The Relation between Working Memory and Language Development in 21- to 36-month-old Native Learners of Turkish

by

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A Thesis Submitted to the

Graduate School of Social Science

in Partial Fulfillment of the Requirements for

the Degree of

Master of Arts

in

Developmental Psychology

Koç University

January 2012

Koç University

Graduate School of Social Sciences

This is to certify that I have examined this copy of a master's thesis by

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STATEMENT OF AUTHORSHIP

This thesis contains no material which has been accepted for any award or any other degree or diploma in any university or other institution. It is affirmed by the candidate that, to the best of her knowledge, the thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

Signed Elda Asael Feldman

Abstract

The aim of this study was to explore the relation between directly assessed working memory (WM) skills and caregiver reports of language development in 21- to 36-month-old Turkish speaking infants and toddlers. It was examined whether two subcomponents of language competence, i.e., vocabulary size and morphosyntactic knowledge, are related to verbal and nonverbal WM skills was examined. Language development was assessed through a parental report inventory, the Turkish Communicative Development Inventory, *Türkçe İletişim Davranışları Gelişimi Envanteri (TİGE)*. TİGE was administered along with a demographic information questionnaire incorporating the HOME scale. Nonverbal WM performance was measured through The Imitation Sorting Task (IST), an imitation game in which the child is asked to sort objects with an increasing quantity by following the sorting modeled by the experimenter. The verbal WM performance was measured through a non-word repetition task (NWR) developed by taking into account the native syllable structure of Turkish. The participants were 92 Turkish speaking young children, living in İstanbul, coming from middle-high to high SES families. The results showed that the two WM tasks were correlated. The verbal working memory measured by the NWR task predicted both vocabulary size and mean length of utterances (MLUs), whereas nonverbal working memory measured by the IST was not a significant predictor of any of the linguistic skills. Both WM tasks were positively correlated with morphosyntactic development, but only the NWR Task predicted it. Children who used multiple morphemes combinatorially scored higher in the IST and NWR Task compared to children who used only one morpheme or did not use any morphemes at all. Although verbal working memory performance has a clearer association with verbal competence in young children, the sorting task performance is also implicated as an additional capacity needed for higher combinatorial ability in children learning a morphologically complex language.

Keywords: language development, vocabulary size, morphosyntactic development, verbal working memory, non-verbal working memory

ÖZET

Bu araştırmanın amacı 21-36 ay arası Türkçe konuşan çocukların doğrudan ölçülen akılda tutma becerileri ile ebeveyn tarafından bildirilen dil gelişimleri arasındaki ilişkiyi incelemektir. Dil gelişimin iki altbileşeni olan kelime dağarcığı ve dilbilgisinin, sözel ve sözel olmayan işler bellek ile ilişkili olup olmadığı araştırılmıştır. Dil gelişimi, çocuğun annesi tarafından doldurulan Türkçe İletişim Davranışları Gelişimi Envanteri (TİGE) ile ölçülmüştür. TİGE, HOME ölçeğini içeren demografik bilgi formu ile birlikte verilmiştir. Sözel olmayan işler bellek, çocuğun araştırmacının oyuncakları nasıl ayırdığını takip edip, aynısını yapmasının beklendiği Taklit Ederek Sınıflandırma Testi ile ölçülmüştür. Sözel işler bellek, Türkçe dilinin hece yapısı göz önünde bulundurularak hazırlanmış olan Anlamsız Sözcük Tekrarlama Görevi ile değerlendirilmiştir. Araştırmaya orta ve yüksek sosyoekonomik düzeyli ailelerden gelen, 92 Türkçe öğrenen çocuk katılmıştır. Sonuçlar, iki işler bellek görevlerinin birbirleri ile ilişkili olduğunu göstermiştir. Anlamsız Sözcük Tekrarlama Görevi ile ölçülen sözel işler bellek kelime dağarcığını ve ortalama sözce uzunluğunu anlamlı bir şekilde belirlerken, Taklit Ederek Sınıflandırma Testi ile ölçülen sözel olmayan işler belleğin bu iki değişken üzerinde etkisi bulunmamıştır. Her iki işler bellek görevi dilbilgisi gelişimi ile pozitif ilişkili olmalarına rağmen, sadece sözel işler bellek dilbilgisi gelişimini anlamlı bir şekilde yordamıştır. Çoklu ek kullanan çocukların, tek ek kullanan veya hiç ek kullanmayan çocuklara göre, Taklit Ederek Sınıflandırma Görevi ve Anlamız Sözcük Tekrarlama Görevi'nde daha yüksek puan aldıkları tespit edilmiştir. Çocuklarda sözel beceriler ile sözel işler bellek becerilerinin daha belirgin bir ilişkisi olmasına rağmen, sınıflandırma becerileri Türkçe gibi biçimbirimleri ekleyerek karmaşık dilbilgisi yapılarını oluşturan bir dilde ekleri birlikte kullanabilme becerisi için ek bir kapasite olarak ortaya çıkmıştır.

Anahtar kelimeler: dil gelişimi, kelime dağarcığı, dilbilgisi, işler bellek, sözel işler bellek, sözel olmayan işler bellek

DEDICATION

“to my family”

ACKNOWLEDGMENTS

I am grateful to my advisor Prof. Aylin Küntay who stimulated my interest in children's development since the first course I have taken from her. It was a great pleasure to have her as my advisor during this thesis. She provided me with her support and guidance through out this learning experience.

I am thankful to my committee members Prof. Ercan Alp and Prof. Ayhan Aksu-Koç who were always available with their support and contributions and Prof. Sami Gülgöz for his valuable comments. I would like to thank Prof. Nalan Babür for sharing her work with me.

I would also like to thank Sinem Olcay who helped me reach the families and Elçin Özkarakaş who helped me during the collection and coding of the data.

Lastly, I am thankful to all the children and their families who participated in this study, provided me the data and made this thesis possible.

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Chapter 1

INTRODUCTION

Although most children acquire language without any problems, the rate at which expressive language skills develops varies significantly among children at the same chronological age. One reason for these individual differences might lie in children's cognitive capacities and skills. For example, recent explanations of the deficit in language development of children with "specific language impairment" (SLI) refer to problems in more general cognitive capacities such as processing speed and memory skills rather than to a language-specific impairment (Gathercole & Baddeley, 1990). This study aims to explore whether relatively poorer ability in early language development of typically developing children is related to poorer working memory (WM) performance. Specifically, it will be examined if vocabulary size and morphosyntactic development are differentially related to different aspects of WM such as the verbal and the nonverbal components. In the following, different theoretical models of WM are laid out before the presentation of previous studies where the relation between WM and language acquisition is investigated.

Chapter 2

THEORETICAL BACKGROUND

2.1 Models of Working Memory

The definition of WM has been a source of disagreement among researchers. According to Cowan's definition (1999), WM is a collection of mental mechanisms that serve to temporarily hold information accessible to allow thinking. Engle, Tuholski, Laughlin, and Conway (1999) differentiate between WM and short-term memory (STM) by defining WM as an active, attention related part of temporary memory and considering STM as a passive part. WM is distinguished from STM and long-term memory (LTM) because its capacity is beyond holding information, allowing the individual to execute cognitive operations. Additionally STM and LTM are both considered as unitary components of the mind whereas WM is evidenced to consist of several components (Baddeley & Hitch, 1974).

There are several models proposed to explain the components of WM. In the first model (see Figure 1), Broadbent (1958) proposed two types of memory: a sensory memory and a central processing unit. The sensory memory receives sensory experience in all forms at once, but can not maintain the information for long. The central processing unit is limited in capacity and can maintain only a small portion of information. These two types of temporary memory contribute to a LTM which feed back to lower levels of memory by helping to encode and interpret information.

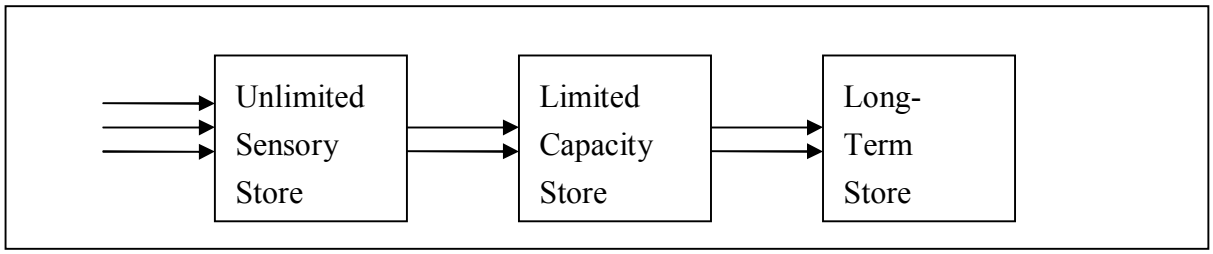

Figure 1. Modal Model (Broadbent, 1958)

In the model proposed by Baddeley and Hitch (1974), WM consists of three components (see Figure 2). The central executive component, the most important one, is responsible for manipulating and processing information. It regulates the flow of information within the WM and retrieves information from other memory systems such as LTM. The central executive component uses processing resources to perform these functions. However, these processing resources are limited in capacity. The efficiency of the central executive depends on the amount of simultaneous demands placed on it. In other words, holding one piece of information reduces the capacity of the WM to hold and manipulate another piece of information (Baddeley & Hitch, 1974).

There are two additional components, called "slave systems" that supplement the central executive component. These are the phonological loop and the visuospatial sketchpad. Each system is specialized to process and hold information belonging to the relevant domain. The phonological loop is responsible for verbally coded information, whereas the visuospatial sketchpad regulates the processing and maintenance of information with a visual or spatial component (Baddeley & Hitch, 1974).

