mother: *Önümüzde büyük bir gün var. Kalkma vakti. Lunaparka gitmeden daha çok şey yapacağız.* 'We have a big day ahead. It's time to get up. We still have a lot of things to do before we go to the amusement park.'
> Part 2: Modality
> The screen goes black. Two pictures of the mother appear. When clicked on one mother says *Kalkabilirsin* 'You may get up' and the other says *Kalkmalısın* 'You must get up'.

In this task, as in the epistemic task, the choices the children were given denoted modality through morphological or lexical means. The modal inflections denoting modality were *-Abil* 'permission', *-AcAk* 'obligation' and *-mAlI* 'obligation', and the modal verbs *gerekmek* 'necessitate' and *izin vermek* 'permit'. There are two things to note here. One is that unlike the epistemic senses of *-AcAk* and *-mAlI*, the deontic senses are similar, in that they both denote powerful obligation. Two, these pairs express different notions in case of deontic modality, namely obligation vs. permission; therefore, the opposition is not one of degree on a continuum of the same notion (high versus low probability) but the opposition of different semantic notions. All possible pairs of choices are provided in Table 23. In the game there are three chapters for each pair of choices. The sequence of the pairs of choices and the

place of the picture with the appropriate answer (left or right) was randomized. The final chapter is a video of the family going to and enjoying themselves in the amusement park. No matter what the children's choices were, the family always got to go to the amusement park at the end.

Table 23 Pairs of Verbal Inflections and Predicates That Constituted the Choices on the Deontic Task

Modal Inflection Pairs		Modal Verb Pairs
-Abil vs. *-AcAk*	*-Abil* vs. *-mAlI*	Gerekmek vs. İzin vermek
Permission vs. Obligation	Permission vs. Obligation	Require vs. Permit

There were three tasks in the ToM test: diverse beliefs, diverse desires and knowledge access. In other words, children's ability to understand that other people can want or believe different things and others may not know what they know was tested. The order of presentation of the ToM tasks was counterbalanced. All the tasks were counter balanced. For the diverse beliefs task, the child was shown the pictures of a girl, a bush and a garage. The children were told that Ayşe was looking for her cat and the cat could be in the bush or in the garage. The children were asked to indicate which place they thought the cat was at, and then they were told that Ayşe thought that the cat was at the other place. The children were asked where they thought Ayşe would look for the cat.

For the diverse desires task, the child was shown the pictures of a man, a cookie and a carrot. The children were told that Ali Amca (Uncle Ali) was hungry and that there was a cookie and a carrot for him to choose. The children were asked which one they would like to eat if they could only choose one of them and then they were told that Ali Amca liked the other one but not the child's choice. The children

were asked which snack Ali Amca would choose when given to choice to choose between a cookie and a carrot.

For the knowledge access task, there was a box and a toy elephant. The children's attention was directed at a closed box. They were asked whether they knew what was inside. After it was established that they did not, the box was opened and the toy elephant inside was taken out. The children played with the elephant for a short while and put the elephant inside the box again. The lid of the box was closed and the children were asked what was in the box. Then, they were told their teacher never saw what was in the box. They were asked whether their teacher knew what was in the box (the knowledge access question) and whether their teacher saw what was in the box (the memory question).

6.2 Results

6.2.1 Preliminary Analyses on Modality Tasks

Scores obtained on the two modality tasks were first analyzed to see if children's performance was above chance level. In the epistemic modality task, there were nine items, with three items for each pair of morphological / lexical contrasts: (*-mAlI* vs. *-Abil*, *-AcAk* vs. *-Abil,* and *Kesinlikle* vs. *Galiba*). Children got one point for each right answer. Therefore, the maximum score that could be obtained was 9. In order to see whether the number of right answers in an age group was above chance level, chi-square tests were conducted. As can be observed from Table 24, 3-year-olds

performed below chance level on the epistemic task, whereas 4- and 5-year-olds performed above chance.

In the deontic modality task, there were nine items, with three items for each pair of morphological / lexical contrasts: (*-mAlI* vs. *-Abil*, *-AcAk* vs. *-Abil* & *Gerek* vs. *Izin*). Children got one point for each right answer. Therefore, the maximum score that could be obtained was 9. In order to see whether the number of right answers in an age group was above chance level chi-square tests were conducted. As can be observed from Table 24, 3 year olds performed below chance level on the deontic task, whereas 4- and 5-year olds performed above chance. In other words, children answered around half of the items correctly, whereas 4- and 5-year olds answered a significant portion of the items correctly.

Table 24 Chi-Square and *p* Values for Total Scores of Each Modality Task by Age Group

	Epistemic Modality			Deontic Modality		
Age	3	4	5	3	4	5
χ^2	0.03	9.63	4.03	0.90	20.80	16.36
df	1	1	1	1	1	1
p	0.86	0.001	0.04	0.34	<0.001	<0.001

As was described in the methods section, on the epistemic modality task children were asked to make a choice among three alternative routes, that is, their probability of being correct by chance was 1/3. On the deontic modality task this probability was 1/2 as the correct response was one of two alternatives. To eliminate this difference in the likelihood of being right by chance, I corrected the raw scores on each task for guessing. The formula I adopted is taken from Ekstrom, French and Harman (1979) and presented below:

Corrected Score = # of correct responses – 1 / # of choices * # of mistakes

In the following analyses of epistemic and deontic modality tasks, the scores corrected for guessing are used.

6.2.2 Comprehension of Modality: Effects of Age and Gender

In the following analyses the hypotheses below were tested.

1. Children's comprehension of modal expressions will change with age; older children will score higher than younger children.
2. There will be no difference in children's comprehension of modal utterances on the epistemic versus the deontic modality tasks.

Gender was included to see whether it had an effect on children's modality performance or not. An Age (3) x Gender (2) repeated measures ANOVA with type of modality as within subjects variable was conducted. There was a main effect of type of modality ($F(1, 39) = 31.32$, $p < .001$, $\eta_p^2 = .445$). Age had a marginally significant effect ($F(2, 39) = 2.73$, $p = .078$, $\eta_p^2 = .123$) and gender had no significant effect ($F(1. 39) = 0.01$, $p = .920$). An inspection of the means in Table 25 shows that 3-year-olds scored lower than 4-year-olds and 5 year olds but there was no difference between 4- and 5-year-olds. As can also be seen from Table 25, children's performance on deontic modality task was higher than their performance on the epistemic modality task.

Table 25 Means and Standard Deviations of Both Modality Scores by Age

	Epistemic Modality		Deontic Modality	
Age	Mean	SD	Mean	SD
3	1.60	2.04	2.80	1.87
4	2.64	2.37	4.90	2.50
5	2.33	2.70	4.60	2.50
Total	2.19	2.37	4.10	2.08

6.2.3 Analysis of Contrastive Morphological and Lexical Pairs

The epistemic and deontic tasks were analyzed separately in more detail in order to test the hypothesis that there would be no difference between children's comprehension of modal utterances expressed with lexical means versus morphological means. Since the modality tasks were investigated separately, the original scores were used instead of the scores that were corrected for guessing.

As already noted, in the epistemic task, children got one point for each right answer. Each pair (*-mAlI* vs. *-Abil*, *-AcAk* vs. *-Abil* and *Kesinlikle* vs. *Galiba*) was asked three times; therefore, the maximum score that could be obtained on a pair was 3 points. Table 26 provides the mean scores for each pair, for each age group for the epistemic task.

Table 26 Mean Scores for All Epistemic Pairs by Age Groups

	Epistemic		
Age	*-mAlI* vs *-Abil*	*-AcAk* vs *-Abil*	*Kesinlikle* vs *Galiba*
3	0.67	1.20	1.07
4	1.13	1.47	1.53
5	0.80	1.20	1.73

Chi-square tests were carried out on the number of correct responses given for an epistemic pair in each age group to see if they differed significantly from chance. The results revealed that three year olds did not perform above chance level in the epistemic task on any of the three pairs. Four year olds performed significantly above chance for two of the pairs (*-AcAk* vs. *-Abil* and *Kesinlikle* vs. *Galiba*) but not on the third pair (*-mAlI* vs. *-Abil*). Five year olds performed above chance level for only one pair (*Kesinlikle* vs. *Galiba*). Note that none of the age groups performed above chance for the *-mAlI* vs. *-Abil* pair. The chi-square values and significance levels are presented in Table 27. These results suggest that 4-year-olds were able to evaluate *-AcAk* and *Kesinlikle* as the forms with "stronger implication certainty" among the contrastive pairs. In other words, at the age children start to perform above chance in epistemic modality task, they can differentiate both within lexical pairs and within morphological pairs.

Table 27 Chi-Square and *p* Values for Each Pair of Epistemic Contrasts by Age

	3 year olds			4 year olds			5 year olds		
	-mAlI vs. *-Abil*	*-AcAk* vs. *-Abil*	*Kesinlikle* vs. *Galiba*	*-mAlI* vs. *-Abil*	*-AcAk* vs. *-Abil*	*Kesinlikle* vs. *Galiba*	*-mAlI* vs. *-Abil*	*-AcAk* vs. *-Abil*	*Kesinlikle* vs. *Galiba*
χ^2	2.5	0.9	0.1	0.4	4.9	6.4	0.9	0.9	12.1
df	1	1	1	1	1	1	1	1	1
p	0.11	0.34	0.75	0.53	0.03	0.01	0.34	0.34	0.001

In the deontic task, children also got one point for each right answer. Each pair (*-mAlI* vs. *-Abil*, *-AcAk* vs. *-Abil* and *Gerek* vs. *Izin*) was asked three times; therefore, the maximum score that could be obtained on a pair was 3 points. Table 28 provides the mean scores for each age group for the deontic task.

Table 28 Mean Scores for All Deontic Pairs by Age Groups

	Deontic		
Age	*-mAlI* vs *-Abil*	*-AcAk* vs *-Abil*	Gerek vs Izin
3	2.07	1.07	1.73
4	2.27	1.93	2.07
5	2.00	1.67	2.40

Chi-square tests were performed to investigate whether the number of right answers for a deontic pair in an age group was above chance level. These analyses revealed that 3-year-olds made a correct choice significantly above chance for the-*mAlI* vs. *-Abil* pair but made a wrong choice significantly above chance for the *-AcAk* vs. *-Abil* pair. Moreover, they were at chance level at answering *Gerek* vs. *Izin* pair correctly. Four year olds displayed correct performance above chance level for all pairs. Five year olds displayed correct performance above chance for the *Gerek* vs. *Izin* and *-mAlI* vs. *-Abil* pairs but not on *-AcAk* vs. *-Abil* pair. The chi-square values and significance levels are presented in Table 29.