The material coded phonologically will decay with time from the phonological store unless an articulatory rehearsal is carried out. The rehearsal process can also be used in the encoding of nonphonological materials such as printed words or pictures by recoding them into their phonological form. The maintenance of material in the phonological loop is influenced by articulatory suppression (where subjects are prevented from rehearsing the

target word and asked to repeat the word "the"), word length, phonological similarity of presented words, and irrelevant speech (where people are asked to say something irrelevant) (Baddeley & Hitch, 1974).

The visuospatial sketchpad is responsible for the processing and storage of visual and spatial information as well as verbal material that is encoded in the form of imagery. For instance, when the name of an object is presented, the information is encoded phonologically. However, if the object is visualized and transformed from a sound based code to a visual based code, the visuospatial sketchpad will be responsible for encoding that information.

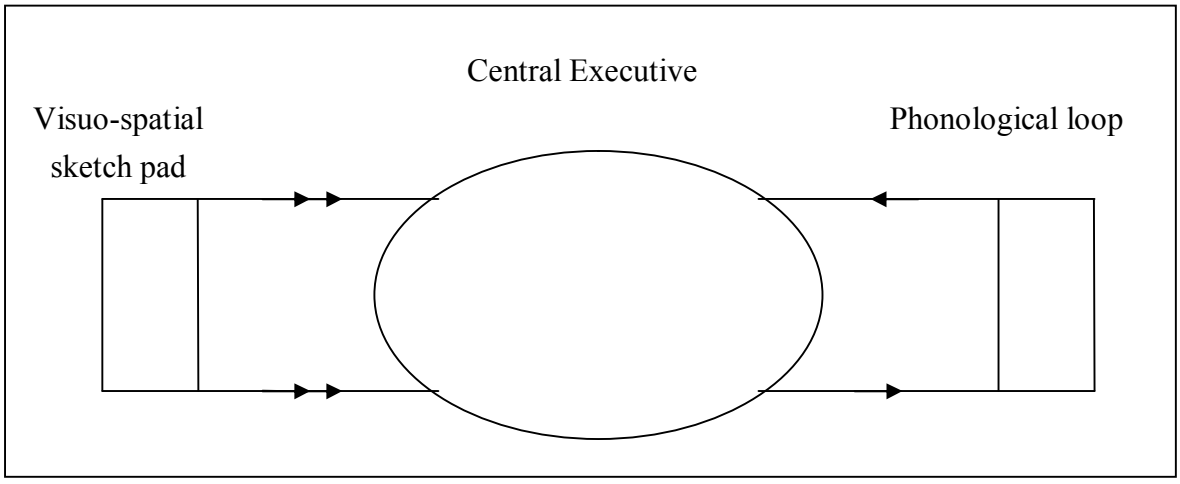

Figure 2. Working memory model of Baddeley and Hitch (1974).

In his most recent theorizing, Baddeley (2000) proposed a more general type of memory storage called the episodic buffer, for the storage of more abstract ideas that are neither phonological nor visuospatial (see Figure 3). It is an active system controlled by the central executive that works as a link between the two subsystems of WM. The episodic buffer is assumed to connect these subsystems with information coming from LTM and with new information.

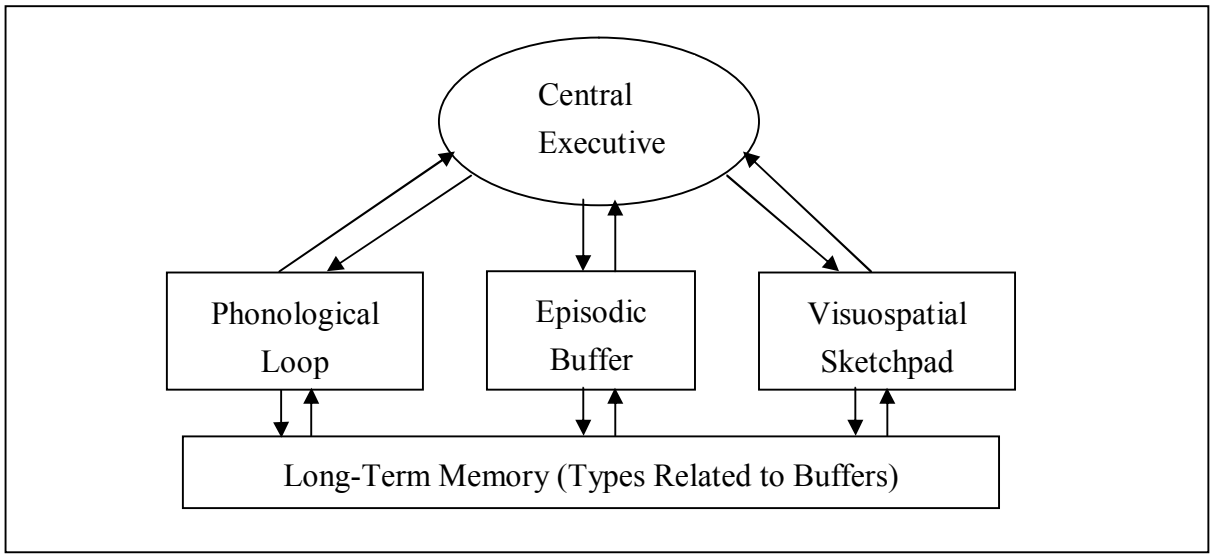

Figure 3. The revised working memory model (Baddeley, 2000).

Cowan (1988) proposed a different model for WM by suggesting a general processing system and emphasizing the role of attention processes in storage. Accordingly, all the incoming information influences the processing system and activates parts of the LTM. Additional to the activated parts of LTM, a subset of that activated memory is in the focus of attention which can maintain 3 to 5 chunks of information (Cowan, 2001, 2005). Engle et al. (1999) called the activated memory as "short-term memory" and the focus of attention as "WM". In contrast to Baddeley and Hitch' multicomponent model of WM, in Cowan's model, WM is a part of LTM, and not a separate system.

More recent research focuses on attentional abilities and basic memory skills for explaining individual differences in the WM capacity. Cowan and colleagues (2006) argue that the important component of WM is the size of the focus of attention which determines the number of items that can be held, and act as a storage component.

Based on the attention control theory of WM capacity, attentional control abilities are the main factor for individual differences in WM capacity and underlying reason why WM capacity is able to predict performance on many tasks such as of fluid intelligence and

academic aptitude (Kane, Conway, Hambrick & Engle, 2007). This view corresponds to Baddeley's central executive component which is responsible for manipulating and processing information, but not for storing.

To understand what WM is capable of doing, we need to consider its limits. WM is capable of holding the information accessible to manipulation. This capacity is limited to a number of ideas at a time and a limited time per idea. The goal of an action has to be kept in WM in order to successfully manipulate the information and achieve the goal. WM mechanisms are limited in time, space and energy.

2.1.1 Time-related limits

Once a piece of information is in WM, it stays active or accessible for a short period of time. In order to hold the information active, one must use rehearsal strategies such as saying it to oneself or constantly paying attention to it. If the information is not attended anymore, it will decay from WM and become inaccessible for further cognitive operations (Courage & Cowan, 2008).

2.1.2 Space-related limits

The memory can not encode and hold large amounts of new information. WM is limited to a number of units of information to be held active temporarily. How much information WM can hold depends on the amount of information carried by each item. Miller (1956) suggested that adults are able to remember a list of seven items.

However, the limitation persists if these seven items to be remembered are richer and more complex than single units of letters or digits. Miller (1956) proposed that by grouping individual items together, we can create chunks, units of information that can hold elaborate information. Chunking the information will reduce a list of seven items into 3-4 chunks that

will be easier to remember, thus overcome this limitation.

2.1.3 Energy-related limits

Information does not pass through the WM automatically. Depending on the goal, a person has to put relevant information to be held in the WM while removing the irrelevant items. In order to do such sorting, attention is required. The energy-related limit of WM is the control of attention. The control of attention requires selecting relevant piece of information and suppressing conflicting messages. For example, we need to keep in mind why we entered into a room or what we are going to say when it is our turn. Low-span individuals may be the ones who do not spend necessary energy to control attention (Courage & Cowan, 2008).

Besides the limits that were mentioned above, there are other factors that influence the performance of WM on a task. If the material tested is familiar to the individual, it is easier to hold and manipulate that information (Chi, 1978). Additionally, the use of mnemonic strategies, such as rehearsal or chunking, can influence the performance of WM.

2.2 Factors influencing the performance of working memory

Although WM improves gradually with the normal course of development, there are some underlying mechanisms that help children to become more efficient in tasks that require the use of WM. These mechanisms are in line with factors that influence WM capacity. The following section provides information about the mechanisms that were found to influence the WM capacity of children.

Landauer (1962) proposed that articulation rate and recall performance are associated. In a memory span task, individuals are required to recall as many words as they can without errors. In this task, WM is responsible for holding and pronouncing the newly heard words with the help of the phonological loop. One factor that increases the recall of the words is

rehearsal. As the word list builds up, the person becomes unable to rehearse all the words. If the phonological memory trace is not refreshed by rehearsal, words decay from the memory. The assumption that individuals could remember a list of as many words as they could pronounce in two seconds explains the performance of younger infants who speak more slowly and thus, recall fewer words than older children and adults. Therefore, the articulation rate becomes the determining factor for the number of words to be recalled from the list.

Results from another study showed evidence for a similar relation between articulation rate and recall (Hulme, Thompson, Muir & Lawrence, 1984). Three groups of children aged 4, 7 and 10 were tested for serial recall abilities. Each subject in the study heard lists of words that contained either one syllable or three syllables and they were asked to recall immediately in the same order. The articulation rates and the number of words recalled from the list were determined. The results indicated that these two variables were strongly correlated. Articulation rates were faster for older children than the younger groups of children. The recall rates showed that the memory performance of older children were better than the younger children. Thus, the results suggest a strong relation between articulatory rates and recall rate as age increases.