Table 29 Chi-Square and P Values for Each Pair of Deontic Contrasts by Age

	3 year olds			4 year olds			5 year olds		
	-mAlI vs. *-Abil*	*-AcAk* vs. *-Abil*	*Gerek* vs. *Izin*	*-mAlI* vs. *-Abil*	*-AcAk* vs. *-Abil*	*Gerek* vs. *Izin*	*-mAlI* vs. *-Abil*	*-AcAk* vs. *-Abil*	*Gerek* vs. *Izin*
χ^2	6.4	3.8	1.1	11.8	3.8	6.4	5.0	0.6	16.2
df	1	1	1	1	1	1	1	1	1
p-value	0.01	0.05	0.3	0.001	0.05	0.01	0.03	0.46	<0.001

The fact that 3-year-olds choose the right answer when *-mAlI* and *-Abil* are contrasted but fail to choose the right answer when *-AcAk* and *-Abil* are contrasted suggests that children have not fully developed deontic notions. On the other hand, 4-year-olds were able to evaluate which form of the pairs *-mAlI* vs. *-Abil, -AcAk* vs. *-Abil* and *Gerek*

vs. *Izin* was the appropriate one given a situation. In other words, at the age children's correct performance becomes steady and is above chance in deontic modality task, they can differentiate both within lexical pairs and within morphological pairs.

6.2.4 Drawbacks of Modality Tasks

There were two problems with the epistemic task. One was that some children tended to choose their favorite colored monster every time no matter what the monsters were saying. There were three 3-year-olds and five 4-year-olds who did just that. Another problem was that two of the non-modal statements turned out to be misleading for children. These statements were *Bu mağara karanlık* 'This cave is dark' and *Bu kapı geniş* 'This door is wide'. However, the rate of being chosen was not significantly above chance for either of these statements. Some children made comments like *Bu mağara karanlıksa orda saklamışlardır hazineyi* 'If the cave is dark, the treasure must be hidden there' or *Bu kapı tam bize göre geniş* 'This door is just wide enough for us'. A problem with the deontic task was that some children preferred to choose the response on a particular side of the screen. No matter what the choices were. The number of children who did so was three 3-year-olds, five 4-year-olds and four 5-year-olds. Note that, even though these children were not excluded from the analysis, the chi-square tests in the preliminary analysis section revealed that from age 4 on children performed above chance, indicating that they were able to comprehend utterances expressing both epistemic and deontic modality.

6.2.5 Performance on the Theory of Mind Test

In order to test the hypothesis that children's theory of mind skills will change with age, an Age (3) x Gender (2) univariate ANOVA with theory of mind scores as dependent variable was conducted. There was a main effect of age ($F(2, 39) = 8.81$, $p = .001$, $\eta_p^2 = .311$) and a main effect of gender ($F(1, 39) = 11.90$, $p = .001$, $\eta_p^2 = .234$). There was no significant interaction effect. Post hoc comparisons revealed that the theory of mind scores of 3-year-olds were significantly lower than those of 4-year-olds ($p < 0.001$) and 5-year-olds ($p = 0.003$) but the theory of mind scores of 4- and 5 year-olds did not differ ($p = 0.392$). An inspection of the means in Table 30 shows that girls performed significantly better on the theory of mind test than boys.

Table 30 Means and Standard Deviations on the Theory of Mind Test by Age

	Female		Male		Total	
Age	Mean	SD	Mean	SD	Mean	SD
3	2.25	0.19	1.29	0.20	1.73	0.80
4	2.66	0.22	2.44	0.18	2.53	0.52
5	2.63	0.19	2.14	0.20	2.40	0.51

In order to see whether the number of children who answered correctly in an age group was above chance level chi-square tests were conducted. As can be observed from Table 31, the number of 3-year-olds who answered correctly was above chance level for none of the tasks but knowledge access tasks came close. The number of 4-year-old who answered correctly was above chance level for all ToM tasks. The number of 5-year-old who answered correctly was almost above chance level for diverse desires task but the number was not above chance for diverse

beliefs task. On the other hand, all 5-year-old children answered knowledge access task correctly.

Table 31 Number of children who answered correctly, Chi-Square and *p* Values for Each ToM Task by Age Group

	3-year-olds			4-year-olds			5-year-olds		
	Diverse Desires	Diverse Beliefs	Knowledge Access	Diverse Desires	Diverse Beliefs	Knowledge Access	Diverse Desires	Diverse Beliefs	Knowledge Access
# of Children with Correct Answers	8	7	11	13	12	13	11	10	15
χ^2	0,07	0,07	3,27	8,07	5,40	8,07	3,27	1,34	15,00
df	1	1	1	1	1	1	1	1	1
p	0,796	0,796	0,071	0,005	0,020	0,005	0,071	0,197	< 0,001

6.2.6 Relationship between Modality, Age and ToM

An additional objective of this experiment was to investigate the relationship between modality and theory of mind. Since there was no effect of gender on modality, the scores of both genders were collapsed. Age had a marginally significant effect on modality so it was kept as an independent variable in this analysis. An Age (3) x ToM (3) repeated measures ANOVA with type of modality as within subjects variable was conducted. There was a main effect of type of modality ($F(1, 38) = 30.04$, $p < .001$, $\eta_p^2 = .441$) and a main effect of age ($F(2, 38) = 3.15$, $p = .054$, $\eta_p^2 = .142$) but no significant effect of theory of mind ($F(2, 38) = 3.97$, $p = 0.505$). There was a significant interaction between age and theory of mind ($F(2, 38) = 4.15$, $p = .023$, $\eta_p^2 = .179$).

Comparisons of the means of the types of modality revealed that children's scores on the epistemic task (M=2.19, SD=2.37) were significantly lower than their scores on the deontic task (M=4.10, SD=2.08) (p <.001). Post Hoc tests on the effect of age indicated that 3-year-olds scored significantly lower than 4-year-olds (p = 0.01) and 5-year-olds (p = 0.012) but there was no a difference between 4- and 5-year-olds (p = 0.991). The interaction between age and theory of mind is illustrated in Figures 13 and 14. An inspection of the means in the figures suggests that the ToM skills of 3- and 4-year-olds did not have an effect on their performance on the modality tasks. On the other hand, 5-year olds who passed all three theory of mind questions obtained higher modality scores than 5-year olds who passed only two of them.

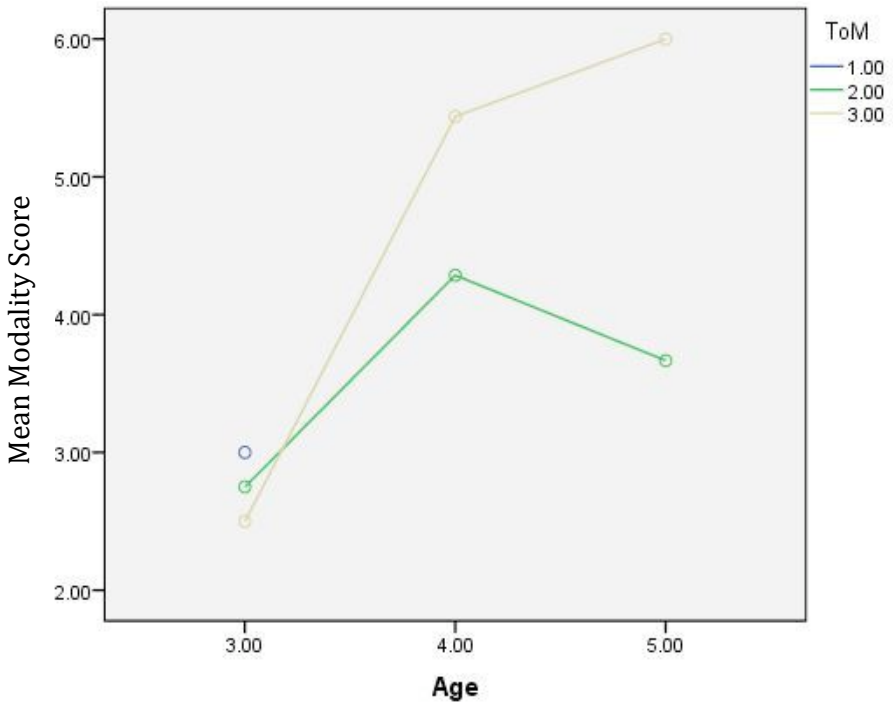


Fig. 13 Effect of age and theory of mind performance on comprehension of epistemic modality

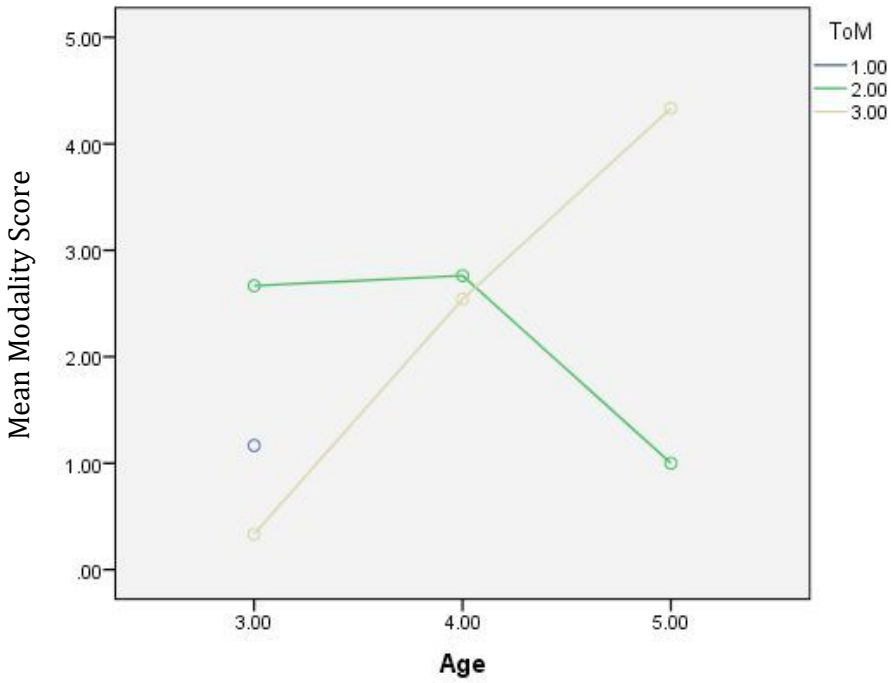


Fig. 14 Effect of age and theory of mind performance on comprehension of deontic modality