The cognitive resources for storage and operating are important mechanisms that increase the performance of WM. The capacity of WM is limited to a certain number of units. This capacity for holding items in mind increases with maturation from 2 items held in memory in the elementary school years to an average of 4 items in adulthood (ranging from 2 to 6 in adults) (Cowan et al, 2005). According to Case, Kurland and Goldberg (1982), older children are more efficient in encoding new information. When children grow up, as they are constantly exposed to new input, the nature of the incoming information becomes less unfamiliar over the years. For that reason, the processing demands become fewer and they need less processing space for intellectual operations. As a result, older children and adults

have more space for storage to hold more information compared to younger children. Thus, the relation between the operation and storage of the new information determines the performance of the WM.

The control of attention is another essential factor that influences the performance of WM. For instance, one has to persistently attend to the goal while manipulating the relevant information and inhibiting the irrelevant information in order to achieve his/her goal. As children grow up, the ability to control attention shows a developmental improvement as well. However, children with low WM capacity have problems in focusing their attention. In a recent study (Gathercole et al. 2008) conducted with elementary school children between the ages of 5 to 10, it was found that children with low WM scores obtained lower score for attentional abilities. The inability to focus attention on the incoming information results in the deficiency in the processing and the maintaining of the input. Thus, there is a reciprocal relation between the WM capacity and ability to control attention.

Studies conducted with adults showed the same pattern for the relation between attentional abilities and WM performance. Conway et al. (2001) showed that adults with higher WM spans were better in ignoring an irrelevant channel in selective listening compared to those with poorer WM spans. Similarly, Kane and Engle (2003) found that adults with better WM abilities were able to avoid naming the irrelevant color word in the Stroop task. The relation between the ability to control attention and WM capacity were found to be persistent in adulthood as well.

Other factors that are not part of WM may help the memory performance of children significantly. These factors are knowledge and strategies. Knowledge may facilitate children's processing speed. 10-year-old children were found to be better in a memory span task with words rather than non-words compared to 6-year-old children (Roodenrys, Hume, & Brown, 1993). The finding suggests that as lexical knowledge increases, the load on WM decreases.

As they grow, children learn how to develop strategies in later childhood such as verbal rehearsal and sorting items into semantically similar categories, consequently becoming better in recalling these items.

Working memory capacity relates to other cognitive mechanisms that help to improve its efficiency. Research has shown that articulation rate, familiarity, control of attention, knowledge and strategies are essential in determining the performance of the working memory capacity. In the following section, a review of past work about the relationship between language development and WM performance will be presented, as this is the most relevant literature to this thesis.

Chapter 3

LITERATURE REVIEW

3.1 Language development and working memory

One of the important achievements in infant development is the acquisition of language. Children seem to acquire language effortlessly as part of their natural development. Despite this effortless and natural development, vocabulary skills of young children may vary significantly (Fenson et al., 1993). Various factors such as mother's level of education (e.g., Dollaghan et al., 1999), history of a speech/language delay in the family (e.g., Bishop, Price, Dale, & Plomin, 2003), and socio-emotional development (e.g., Bornstein et al., 1998) have been shown to influence child vocabulary development.

Another factor influencing children's vocabulary development is the cognitive resources children use in processing language. Studies have used the non-word repetition (NWR) task to measure the phonological working memory (PWM) of children. The NWR Task requires the child to imitate nonsense words comprised of different lengths (i.e., number of syllables) (Gathercole & Baddeley, 1989). Stokes and Klee (2009) conducted a study in which they aimed to explore the factors that influence vocabulary development in two-year old children. They tested 232 children between 24 and 30 months on expressive and receptive vocabulary using the British adaptation of MacArthur-Bates CDI along with a demographic questionnaire and a questionnaire on the child's social-emotional status. They also tested children on their nonverbal cognitive development, word learning and WM skills. The Visual Reception scale of the Mullen Scales of Early Learning (MSEL VRO) was administered as a measure of nonverbal cognitive development. The Expressive and Receptive One-Word

Picture Vocabulary Test were used to measure word learning. The NWR Task was administered for measuring WM skills. The result showed that MSEL VRO and vocabulary skills were moderately correlated, but WM was a strong predictor of vocabulary skills.

Adams and Gathercole (1996) found that phonological memory abilities were associated with differences in the expressive language abilities of 4- and 5- year-old children. Children were read "The Bus Story" and shown pictures depicting the components of the story. Then, the child was asked to tell the story to the examiner with the help of the pictures. Researchers recorded children's utterances and their sentence length was calculated. They selected the five longest sentences and calculate the mean length in words of these sentences. The results showed that children's scores on memory span and the non-word repetition (NWR) task were associated with the mean length of utterance used in their narratives of the Bus Story. For 3-year-old children, phonological memory skills were related to their productive vocabulary and length of their utterances in terms of mean number of grammatical morphemes (Adams & Gathercole, 1995). The speech production abilities of these children were evaluated on the basis of vocabulary diversity, the mean length of utterances and syntactic complexity in their spontaneous speech during a structured play session. Children with good phonological memory abilities, assessed through the NWR Task and memory span for digits, produced language with more grammatically complex structure, richer vocabulary size and longer utterances than children who had poorer phonological memory abilities. In another study, Adams and Gathercole (2000) showed a relationship between NWR and vocabulary skills in children above the age of four. They found that 4-year-old children who have better phonological memory abilities on the NWR produced a greater number of words and longer utterances than the children with poorer non-word repetition skills. Similarly, Blake et al. (1994) found a relationship between verbal memory span for words and mean length of utterance (MLU) of the spontaneous speech of 3-year-old children.

As language understanding and language production depend heavily on the ability to use cognitive capacity for incoming information, the role of processing speed is of interest to understand the vocabulary development of children. Gathercole and Baddeley (1993) found a correlation between PWM and vocabulary development in preschool children. Limitations of the WM capacity create individual differences in processing speed of new information, thus in acquisition of new words. Faster processing of novel phonological information facilitates the acquisition and the production of new words. Fernald and Marchman (2006) conducted a longitudinal study to explore the relation between speech processing efficiency and vocabulary growth in 2-year-old children. They observed 59 English-learning children at 15, 18, 21 and 25 months. In a looking preference study, they recorded the time course of eye movements of children in response to the spoken label of one of the four pictures which were shown. The results showed that speed and accuracy in spoken word recognition at 25 months were correlated with lexical and grammatical development from 12 to 25 months. Moreover, children who were faster to comprehend words at 25 months showed accelerated growth in expressive language abilities across the second year.

In another study, Marchman and Fernald (2008) examined the relation between vocabulary size at 2 years and expressive language abilities and WM measures later in subsequent years. The vocabulary size at 25 months was assessed through the number of words reported on MacArthur-Bates Communicative Development Inventory. At 8 years, children's language skills were assessed based on their performance on expressive vocabulary, formulating and recalling sentences and word structure. The WM measure at 8 years included a digit span task and a word order task. The digit span task required the child to repeat increasingly longer sequences of digits. In the Word Order task, the child was asked to point to pictures in the same order the experimenter named them. The results of the study showed that vocabulary size at 25 months was strongly related to linguistic and cognitive

skills at 8 years. This study suggests that early language skills are a predictor of later achievements in linguistic abilities and efficiency in information processing.

In a similar study, Hurtado, Marchman, and Fernald (2008) investigated whether maternal talk predicted processing speed and vocabulary size in Spanish-speaking children of 18 months. The results suggested mutual relations between maternal input, vocabulary size and processing speed. They showed evidence that the amount of input the caregiver provides influences child's processing speed efficiency and vocabulary growth. Additionally, children with greater vocabulary size had an advantage in their uptake of new information from input compared to children with poorer vocabulary size.

Pascual-Leone (2000) proposed that there are age-related changes in memory capacity of children, called M-space, M representing the child's cognitive capacity. More specifically, M-space is the number of items one can hold in STM. The mental capacity is expressed as $M = a + k$, a representing a constant shared by all children, and k standing for the variable that changes with increasing age. M-space is assessed through WM tasks such as name retrieval, visual search, and counting tasks. According to Pascual-Leone, M-space determines the number of separate concepts a child can manipulate simultaneously, because it reflects the amount of space for cognitive processing. As a is presumed to be identical for all children, k is the factor to estimate M. k represents the number of things that a child can hold and operate on.

Most of the research on the relation between WM and language development, focus on the verbal WM abilities of children. Based on Pascual-Leone's view, Viterbori, Alp, Scopesi, Zanobini, and Usai (unpublished data) conducted a study to investigate the relation between the nonverbal WM skills and language development of children. Twelve normally developing and twelve language delayed 28-month-old Italian speaking children participated in the study. In The Imitation Sorting Task (IST) (Alp, 1994) was used to measure the nonverbal WM

skills, where children were asked to sort the objects into two canisters preceeded by experimenter's demonstrations. The Italian version of the McArthur Communicative Development Inventory was used (Camaioni, Caselli, Longobardi, & Volterra, 1991) for measuring expressive vocabulary, morphological development and syntactic development. The results showed that children who were delayed in morphological development had a lower score on IST than children with better morphological skills. This finding suggests a positive association between nonverbal WM skills and morphosyntactic development.