6.3 Discussion

My initial question in this study was whether there would be a temporal lag in children's comprehension of the two types of modal statements or whether such understanding would develop around the same time. My results showed that 3-year-olds perform very erratically on both modality tasks but 4- and 5-year-olds perform above chance level in two out of three pairs of contrastive morphological/ lexical markers in both modality tasks. That is, there is development with age in both modality tasks

Additionally, there was a significant interaction effect of age and ToM on comprehension of modalized utterances showing that 3 and 4-year-olds perform similarly on modality tasks no matter what their theory of mind score is, but 5-year-old children with more developed theory of mind skills have a better understanding of modal expressions. This suggests that theory of mind skills become an important contributor to understanding modal notions only with age. This finding suggests that there may be other capacities at play here. These capacities, which were not investigated in the present study, affect comprehension of modal expressions and develop with age. Some 4-year-olds might have advanced theory of mind skills but because they were lacking in these other capacities, their modality scores were not better than 4-year-olds with lower theory of mind skills. These mysterious capacities might be memory, attention or executive function skills. In the future it would be interesting to test children's various cognitive capacities as well as their comprehension of modality for a more comprehensive understanding of developments in this semantic domain. I also explored children's performance on individual ToM tasks. In the longitudinal study the children preferred using belief-based epistemic adverbs than knowledge-based epistemic adverbs; therefore, I wanted to see whether children's performance on diverse belief task would be better than their performance on knowledge access task. This was not the case. Children's performance on knowledge access task was better than their performance on diverse beliefs task. This suggests that even though children start to talk about beliefs earlier than knowledge, children still project their own beliefs upon others long after they realize people can know different things.

There were significant differences in children's performance on epistemic and deontic tasks. There was not a difference in 3-year-olds deontic and epistemic scores, which is expected since they performed below chance level on both tasks. Deontic modality scores of 4- and 5-year-olds were significantly higher than their epistemic scores. In other words, children acquired both modalities at age 4 but they were more successful on the deontic task. This might be due to two reasons. It might be that the ability to reflect on deontic notions develops faster than the ability to reflect on epistemic notions. Another reason might be that the deontic task was inherently easier than the epistemic task for the following reasons. First, the deontic task was very close to real life and it included many situations from children's everyday lives, whereas the epistemic task was somewhat artificial. Second, since in the epistemic task there were three choices given when in the deontic task there were two, the epistemic task posed more of a memory load.

Even though the lexical items of epistemic and deontic tasks were different, the morphological items were the same. Both tasks included items opposing *-mAlI* vs. *-Abil* and *-AcAk* vs. *-Abil*. The results show that 4-year-olds performed above chance level on items contrasting *-AcAk* vs. *-Abil* in both epistemic (assumption vs. speculation) and deontic (obligation vs. permission) modality tasks; however, they performed above chance level on items contrasting - *mAlI* vs. *-Abil* only in deontic modality task. These results suggest that children know both epistemic and deontic meanings of *-AcAk* and *-Abil* at age 4 but they only know the deontic meaning of *-mAlI* at this age. This is expected since both *-AcAk* and *-Abil* appeared in the longitudinal data but *-mAlI* did not. Children have been using *-AcAk* and *-Abil* for at

least the last two years so they are more competent on all meanings of these markers. On the contrary, they must have acquired more *-mAlI* recently (since it was not present in the longitudinal data) and are not competent in all its meanings. It would be interesting to gather data from children older than my longitudinal study participants to see the acquisition of *-mAlI* to answer questions like the following: when exactly children start to use *-mAlI* and in what context do they use it.

Gender was also considered as a possible influence on the ability to comprehend modalized expressions since language development has been known to be affected by gender (e.g. Karrass et al., 2002). The results indicated that gender was not a factor in a child's ability to comprehend modalized utterances. Gender, on the other hand, was a factor in children's theory of mind skills. Girls tended to get higher scores on ToM test than boys. This finding is not surprising considering the theory of mind literature (e.g. Bosacki, 2000; Walker, 2005; Calero, 2013).

A major limitation of the current study is the number of participants. Same analyses with more participants might have revealed more significant relationships between variables. Another limitation is as mentioned above there are quite a few differences between the epistemic and deontic tasks. The epistemic task was kept similar to what has been used in the literature. The inspiration came from Hirst and Weil 1982 and many other studies that have been inspired by their study including Bryned and Duff (1989), Moore, Pure and Furrow (1990), Bascelli and Barbieri (2002), Ifantidou (2009) and, Watzema (2009). In the future I would like to design an epistemic task more similar to the deontic task. A possible epistemic task for a future experiment could be: In a treasure hunt game similar to the current study's

epistemic task, the rabbit arrives at the fork in the road and there is a single monster there who talks about the reasoning behind his clue. The child would be given two choices (a certain statement about which road leads to the treasure and an unsure statement) and would be asked which one would be the monster's clue. The current study was only a start into the investigation of Turkish preschoolers' ability to comprehend epistemic and deontic modalities.