Other studies that are conducted to understand the effects of WM on language development involve children with specific language impairment (SLI) or hearing impairment (HI). Hansson, Forsberg, Löfqvist, Maki-Torkko and Sahlén (2004) conducted a study to investigate the role of phonological STM and WM in a novel word learning task in children who were diagnosed with SLI in preschool, children diagnosed with HI in primary school age and children with normal language development. The WM capacity was assessed through the NWR Task or the non-word discrimination task (in which children had to decide whether the two non-words they hear are the same or different). The development of language was assessed in terms of lexical ability, language comprehension, literacy, and reading speed. The results confirmed the hypothesis that the performance of children with HI was better than children who have been diagnosed with SLI in preschool. Another study examined the relation between WM and language comprehension in children diagnosed with SLI. Thirteen children with SLI and 13 age-matched children with typical language development completed the NWR Task, sentence comprehension and syntactic complexity tasks. The results showed that children with SLI had larger processing and attentional capacity limitations compared to their peers as they performed more poorly in all WM tasks (Marton & Shwartz, 2003)

Archibald and Gathercole (2007) conducted a study in which 42 children, 14 school-age children with SLI, and two groups of typically developing children matched either for age

or language abilities were administered a set of complex memory tasks that measure verbal and visuospatial storage and processing efficiency. The findings showed that children with SLI were slower and less accurate when processing verbal and visuospatial information than age-matched children. In addition, children with SLI displayed poorer performance on complex memory tasks compared to both typically developing control groups. In a similar study, Bavin (2005) examined whether children with SLI differ from age-matched typical developing children in performance on a set of spatio-visual memory tasks. Children with SLI were less accurate in recalling patterns and less able in associating a pattern with a location compared to typical children.

In summary, studies of children with typical and impaired language development both suggest that WM capacity plays a crucial role in the development of expressive language and general verbal skills. In the following section, the aim of the present study and the hypotheses are presented.

Chapter 4

PRESENT STUDY

4.1 Aim of the study

In the light of the background literature, the present study aims to investigate the relation between different components of language development, vocabulary size and morphosyntactic development, and different components of WM, verbal and nonverbal. This study intends to determine whether young children (21 to 35 month olds) with a larger vocabulary size and more morphosyntactic knowledge are better in working memory tasks, a nonverbal WM task (IST) and a verbal WM task (NWR). In other words, we will examine whether working memory performance is differentially related to subcomponents of language development.

More specifically, a measure of verbal WM capacity, the NWR Task is expected to predict vocabulary size, morphosyntactic knowledge, and the mean length of utterances. As an exploratory question, it will be analysed whether IST, as a measure of nonverbal WM capacity, is a predictor of vocabulary size, morphosyntactic knowledge, and the mean length of utterances as well. Based on Pascual-Leone's proposition for M-space and previous researches on working memory and language development, both verbal and nonverbal WM capacity demands are expected to be involved in learning morphological paradigms such as alternations of word stems (e.g. *al*) into their different morphological forms (e.g. *al-dı*, *al-dın-mı*) with added meanings. Similarly, both of the WM measures are expected to predict children's scores on complex word forms such as using multiple morphemes combinatorially (e.g. *baba-m-ın*). That is, acquisition and use of more complex structures is presumed to require progressively larger WM capacity. Adams and Gathercole (1995) showed that 3-year

old children with good phonological memory ability had longer, more grammatically complex production of language with a richer array of words.

4.2.1 Research questions

1. In the WM model proposed by Baddeley and Hitch (1974), phonological loop and visuospatial sketchpad are specialized to process and hold information belonging to the relevant domain. However, there is a flow of information from one component to the other by transforming the incoming information into their either phonological or visual form. Accordingly, the two WM tasks, the Imitation Sorting Task and NWR task, were expected to yield scores that are correlated.
2. The ability to learn and produce new words requires cognitive resources. The phonological component of working memory has a crucial role in the acquisition of new vocabulary (Gathercole & Baddeley, 1989). Children who are better in phonological cognitive resources are expected to have a large vocabulary size. Accordingly, the NWR Task was expected to predict vocabulary size of children. Word learning is not only acquired by phonological input. Children are also exposed to visual object or action meaning of the word accompanied by the sound (at least for physically present referents), where they use their visual capacity. Therefore, it will be explored whether children who score high in the IST, a measure of nonverbal WM, have larger vocabulary size compared to children who score low on this task.
3. In order to communicate properly, children have to learn the grammatical rules of combining morphemes into words and words into grammatically correct sentences. Children learn this skill by following how people use these combinations. They need to process and store the information in the phonological form in order to be able to reproduce them. Therefore, the NWR Task, as a measure of verbal WM skills is expected to predict children's morphosyntactic knowledge (i.e. scores obtained from

Part II of TİGE-II: Sentences and Grammar). IST requires the child to follow the grouping of the toys that are sorted. While watching the demonstration, children have to keep multiple items in their mind in the context of goal directed action. It will be explored whether IST, as a measure of nonverbal WM skills, will predict children's morphosyntactic knowledge.

4. As children's knowledge of vocabulary and grammatical rules increases, the complexity of their spoken language will increase and they will start to use multiple-word sentences with attached meanings. Children learn the grammatical rules of a language by processing and storing adults' spoken language. Previous studies showed that verbal WM skills are influential in children's processing and maintaining of new information (Adams & Gathercole, 1995, 2000, Blake et al. 1994). Therefore, the NWR Task, as a measure of verbal WM skills, is expected to predict the mean length of utterances. As language is mostly used in conjunction with events that go along, Nonverbal WM skills are used to collect information about the non-verbal input while establishing a link between the phonological form and its visual demonstration (i.e. hearing about "picking up the toy from the floor" while seeing the actual behavior). As an exploratory question, it will be analyzed whether IST, as a measure of nonverbal WM skills, predicts the mean length of utterances.
5. Verbal WM skills were found to be associated with more complicated speech (Adams & Gathercole, 1995). Therefore, it is expected that children who started to use more multiple morphemes combinatorially are expected to score high in the NWR Task. Additionally, as the IST requires the child to keep in mind many items at a time, it will be explored whether children who use multiple morphemes combinatorially have higher IST scores compared to children who use only one morpheme at a time or do not yet use any morphemes at all.

Chapter 5

METHOD

5.1 Recruitment

To recruit child participants, several preschools were contacted via phone. Once the preschool administration accepted to participate in the study, parents of the attending children were informed about the aims and the procedure of the study through a letter, sent along with an application letter. Because the response rate from the preschools was rather low, the announcement of the study (See Appendix A) has also been published in mother-child forums on the internet. Some parents who participated in the study often named their acquaintances who they thought would volunteer as well. Application forms (See Appendix B) were sent and from those who sign up for the study, a participant pool was created. Parents with lower education level than high school were eliminated from the participant pool to ensure a relatively homogeneous sample to those samples where IST has been administered before. There were also few bilingual children in the application list. Their mothers were contacted and asked about the frequently used language at home between the caregiver and the child. Six children were eliminated from the participant pool because their mothers reported that their children were exposed to Turkish less frequently than the other language. Children who were taught few words and songs in a second language were allowed to participate in the study. Once the participant pool was ready, and the children reached the desired age, parents were invited to the Koç University Language and Communication Lab in accordance with preset gender and age groups.

5.2 Participants

153 mothers signed up for the study, 39 of them dropped out before they visited the lab, and 20 of them had to be removed as their children were not cooperating with the experimenter during the Imitation Sorting Task. From the 94 remaining participants, two children were eliminated as they were suspected to have a developmental disorder. Thus, the analyses were carried out with the data obtained from 92 children and their mothers, with 5 or 6 participants for each age monthly period from 21 months to 35 months. The 36-month-old group had just 2 children, 1 boy and 1 girl. 52% of the participants were girls ($N = 48$). Table 5.1 provides information on the number of participants in each monthly age group that were included in the analyses. All the children and their families were native speakers of Turkish, living in Istanbul, having middle to high SES backgrounds.

Table 5.1 Number of participants in monthly age groups by sex (*N*=92)

	Sex		
Age by month	Male	Female	Total
21	3	3	6
22	3	3	6
23	3	3	6
24	3	3	6
25	3	3	6
26	3	3	6
27	3	3	6
28	3	4	7
29	3	5	8
30	3	2	5
31	3	3	6
32	2	3	5
33	2	3	5
34	3	3	6
35	3	3	6
36	1	1	2
Total	44	48	92

5.3 Measures

5.3.1 Turkish Communicative Development Inventory [Türkçe İletişim Davranışları Gelişimi Envanteri (TİGE)]

TİGE (Türkçe İletişim Davranışları Gelişimi Envanteri) (Aksu-Koç, A., Küntay, A., Acarlar, F., Maviş, İ., Sofu, H., Topbaş, S. & Turan, F., 2011) is an adapted version of the MacArthur-Bates Communicative Development Inventories (CDI) that have been developed for the English language. There are a total of 61 CDI-type inventories developed to assess language development of young children through parental reports in different languages. Some of these inventories are still in progress, need validity studies, and manual publications (Dale & Penfold, 2011).

TİGE is a parent report form for assessing language and communication skills of 8- to 36-month-old Turkish speaking infants and young children. TİGE consists of two versions: TİGE-I for 8- to 16-month old children and TİGE-II for 16- to 36-month old children. It is administered to the primary caregiver of the child, usually the mother. In this study, TİGE-II (See Appendix C) was the only device used to collect data because of the age range targeted (21 to 36 months), but here information about TİGE-I is provided for the sake of being complete.

5.3.1.1 TİGE I

The administration of TİGE-I starts with the examiner briefly informing the mother on the language development of 8-16 month old infants and answering any initial questions. TİGE-I is divided into two parts: Early Words, and Actions and Gestures.

The first part, Early Words, aims to collect data on first signs of understanding, expressions, starting to talk and vocabulary size of the infant.

In the section about the first signs of understanding, the mothers is asked whether the

child reacts by turning to the sound when called by his/her name, by stopping when said "not" (*hayır*) and by looking around when said "here is mommy/daddy" (*anne/baba burda*).

For expressions, the mother is asked to identify the expressions that she thinks the child understands such as "Are you hungry?" (*Acıktın mı?*), "Come here" (*Buraya gel*), Open your mouth" (*Aç ağzını*) and "Time to go to bed" (*Yatma zamanı*).

The mother is asked how often the child repeats newly learned words or recently heard sentences and names the objects around them.

The last section of PART 1 assesses the vocabulary size of the infant. The examiner says a word and the mother is asked to respond either by saying "understands" or "understands and says". The words belong to 20 different categories.

PART 2 of the inventory, Actions and Gestures consists of six sections: Early Communications Signs, Games and Routines, Acting on the Objects, Parent-like Behaviors, Imitating Adult's Behavior/Acting like Adults, and Object Represented as Another.

Early Communications Signs

The mother is informed on how infants use gesture when they first start to communicate and then asked how often their children perform the gestures on the list such as waving goodbye when someone leaves, pointing to an object out of his/her reach or nodding his/her head for "yes".

Games and Routines

The mother is asked to report whether the child joins the games such as peek-a-boo, tickling, singing or dancing and any other games they play.

Acting on the Objects

The mother is asked whether the infant does or tries to do the actions on the list with toys or real objects. The list consists of items such as "uses fork or spoon to eat", "pours water from one container to another", or "smells flower".

Parent-like Behaviors

The mother is asked to report the behaviors their infants display with their dolls or toy animals. The items listed consist of daily parental behaviors for taking care of infants such as "bottle-feeding, hugging and kissing, changing diaper".

Imitating Adult's Behavior/Acting as Adults

The mother is asked whether the infant does or tries to do the actions with toys or real objects. The items listed consist of adult behaviors such as "writing with a pen, watering the plant or wearing glasses".

Object representing other objects

The mother is asked whether the infant uses an object as a representative of another such as using a banana for a phone.

5.3.1.2 TİGE-II

TİGE-II starts with the examiner briefly informing the mother on the language and communication skills of children between 16 and 36 months old. The mother is assured that it is not to be perceived as a problem if the child knows only a few words from the list and that the list is built for children of a wide age range.

As the administration begins, the mother is asked to report whether the child uses the words and morphosyntactic forms mentioned by the examiner. In about half of the interviews, mothers volunteered to fill out the form by themselves. They were given the forms and were assisted until the end of the inventory to answer any questions.

TİGE-II consists of two parts. The first part assesses the vocabulary size of the child through a word checklist and early pragmatic skills by questions. The checklist consists of 717 words belonging to 21 different categories, such as animals, toys, people, clothing, body parts etc. For the pragmatics part, the mother is asked whether the child speaks about the past

and future events, about a missing object or a person, whether he/she understands when asked for a missing object and whether he/she points to a property of a missing person and says to whom the object belongs.

Part II of TİGE-II is designed to collect information about the child's knowledge of sentence structure and grammar. This part on morphosyntactic development assesses the child's use of minor elements of Turkish sentence structure. Because Turkish is a language with a complex system of morphology, there is a section that assesses whether the child uses nominal case markings (e.g., accusative, dative, causative, nominative and genitive), tenses (e.g., simple present, simple past, past progressive, simple future), negation, and question endings. In addition, the mother is asked to report the three longest sentences the child has ever produced.

The last section consists of examples of complex sentence structures. The mother is read two semantically similar sentences, with one having a relatively more complex structure, such as in "Let's go home" (*Eve gidelim*) versus "I want to go home." (*Eve gitmek istiyorum*). The mother is asked to identify the sentence the child is more likely to say to express the meaning.

Scoring

The administration of TİGE-II yielded several scores for the language development of the child. Each child obtained a score for vocabulary size, which corresponded to the number of words out of 717 words they were able to produce. In the Part-II of TİGE-II, mothers were asked to report the three longest sentences their children use. The mean length of utterances (MLUs) was calculated by parsing each word into their smallest meaningful units. For instance, if the mother reported the following sentence as one of the longest sentence of the child, "*Anne, babam eve gelecek mi?*", the number of morphemes was obtained by identifying

each meaningful unit (e.g. *Anne baba-m ev-e gel-ecek mi?*). In this five-word sentence, there were eight morphemes used by the child, including the possessive, the dative, the future tense and the question marker. Then, a score for the mean length of utterance used in three sentences was obtained.

A score for morphosyntactic development of the child was calculated by summing up each answer given to the Part II of the TİGE-II. The maximum score that could be obtained from this part was 61.

In Part II of TİGE-II, mothers were asked about their children's use of nominal case markings, tenses, negation, and questions. Some of these morphemes are used alone, and others combinatorially. 11 words with only one additional morpheme to the stem (i.e. *bakı-yor, öp-tü, aç-mış, sev-er, gid-ecek, iste-me-m, gel-sene, gel-sin, gel-se, gel-meli, iç-ir)* and 8 words with multiple morphemes (i.e. *gel-e-lim, gel-miş-ti, gel-iyor-muş, gel-ebil-ir, gel-me-di, gel-e-me-di, iç-il-ir, iç-il-mez)* were identified. Each child received two scores; the number of words used with only one morpheme (out of 11) and the number of words used with multiple morphemes (out of 8). Then, children were categorized as using only one morpheme or not using any morphemes at all and using multiple morphemes combinatorially. In order to categorize a child as using multiple morphemes combinatorially, it was required that he/she uses at least two different multiple morpheme words combinatorially

5.3.2 Demographic form

After the administration of TİGE, the experimenter used the demographic form (See Appendix D). This form collects data about the residential and family environment of the child. The questions ask for information about the date and place of birth of the mother, educational background of the mother and the father, child's health and how childcare is carried out.

The HOME inventory is one of the parts of the demographic form to assess the quality of the home environment as well as the quality of parenting. This Turkish version of the HOME inventory was adapted by Baydar and Bekar (2007). It collects information about the child's experiences as reported by the mother and observed by the researcher. The mothers also reported about the availability of the language materials such as toys of different shapes, sizes and colors, children's books, songs appropriate for children, language stimulation, that is how often the child is read a book or whether the parents try to teach the child about numbers, shapes or colors. The quality of the physical environment is judged on the basis of the availability of the free space at home, tidiness of the home, and the safety of the play area outside. The mother's behavior is observed to assess the degree of warmth and harsh disciplinary practices. The last part of the inventory asks the mother to provide information about the income and expenses of the family. After the interview, the examiner evaluated the level of interest of the mother and judge whether the information provided is genuine.

5.3.3 The Imitation Sorting Task (IST)

The Imitation Sorting Task (IST) is an imitation game developed to measure the size of the WM in very young children (Alp, 1994). IST was first administered to 42 children whose responses were recorded by an experimenter and an observer. The interobserver reliability of the measure is 100%. IST also has a high test-re-test reliability (r = 0.75). When children were tested within a few weeks, results showed that their score and rank remained similar to their original score and rank. When administered for a third time about 6 months later, the children's scores increased even though their rank still remained very similar to their original rank which shows age differentiation in the size of WM in young children and no learning effects in a few months time.

In the following section, the apparatus, the materials and the procedure are explained.

Most of the details were directly adapted from Alp (1994).

Apparatus

Children were sat on a highchair or on the mother's lap with a specially designed table placed in front of them so that the surface of the table served as the highchair's tray. The tray measured 30x80 cm with two wells on each side. Two transparent plastic canisters were designed to allow the child to see the inside. They measured 15 cm in diameter and 24 cm in height. They were placed on the wells in a way that they will stand 10 cm tall and 40 cm apart from each other.

Sets of toys

There were 180 toys of different shapes and colors used to be sorted by the participants. The toys included eating utensils, animals, vehicles, fruits, and furniture. They ranged in size from 2 cm to16 cm. New toys were selected for this study, but they were similar to the ones used in the original study.

The task consisted of eight levels, with five sets of toys to be sorted at each level, allowing 5 trials for each level. The number of toys in each set was designated by the level. For instance, in Level 3, there were 3 toys in each set. Each set of toys was carefully chosen to avoid sorting on the basis of perceptual or conceptual similarity and ambiguity of correct sorting of toys based on imitation. The presentation of the toys is arranged in order to avoid the consistent repetition of placing the toys from the same colour, size, shape and category into two canisters, one placed on the right and the other on the left.

The Levels

The IST consisted of eight levels of increasing difficulty. Each level had its own specific toys to be sorted. The number of toys increased as the level of difficulty increased.

Level 1 consisted of one toy to be dropped into one canister, and was considered as a trial task. Level 1 tested to determine whether the child understands the task and can imitate dropping the toy into the canister.

After Level 1, the second canister was introduced and kept for the succeeding levels. Level 2 consisted of sets with two toys to be sorted, each into one canister. A trial was scored successful when the child sorted the objects into the separate canisters in the same way that the experimenter did.

For Level 3, the child was required to sort three objects in total, two objects in one canister and the remaining object in the other canister. In neither of the sets the child was required to follow the same order as the experimenter. The focus was on whether the child sorted the objects by dividing them into two correct subsets independent of the order and in which canister they were dropped. The child was considered to have done a correct imitation when he/she formed the same subsets as the experimenter. The subsets consisted of equal number of toys at even numbered levels, whereas at odd numbered levels, there was one more toy to be dropped in one canister compared to the other canister.

Before each trial, the child was allowed to explore the objects for a few seconds. Then, the experimenter demonstrated to the child how to sort the objects into the two canisters. After the demonstration, the toys were handed to the child and the child was requested to sort the objects in the same way as the experimenter did. At each set, the child received two opportunities to observe and imitate the demonstration for correct sorting of the toys. Each trial started after the demonstration of the experimenter. If the child failed to sort the objects in the first trial, the experimenter demonstrated again and a second trial followed. It was

considered an unsuccessful trial when the child failed both trials in a set. The child received a pass when a set of toys at a level is sorted correctly on either the first or the second trial. When the child passed one set of toys at a level, the following set of toys was introduced. With 5 sets of toys in each level, a pass was recorded when the child passes either two out of the first three sets of toys or three out of the five sets of toys at that level. If the child successfully imitates the experimenter in the first two sets of a level, a pass was recorded and the toys of the next level were presented. The administration of the test continued until the child failed two consecutive levels. The score of the child was the highest level passed during the administration of the task. For instance, if the child passed two out of three trials in the fourth level, and failed to pass the trials of the fifth level, then he got 4 points for this task. In other words, the level the child passed was converted to a numerical score for IST performance.