CHAPTER 7

GENERAL DISCUSSION AND CONCLUSIONS

In this thesis I have tried to address the discordance between the linguistic literature on modality and the literature on language acquisition as well addressing how modality is acquired in Turkish. As mentioned in Chapters 1 and 2 the semantics of modality and typology of modal notions are very complicated and researchers have yet to agree on how to categorize modal notions. The category that supporters of even most divergent perspectives agree on is that of epistemic modality defined as the speaker's attitude toward the truth of the statement he/she is making (Lyons, 1977; Bybee, Perkins & Pagliuca, 1994; Papafragou, 2000; Palmer, 2001; Portner, 2009). The modal notions not included in the definition of epistemic modality are obligation, permission, volition, ability and evidentiality. The categorizations of these modal notions are problematic. Each researcher categorizes them according to his/her own reasons well justified within their chosen framework. In short, the literature reflects a lack of consensus regarding a categorization of modal notions in semantics and typological linguistics.

Researchers doing longitudinal studies on the acquisition of modality in English have followed the classic categorization of modality into "epistemic" and "deontic". Overall, their results have demonstrated that epistemic modality is acquired later than deontic modality. However, experimental studies on the acquisition of modality in English have not supported this developmental pattern. According to experimental studies epistemic and deontic modalities are acquired

around the same time. When inspected closely, the reason behind these two types of studies becomes apparent; they defined "deontic modality" differently. The definition of "deontic modality" adopted in the longitudinal studies comprised modal notions such as obligation, permission, volition and ability, whereas the definition used in the experimental studies was much narrower and only included obligation and permission. The narrower definition of experimental studies is in accordance with the definition in semantics where the term "deontic modality" is usually used for obligation and permission. In fact, the "classical" (as Portner (2009) labels it) way of categorizing modality is dividing it into three categories: epistemic, deontic (obligation and permission) and dynamic (volition and ability). When one reanalyzes the longitudinal studies on the acquisition of modality in English with these three categories, one sees that the developmental pattern becomes dynamic modality first and then around the same time epistemic and deontic modalities, as shown in Chapter 2. This pattern is also supported by the findings of the experimental studies.

When investigating the acquisition of modality in Turkish, I aimed to adopt a framework that would give the most detailed picture of the development of modal notions. Moreover, I wanted to use a categorization system that would be very clear in the way it defines modal categories to avoid misunderstandings. I have chosen Palmer's categorization because he proposes a four-way classification with the three types used in classical categorizations, plus evidentiality as the fourth modal category. What should be noted here is that, Palmer does not include the mood markers imperative and conditional under his four categories. I have included the

conditional under epistemic modality since a conditional statement is a speaker's attitude toward a possibility. The imperative is more controversial since it could be included under deontic modality as there may be external conditions that lead the speaker to utter an imperative or under dynamic modality because it is internal conditions that lead to the pragmatic function. I have chosen to include it under dynamic modality because I believe it denotes the speaker's wish (volition) and not a requirement (obligation) in child speech and child-directed speech.

The main purpose of the current study was to explore the emergence and subsequent development of the expression of modality in Turkish. The results of my longitudinal study have shown that the first modal category Turkish children acquired is dynamic modality. They used dynamically modalized utterances to request objects, actions and attention. Then, they acquired evidential modality for making inferences and narrating stories. The two modal categories that were acquired last were the epistemic and the deontic. However, the utterances with epistemic and deontic modalities were very scarce. Therefore, in order to get more insight into their acquisition I conducted an experimental study assessing older children's understanding of utterances expressing these notions. The results suggest that children develop an understanding of epistemic and deontic modalities around the same time, but that the pace children become competent in deontic modality is faster. The developmental pattern of dynamic first, evidential second and epistemic and deontic modalities last is similar to the developmental pattern in English, which is dynamic modality first and then epistemic and deontic modalities (Pea et al., 1982). A similar developmental pattern is followed by Italian children. They acquire

dynamic modality first, then around the same time epistemic and deontic modalities (Calleri, 1995). Greek and Korean children, on the other hand, display different developmental patterns. Similar to the developmental pattern in Turkish, English and Italian, dynamic modality is the first modal category acquired in Greek and Korean; however, the acquisition of epistemic and deontic modalities show different trajectories. In Greek epistemic modality is acquired the last (Stephany, 2011) and in Korean deontic modality is acquired the last (Lee, 2009; Choi, 1995). The differences may be due to differences in the coding of modal expressions (e.g. in Korean deontic modality is denoted with modal auxiliaries, whereas the other modal categories are denoted with obligatory sentence-ending markers) or due to the cultural differences (e.g. in some cultures it may be important for children to learn about the norms and rules that govern behavior at an earlier age than in others).

The current study also shed some light into the possible factors that may influence the acquisition of modality. For example, the longitudinal study revealed that the emergence of modal forms in child speech was related to whether the means of modal expression was morphological or lexical, to the number of functions a modal form has and to a form's frequency in child directed speech.

Morphological means of expression of modality emerged before lexical means. Dynamic and evidential modalities were the earliest categories and they were expressed only morphologically. The modal categories that emerged later - epistemic and deontic—were expressed equally with either morphological or lexical forms. This was the case in Korean (Choi, 1991) also. Both Turkish and Korean are

agglutinative languages, so early acquisition of morphological forms is not surprising considering Xanthos et al.'s study (2011) mentioned earlier. Their results showed that morphological richness in CDS and the pace of acquisition of CS were positively correlated.

The first modal forms children used were unifuncitional. When children later started using multifunctional forms, they at first used them only for a single function and subsequently in a multifunctional way. These results suggest that it is easier for children to map a form onto a single function, in line with Slobin's operating principle (1985) "one form: one meaning". The "one form: one meaning" way of thinking (i.e. mutual exclusivity) applies to various areas in child development. Not only do children learn the meanings of words this way (Markman, 1994), but also children learn functions of tools this way. When children are learning what a tool is used for, they at first assign a single function (Casler, Terziyan & Greene, 2009).

The morphological forms with highest frequencies in child directed speech emerged first in children's speech. This relationship between CDS and age of emergence in TAM morphology is seen in the case of open class words also. Hart (1991) found that the first words children acquired were the ones that were the most frequent in CDS. This relationship is controversial in the acquisition of modality literature since research on English and Greek supports it, while research on Italian and Korean oppose it. In English the first acquired modal auxiliaries were the ones most used in CDS (Wells, 1979). In Greek the frequencies of lexical means of modal expressions were analogous in children's speech and CDS (Stephany,

2011). On the other hand, in Italian the acquisition of modality of two siblings (assuming since they are raised in the same family, their input should be similar) differed from one another considerably (Calleri, 1995) and in Korean the frequencies of modal markers in CDS did not correlate with the order of emergence in children's speech (Choi, 1991). The reason for controversial findings might be the fact that this is not the only influence on the acquisition of modality and other influences might be as or more important.

The experimental study revealed that development of theory of mind skills is related to children's ability to understand modality. In the acquisition of modality literature, researchers have tried to explain the later emergence of epistemic modality in the longitudinal studies on English by its presumed relation to theory of mind. They claim that children need to develop theory of mind before they can understand notions of epistemic modality (Papafragou, 2002) . The researchers who make this claim treat dynamic notions together with deontic notions and hence look at modality bipolarly. Therefore, they fail to see that while dynamic modality is acquired early, deontic modality is actually acquired later around the same time as epistemic modality. Then the question becomes why deontic modality is acquired later with epistemic modality. The answer researchers proposed for the late acquisition of epistemic modality actually holds true for deontic modality as well. As my results show, both types of modality are related to theory of mind. Children theory of mind skills contribute to the comprehension of both epistemic and deontic modalities.

APPENDIX A

EPISTEMIC TASK

Bunny comes across a fork with three options.
Bunny: Hazine hangi yolun sonunda?
Purple Monster: Bu yol taştan yapılmış.
Green Monster: Bu yol olmalı.
Red Monster: Bu yol olabilir.

Bunny comes across a river with three bridges.
Bunny: Hazine hangi yolun sonunda?
Purple Monster: Bu yol kesinlikle.
Green Monster: Bu yol galiba.
Red Monster: Bu köprü kahverengi.

Bunny comes across a mountain with three caves.
Bunny: Hazine hangi yolun sonunda?
Purple Monster: Bu mağara solda.
Green Monster: Bu yol olabilir.
Red Monster: Bu yol olacak.

Bunny comes across a wall with three doors.
Bunny: Hazine hangi yolun sonunda?
Purple Monster: Bu yol galiba.
Green Monster: Bu yol kesinlikle.
Red Monster: Bu kapı kahverengi.

Bunny comes across a fork with three options.
Bunny: Hazine hangi yolun sonunda?
Purple Monster: Bu yol geniş.
Green Monster: Bu yol olmalı.
Red Monster: Bu yol olabilir.

Bunny comes across a mountain with three caves.
Bunny: Hazine hangi yolun sonunda?
Purple Monster: Bu yol olacak.
Green Monster: Bu mağara karanlık.
Red Monster: Bu yol olabilir.

Bunny comes across a river with three bridges.
Bunny: Hazine hangi yolun sonunda?
Purple Monster: Bu köprü kahtadan yapılmış.

Green Monster: Bu kesinlikle.
Red Monster: Bu yol galiba.

Bunny comes across a wall with three doors.
Bunny: Hazine hangi yolun sonunda?
Purple Monster: Bu yol olmalı.
Green Monster: Bu yol olabilir.
Red Monster: Bu kapı geniş.

Bunny comes across a fork with three options.
Bunny: Hazine hangi yolun sonunda?
Purple Monster: Bu yol olabilir.
Green Monster: Bu yol taştan yapılmış.
Red Monster: Bu yol olacak.

APPENDIX B

DEONTIC TASK

Chapter 1

Video:
Mother: Oğlum sabah oldu. Kalkma vaktin geldi! Bugün bğyğk bir gün var önümüzde. Unuttun mu bugün lunapark günü!!

The forced choice: izin vermek vs gerekmek
Mother: Kalkmana izin veriyorum vs Kalkman gerekiyor

Chapter 2

Video:
Mother: Poff çok kötü kokuyorsun. En son ne zaman yıkandın?
Son: Bilmem.
Mother: Böyle kokarken götürmem seni lunaparka. Hemen

The forced choice: *-Abil* vs *-AcAk*
Mother: Yıkanabilirsin vs Yıkanacaksın

Chapter 3

Video:
Mother: Bak abin yıkanıyor. Sen daha dün yıkandın. Ama saçın ıslakken daha rahat örülüyor. Eğer istersen…

The forced choice: *-Abil* vs *-AcAk*
Mother: Yıkanabilirsin vs Yıkanacaksın

Chapter 4

Video:
Daughter: Yok istemiyorum.
Mother: Tamam nasıl istersen. Aaa, daha balığına yem vermemişsin.. Zavallıcık çok acıkmıştır. Hemen ona…
The forced choice: *-Abil* vs *-mAlI*
Mother: Yem verebilirsin vs Yem vermelisin

Chapter 5

Video:
Son: Anne biraz televizyon seyretmek için vaktimiz var mı?
Mother: Evet.