Procedure

When the family arrived, the child was invited into the testing room with an accompanying adult, usually the mother. If there were other accompanying members of the family, they were asked to wait in the reception room of the lab.

The session started with the child sitting on the highchair or on the mother's lap. The experimenter gave a warm-up toy, a yellow bunny-shaped mold, to the child letting him or her to explore it while giving the instructions to the mother about the session. The accompanying adult was asked to remain silent and not to interfere during the administration except encouraging the child at times for correct imitation with cheers and clapping. When the child was ready to start, the experimenter took the warm-up toy away from the child and hit it on the tray three times while saying "hop" each time and dropped it into the canister. Then, she retrieved the toy from the canister and gave it back to the child saying "Now, you do it!"

(*Şimdi sen yap*) or "Now, it's your turn" (*Şimdi senin sıran*). This sequence continued for the toys in the first level.

Once the child was judged to understand the task, the second canister was introduced on the left side and the administration of Level 2 started. The administration of the task ended after two consecutive failed levels. After each successful trial, the child was rewarded as described before. After a failed trial, the experimenter maintained a positive facial expression and encouraged the child by saying "Let's do it again" (*Hadi, bir daha yapalım.*) following a second demonstration. Each set of toys was introduced with the experimenter saying "I've got more toys for you" (*Şimdi*, ye*ni oyuncaklar geliyor*). The duration of the administrations depended on how fast a child can imitate the correct sorting and on the highest level he or she could pass, and lasted 5 to 40 minutes.

After each trial, the experimenter recorded the child's imitations as "pass" or "fail" on the scoring sheet. The scoring sheet included a table in which the experimenter can mark "pass" or "fail" for each set in each level (See Appendix E). During the entire session, a camera recorded the administration providing the experimenter the opportunity to check the noted responses of the child.

Scoring

Each child received a score for nonverbal WM performance. During the administration of the IST, the experimenter noted the child's imitation on the scoring sheet and any ambiguity was cleared watching the video recorded during the session. The child's score for IST was the highest level passed, with a maximum score of 8. If the child passed only the initial warm-up trial, his/her score was 1.

Elda Asael Feldman was trained to administer the IST by watching videos of previous administrations conducted by other experimenters working in Alp's studies. Prof. Alp also

assisted Elda for her first administration, watched videos of them and gave her information and feedback.

5.3.4 The Non-Word Repetition Task

The NWR Task aims to measure children's verbal WM. The non-words on this task have been adopted from an unpublished study of Babur et al, 2009. In order to obtain these words, 483 children's story books, and 7 Turkish textbooks used at the first 5 grades of elementary school were scanned and 453,000 words were identified. Then, the number of words was decreased to 53,688 most frequent words. In these words, the number of syllables was counted and one to six syllable-words provided the range.

From this word frequency list, non-words were derived based on the phonological and morphological structure of Turkish. The frequency of sounds in Turkish words was taken into account and first sounds of words were chosen accordingly. All the sounds were represented except the "j" sound in the beginning of the word. In order to make sure that these non-words were not meaningful in other languages spoken in Turkey, speakers non-Turkish languages spoken in Turkey went through wordlist, and any words meaningful in those languages were eliminated. Finally, a list of 126 non-words was obtained.

29 words were adopted for this study and similar sounding 11 non-words were added so that there was equal number of non-words for each syllable length. There was a total of 40 words comprised the NWR Task used in this study (See Appendix F). The task started with the experimenter explaining the task to the child. The experimenter asked the child to listen to her carefully and repeat the word she mentioned. A familiar word "daddy" (*baba*) was chosen as the trial word. Once the child has understood the task, the experimenter mentioned the first word and encouraged the child to repeat it back. The child's answer was noted and the next word was presented. There were a total of 40 non-words, ten non-words at each length from

two to five syllables. The task was ended after five consecutive failures of the child (incorrectly repeated or non-repeated words). Children were scored based on the number of correctly repeated non-words. Immediate self-corrections were also credited as a correct repetition.

Scoring

The score for verbal WM performance was the number of correctly produced non-words. Each child received a score out of 40. The scores ranged between 0 and 39. When the children refused to repeat the non-words, it was coded as missing.

5.4 Data collection

All of the data were collected in the Language and Communication Development Lab at Koç University, Istanbul. Elda Asael Feldman collected all the data and but for administering the IST, she got help from an undergraduate assistant who passed her the toys at each level. The data collection took place in two consecutive parts, lasting about two hours in total. The data collection always started with the measures obtained from the child and continued with the mother to ensure the child does not lose interest towards the end of the interview. In the first part, the experimenter first administered the IST to the child and continued with the NWR Task, and the order was the same for all participants. After completing both measures, the mother and the child were accompanied to the reception room, where the child had free play time on his/her own and the mother was interviewed about the language development of the child, using TİGE-II.

Chapter 6

RESULTS

The first section presents the data set descriptively and presents the relations between vocabulary size, morphosyntactic development, nonverbal WM and verbal WM. The second section presents the results of hierarchical regression and ANOVA analyses that address the study's main questions.

6.1 Descriptive analyses

Children's scores on vocabulary size, morphosyntactic development, nonverbal WM and verbal WM were examined in terms of means, standard deviations, minimum and maximum values. Table 6.1 provides the descriptive statistics for vocabulary size score for each monthly age group. The total score that could be obtained for vocabulary size was 717 points, obtained from Part I of TİGE-II.

Table 6.1 Mean scores for vocabulary size at each month (*N*=92)

Age by month	*N*	*Mean*	*SD*	Min	Max
21	6	287	209.3	6	584
22	6	287	289.7	30	669
23	6	214	197.9	29	492
24	6	339	158.9	75	479
25	6	360	222.8	126	636
26	6	362	253.5	36	586
27	6	448	209.4	160	642
28	7	510	134.6	220	608
29	8	526	180.5	196	668
30	5	474	140.0	258	596
31	6	600	64.0	477	650
32	5	664	38.0	600	698
33	5	559	87.9	419	649
34	6	680	26.5	635	713
35	6	576	60.2	495	647
36	2	619	64.3	573	664

Children's vocabulary size showed a gradual increase overall from 21 to 36 months, consistent with the findings of TİGE study (Aksu-Koç et al., 2011).

The data obtained from the TİGE study have been used to set the norms on vocabulary size of children at each montly age group from 8-to-36 months old. Based on these norms, the percentile for each child in this study was identified. Figure 4 represents the number of

children in different percentiles for vocabulary size.

At months 23, 30, 33, 35, and 36, the mean score obtained for vocabulary size was lower than the previous monthly age group. When compared to the norms, it was observed that most of the children in these months performed between the 20th and 40th percentile, which resulted in the low vocabulary size scores for these months.

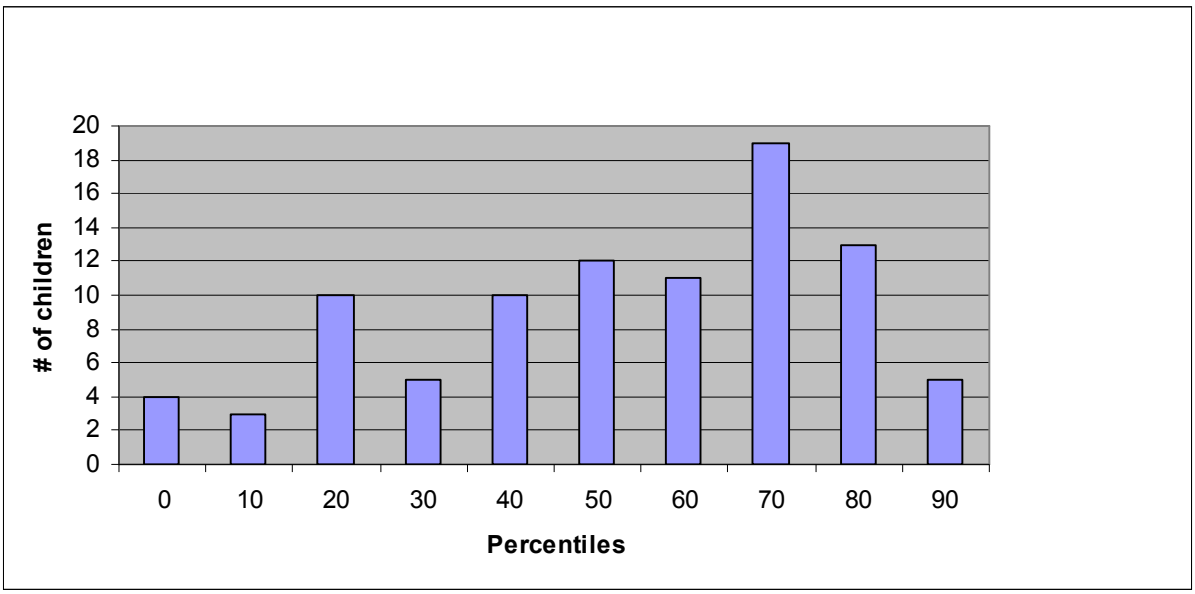

Figure 4. Number of children in different percentiles for vocabulary size

Of 92 children, 7.6% of them scored below 20% of their peers (n = 7), and 19.5% scored above 80% of their peers (n = 18). Children, whose scores were between the 20-49% percentiles, constituted the 27.2% of the sample (n = 25), whereas 45.7% of the participants scored within the 50-79th percentiles (n = 42). In this higher SES sample than the TİGE sample, the number of children who scored in the higher percentiles is greater than the number of children who are in the lower percentiles.

Table 6.2 presents the descriptive statistics for the morphosyntactic development score of children, obtained by summing up each answer given in the Part II of TİGE-II (maximum score of 61) and the mean number of morphemes used in three sentence.