The forced choice: *-Abil* vs *-mAlI*
Mother: Televizyon seyredebilirsin vs Televizyon seyretmelisin

Chapter 6

Video:
Daughter: Abi sen televizyon seyrederken ben oyuncaklarınla oynasam olur mu?
Son: Tabi. Oyuncaklarımla…

The forced choice: izin vermek vs gerekmek
Son: Oynamana izin veriyorum vs Oynaman gerekiyor

Chapter 7

Video:
Mother: Anneciğim ilaç alma vaktin gelmiş.

The forced choice: izin vermek vs gerekmek
Mother: İlaçlarını almana izin veriyorum vs İlaçlarını alman gerekiyor

Chapter 8

Video:
Mother: Hadi gidiyoruz. . Televizyonu kapatın. Oyuncakları kaldırın.

The forced choice: *-Abil* vs *-AcAk*
Mother: Ayakkabılarınızı giyebilirsiniz vs. Ayakkabılarınızı giyeceksiniz

Chapter 9

Video:
Grandma: Çocuklar hava çok soğuk. Bakın annenizle ben ne güzel paltolarımızı giydik. Haydi şimdi sıra sizde.

The forced choice: *-Abil* vs *-mAlI*
Grandma: Paltonuzu giyebilirsiniz vs Paltonuzu giymelisiniz

Chapter 10

Video: Family goes to the amusement park. The end.

APPENDIX C

THEORY OF MIND TEST

Diverse Desires (Farklı İstekler)

(Üzerinde yetişkin bir adam, havuç ve kurabiye resimleri olan bir kâğıt)
Ön Test Sorusu
E: Bak burada Ali amca var. Ali amca hafif bir şeyler yemek istiyor. Burada iki çeşit yiyecek var: havuç ve kurabiye. Sen hangi yiyeceği yemek istersin? Havucu mu yoksa kurabiyeyi mi tercih edersin? (own desire question)
C:
Eğer çocuk havucu tercih ederse…
E: Çok güzel bir seçim ama Ali amca kurabiye istiyor. Havuçları sevmiyor. En çok kurabiyeleri seviyor.
*Eğer çocuk kurabiyeyi tercih ederse tam tersine Ali amcanın havuç istediği söyle**necek.***
Test Sorusu 1
E: O zaman şimdi yemek yeme vakti. Ali amca yiyeceklerden sadece birini alabilecek. Ali amca hangi yiyeceği isterdi? Havucu mu yoksa kurabiyeyi mi?
C:
Çocuğun bu soruya verdiği cevabın doğru olarak kabul edilebilmesi için kendi tercihinin tam tersini söylemesi gerekiyor.

Diverse Beliefs (Farklı İnançlar)

(Üzerinde kız çocuk, çalılıklar ve garaj resmi olan bir kağıt)
E: Bak bu Ayşe. Ayşe kedisini arıyor. Kedisi ya çalılıkların arasında ya da garajda saklanıyor olabilir. Sence kedi nerede? Çalılıkların arasında mı yoksa garajda mı? (own belief question)
C:
Eğer çocuk çalılıklar derse…
E: Evet, bu iyi bir fikir. Ama Ayşe kedisinin garajda olduğunu sanıyor.
Ya da eğer çocuk garaj derse, o zaman Ayşe'nin kedisinin çalılıklarda olduğunu sandığı söylenecek.
Test Sorusu 1
E: Öyleyse Ayşe kedisi için nereye bakacak? Çalılıklara mı yoksa garaja mı?
C:
Çocuğun bu soruya verdiği cevabın doğru olarak kabul edilebilmesi için kendi inancının tam tersini söylemesi gerekiyor.

Knowledge Access (Bilgiye Erişim)

(Üzerinde ne kutusu olduğuna dair hiçbir işaret bulunmayan bir kutu ve içine yerleştirilen bir oyuncak timsah)
(O ana kadar odada olan araştırmacının yardımcısı işi olduğunu söyleyerek dışarı çıkar)
E: Bak burada bir kutu var. Sence bu kutunun içinde ne var?
C:
(Çocuk bilmediğine dair herhangi bir cevap verebilir)
Daha sonra kutu açılır ve çocuğa kutunun içinde ne olduğu gösterilir.
E: Bakalım ne varmış… Aa kutunun içinde oyuncak bir timsah varmış.
(Kutu tekrar kapatılır)
E: Tamam, ne vardı kutunun içinde?
C:
Test Sorusu 1
E: … abla kutunun içinde ne olduğunu hiç görmedi. Şimdi …abla geliyor. … abla kutunun içinde ne olduğunu biliyor mu? (the target question)
C:
Test Sorusu 2
E: … abla kutunun içinde ne olduğunu gördü mü? (the memory question)
C:
(Daha sonra araştırmacının yardımcısı odaya girer ve aynı sorular ona da sorulur)
Doğru cevap 1: Hayır
Doğru cevap 2: Hayır

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