Table 6.2 Mean scores for morphosyntactic development score at each month (*N*=92)

Age by month	*N*	*Mean*	*SD*	Min	Max
21	6	18	19.6	0	49
22	6	18.5	25.5	0	56
23	6	17.8	21.1	0	47
24	6	26.3	16.9	0	41
25	6	27.5	26.1	0	57
26	6	30.5	23	2	53
27	6	38	18.1	11	60
28	7	42.3	16.8	5	54
29	8	39.6	18.2	6	59
30	5	43.8	9.2	32	54
31	6	54.8	4.9	48	61
32	5	53	7,9	39	58
33	5	52.8	2.8	49	56
34	6	56.8	3.7	51	61
35	6	44.6	13.7	21	58
36	2	44	15.5	33	55

The scores ranged between 0 and 61. Similar to vocabulary size, morphosyntactic development showed an increase as children's age increased. 8 children, between 21 and 25 months of age, scored 0 in the morphosyntactic development part.

Table 6.3 presents the descriptive statistics for the mean length of utterances (MLUs) of children. MLUs were obtained by averaging the total number of morphemes used in

children's three longest sentences.

Table 6.3 Mean scores for MLUs at each month (*N*=92)

Age by month	*N*	*Mean*	*SD*	Min	Max
21	6	3.3	2.9	0	8
22	6	3.5	3.7	0	9
23	6	2.8	3.1	0	6.3
24	6	4.6	2.7	0	6.7
25	6	4.4	3.3	0	9.7
26	6	4.4	2.2	2	7.7
27	6	6.4	2.6	3.3	11
28	7	6.9	2.6	2.7	10.3
29	8	6.3	2.6	2.3	9.7
30	5	5.5	1.8	2.6	7
31	6	8.1	1.3	6.7	9.7
32	5	8.2	1.5	6.7	10
33	5	9.2	1.9	6.7	12
34	6	8.9	0.9	8	10.7
35	6	7.4	2.2	4.3	10
36	2	9.5	2.1	8	11

The scores for MLUs ranged between 0 and 12. Children's use of morphemes increases with age. 8 children between 21 and 25 months scored 0. They were reported by their mother as not using any sentence.

The table 6.4 presents the descriptive statistics for the IST score. The highest level passed in the IST was the score of the child, with a maximum score of 8.

Table 6.4 Mean scores for IST at each month (*N*=92)

Age by month	*N*	*Mean*	*SD*	Min	Max
21	6	2.5	0.5	2	3
22	6	2.0	0.0	2	2
23	6	2.2	0.4	2	3
24	6	3.0	0.9	2	4
25	6	2.5	0.5	2	3
26	6	2.5	0.5	2	3
27	6	2.7	0.5	2	3
28	7	3.7	1.1	2	5
29	8	2.5	0.9	1	4
30	5	4.0	1.2	3	6
31	6	3.8	1.0	3	5
32	5	4.2	0.8	3	5
33	5	4.0	2.0	2	7
34	6	4.8	1.2	4	7
35	6	4.3	1.2	3	6
36	2	3.5	0.7	3	4

The scores for Imitation Sorting Task ranged between 2 and 7, consistent with the findings of Alp (1994) for the age range studies, with an exception of a 29 month-old

child who could not pass level 2 and scored 1 point for this task.

In Table 6.5, descriptive statistics for NWR Task, measuring the verbal WM, are presented. The total number of each correctly repeated non-word was the score for the NWR Task, with a maximum score of 40.

Table 6.5 Mean number of nonwords repeated at each month (*N*=77)

Age by month	*N*	*Mean*	*SD*	Min	Max
21	5	4.0	5.9	0	13
22	6	8.0	9.4	0	22
23	5	7.4	10.2	0	20
24	5	4.4	5.4	0	14
25	5	16.0	13.6	2	36
26	4	15.5	8.1	8	27
27	5	16.2	10.6	6	32
28	6	15.0	9.6	2	25
29	6	18.0	12.8	1	33
30	3	15.7	6.1	9	21
31	5	31.6	7.6	19	39
32	5	26.0	6.6	21	37
33	4	25.5	8.4	17	35
34	6	31.7	5.0	26	40
35	5	23.8	5.8	20	34
36	2	18.5	4.9	15	22

Similar to previous findings, there was an overall increase in the number of non-words repeated with age. 12 children scored 0 on this task and 15 children refused to repeat the non-words.

The 16 monthly age groups, from 21 –to -36 month olds, were clustered into 4 groups of age in order to observe the differences at every 4 months. Table 6.6 represents the mean scores for vocabulary size, morphosyntactic development, IST and NWR Task in 4 groups.

Table 6.6 Mean scores for vocabulary size, morphosyntactic development, MLUs, IST and NWR Task scores, ages grouped by 4 months

	Age groups			
Variables	21-24	25-28	29-32	33-36
Vocabulary score	282	420	566	608
Morphosyntactic score	20	35	47	51
MLUs	3.5	5.5	7.0	8.7
IST score	2.4	2.8	3.6	4.2
NWR Task score	6	15	22	24

Children's vocabulary size shows a consistent increase across every four months. The highest increase is observed from the first to the second and from the second to the third age group. There is an average of 140 words of increase between the age groups.

Children's morphosyntactic development scores increased consistently as their age increased as well. The mean length of utterance increased about two units at every 4 months. There was an average increase of .5 point in IST score at every four months suggesting that as children grow up, their nonverbal WM capacity increases. Children's score on NWR Task

increased at each age interval, but showed smaller incrase between the 3rd and 4th age group.

Increases in the scores of vocabulary size, morphosyntactic development and NWR Task display a similar pattern of higher increases between the 1st and 2nd , and between the 2nd and 3rd age group, but lower increase from the 3rd to the 4th age group. These parallel patterns are tied to the fact that these three variables were highly intercorrelated, as presented below in Table 6.7.

Associations among variables: bivariate analyses

In order to examine the associations between age, WM capacity and language development, Pearson correlations were conducted. They are presented in Table 6.7 and described in the following section. Sex was not found to be significantly associated with any outcome variable; therefore it was not included in the table.

Table 6.7 Pearson correlations among age, vocabulary size, morphosyntactic development, mean length of utterances, IST and NWR Task scores

Variables	1	2	3	4	5
1 Age by month					
2 Vocabulary size (N=92)	.62**				
3 Morphosyntactic development (N=92)	.59**	.95**			
4 MLUs (N=86)	.61**	.85**	.89**		
5 IST score (N=92)	.60**	.47**	.44**	.42**	
6 NWR Task score (N=77)	.65**	.76**	.77**	.73**	0,50**

** Correlation is significant at the 0.01 level (2-tailed).

The two scores of language development, vocabulary size and morphosyntactic development, were highly correlated (r =.95, p < .01*)*. Children who had greater vocabulary size also exhibited more advanced morphosyntactic development. Vocabulary size was also highly correlated with the mean length of utterances of children used in their three longest sentences (r =.85, p < *.01)*.

The two measures of WM, IST and NWR Task were significantly correlated (r =.50, p < *.01)*. IST and NWR Task were both significantly correlated with vocabulary size (r =.47, p < *.01, r* =.76, p < *.01)*; however, the association was stronger for NWR Task.

6.2 Exploratory analyses

Relation of predictor variables to vocabulary size

Hierarchical regression analyses were conducted to investigate whether IST and NWR Task mediated the relation between age and vocabulary size (see Figure 5). Table 6.8 presents the results. In Model 1, age was entered as a predictor of vocabulary size and predicted 41% of the variability in vocabulary size of children (F(1, 75) = 54.34, p < .001). As age increased, children's vocabulary size increased (β = .65, p < .001). In Model 2, IST was entered as well but it did not significantly predict the outcome above and beyond age, ΔR^2 = .00, F(2, 74) =26.92, *ns*. In Model 3, when NWR Task was added into the equation, the new model accounted for %58 of the variability in vocabulary size, ΔR^2 = .19, F(3, 73) = 36.79, p < .001. Better skills in NWR Task were associated with greater vocabulary size (β = .59, p < .001). The effect of age remained significant whereas the effect of IST remained nonsignificant.

In sum, age and NWR Task significantly predicted the vocabulary size. The results indicated that children of older ages and children with better verbal WM skills are more likely to have a greater vocabulary size. Difference in IST score was not able to explain differences in vocabulary size, beyond age. In step 3, the magnitude of the influence of age as a predictor

of vocabulary size was reduced when NWR Task was included into the model (*ß*= .30, *p*< *.01)*. Age was correlated with both NWR Task and vocabulary size (Table 6.7). The results indicated that there is a partial mediation between age and vocabulary size through verbal WM skills. In other words, age influenced vocabulary size both directly and indirectly through verbal WM skills.

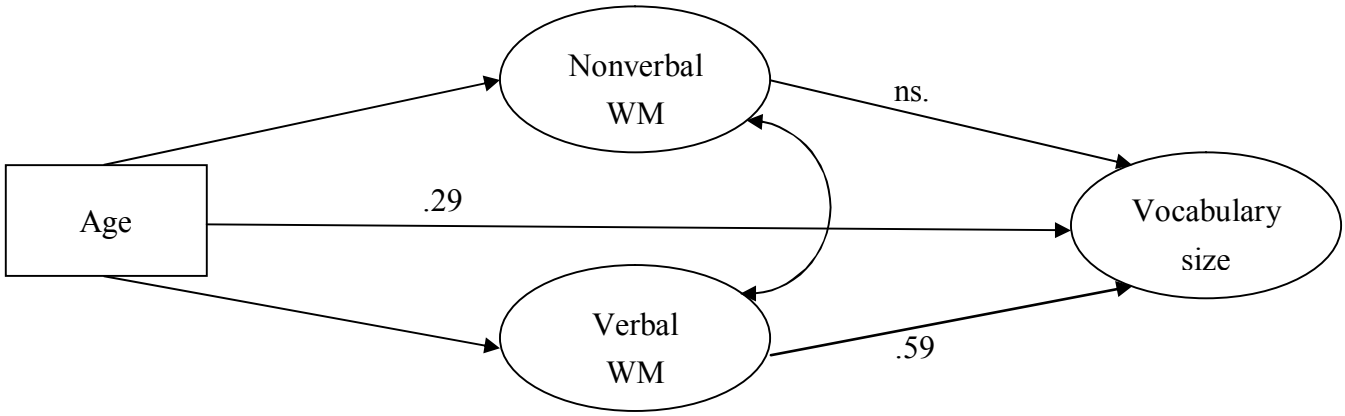

Figure 5. Relation of predictor variables to vocabulary size

Table 6.8 Hierarchical regression analysis for age, IST and NWR Task scores predicting vocabulary size (*N*=77)

	Model 1			Model 2			Model 3		
Variables	B	SE B	ß	B	SE B	ß	B	SE B	ß
Age	28.88	3.91	.65***	27.68	5.11	.62***	13.24	4.82	.30**
IST				6.76	18.27	.04	-7.36	15.18	-.05
NWR Task							9.97	1.64	.59***
Adjusted R^2	.41			.41			.60		
F for change in R^2	54.33***			.14			36.79***		

Note. $p < .01$ **, $p < .001$ ***

Relation of predictor variables to morphosyntactic development score

Another set of analysis was conducted to estimate the variance in morphosyntactic development that was attributable to age, nonverbal WM and verbal WM (see Figure 6). Table 6.9 demonstrates the results of the regression analyses predicting morphosyntactic development. In Model 1, age was entered and accounted for 35% of the variance in morphosyntactic development $F(1,75) = 41.71$, $p<.001$. As children's age increased, there was an increase in their score of morphosyntactic development ($\beta = .60$, $p < .001$).

In model 2, IST score were added but the model did not significantly predict the outcome variable $\Delta R^2 = .00$, $F(2, 74) = 20.60$, *ns*.

In model 3, NWR Task score were added in model 3 and accounted for an additional of 25% of the variance in morphosyntactic development score of the children, $\Delta R^2 = .26$, $F(3, 73) = 39.06$, $p < .001$. Although correlation analysis revealed a moderate correlation between IST and morphosyntactic score (Table 6.7), the effect of IST score remained nonsignificant while age and NWR Task score were significantly associated with morphological development score ($\beta = .21$, $p < .05$; $\beta = .68$, $p < .001$ respectively). The results showed that as children grow up, those who have higher verbal WM skills are more competent in using language with more complex grammatical constructions. The correlation of age with both NWR Task and morphosyntactic development and the decrease in the effect of age in the presence of NWR Task indicated that age influenced morphosyntactic development both directly and indirectly through verbal WM skills. There was a partial mediation between age and morphosyntactic development through verbal WM skills.

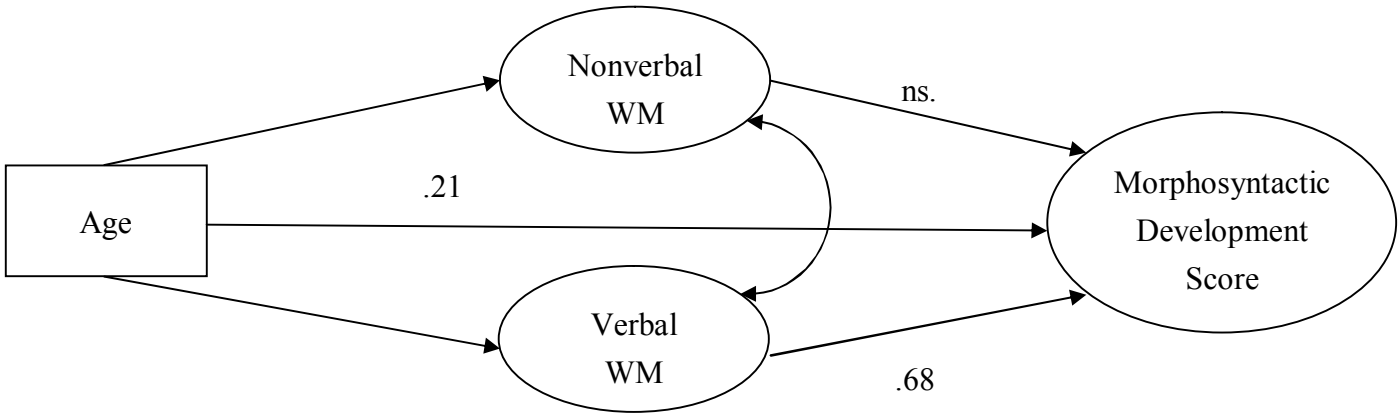

Figure 6. Relation of predictor variables to morphosyntactic development score

Table 6.9 Hierarchical regression analyses for age, IST and NWR Task scores predicting morphosyntactic development (*N*=77)

	Model 1			Model 2			Model 3		
Variables	B	SE B	ß	B	SE B	ß	B	SE B	ß
Age	2.65	.41	.60***	2.59	.54	.59***	.93	.48	.21**
IST				.33	1.9	.02	-1.29	1.51	-.08
NWR							1.14	.16	.68***
Adjusted R^2	.35			.34			.60		
F for change in R^2	41.71***			.03			49.17***		

Note. $p < .01$ **, $p < .001$ ***

In addition to morphosyntactic development score, another score for just morphological knowledge was obtained by summing up the answers given to Part II of TİGE-II without considering the 9 questions in the Complex Sentence Structure part. The total possible score for morphological development was 43. A new set of analysis was conducted

to estimate the variance in morphological knowledge that was attributable to age, nonverbal WM and verbal WM. Table 6.10 demonstrates the results of the regression analyses predicting morphological knowledge. In Model 1, age was entered and accounted for 30% of the variance in morphological knowledge $F(1,75) = 33.78$, $p<.001$. As children's age increased, there was an increase in their score of morphological knowledge ($\beta = .66$, $p < .001$).

In model 2, IST score were added but the model did not significantly predict the outcome variable $\Delta R^2 = .00$, $F(2, 74) = 16.67$, *ns*.

In model 3, NWR Task score were added in model 3 and accounted for an additional of 25% of the variance in morphological knowledge of the children, $\Delta R^2 = .25$, $F(3, 73) = 43.45$, $p < .001$. Although correlation analysis revealed a moderate correlation between IST and morphological knowledge ($r = .36$), the effect of IST score remained nonsignificant. However, in the third model, the original significant effect of age became nonsignificant ($\beta= .18$, *ns*). The NWR Task score was the only significant predictor of morphological knowledge ($\beta=.68$, $p<.001$)

Table 6.10 Hierarchical regression analyses for age, IST and NWR Task scores predicting morphological knowledge (*N*=77)

	Model 1			Model 2			Model 3		
Variables	B	SE B	ß	B	SE B	ß	B	SE B	ß
Age	1.79	.31	.56***	1.78	.40	.56***	.59	.37	.18
IST				.02	1.43	.00	-1.15	1.15	-.10
NWR							8.3	.13	.68***
Adjusted R^2	.30			.29			.55		
F for change in R^2	33.78***			.00			43.45***		

Note. $p < .001$ ***

Another score was obtained just for the complex sentence structure part by summing up the answer given to 9 questions in the last section of TİGE-II. Based on children's frequency of using complex sentence structure, scores ranged between 0-18. Regression analysis was conducted to estimate the variance in the use of complex sentence structure that was attributable to age, nonverbal WM and verbal WM. Results of the regression analyses are presented in Table 6.11. In Model 1, age was entered and accounted for %43 of the variance in the use of complex sentence structure $F(1,75) = 58.55$, $p<.001$. As children got older, their use of complex sentence structure increased ($\beta = .62$, $p<.001$).

In model 2, IST score was added into the model but the new model did not significantly predict children's use of complex sentence structure $\Delta R^2 = .00$, $F(2, 74) = 29.20$, *ns*.

In model 3, NWR Task score was added into the model which accounted for an additional 23% of the variance in children's use of complex sentence structure. $\Delta R^2 = .23$, $F(3,$

73) = 50.04, *p*<.001. The magnitude of the effect of age was reduced (β = .27, *p*<.01) and the effect of the IST score remained nonsignificant. The NWR Task score was the only significant predictor of children's use of complex sentence structure (β = .64, *p*<.001).

Table 6.11 Hierarchical regression analyses for age, IST and NWR Task scores predicting children's use of complex sentence structure (*N*=77)

	Model 1			Model 2			Model 3		
Variables	B	SE B	ß	B	SE B	ß	B	SE B	ß
Age	.86	.11	.66***	.80	.15	.62***	.35	.13	.27**
IST				.31	.53	.07	-.14	.41	-.03
NWR							.32	.04	.64***
Adjusted R^2	.43			.43			.66		
F for change in R^2	58.55***			.35			50.04***		

Note. *p* < .001 ***, *p* < .01**

Relation of predictor variables to mean length of utterances (MLU)

Additional hierarchical regression analyses were conducted to examine the predictive role of age, nonverbal WM and verbal WM on the MLU of children's longest three sentences (see Figure 7). Table 6.12 demonstrates the results of the regression analyses predicting MLUs. In Model 1, MLU was regressed on age and the model predicted 41% of the variability in MLU ($F(1, 75) = 53.05$, $p < .001$). As children's age increased, they used more morphologically complex utterances in their sentences ($\beta = .64$, $p < .001$). IST score were added in the model 2 and but this model did not significantly predict the outcome, $\Delta R^2 = .05$, $F(2, 74) = 26.21$, *ns*. In Model 3, when NWR Task score was added into the equation, the three-

predictor model accounted for 57% of the variance in MLU children's sentences ($F(3, 73) = 30.66$, $p < .001$). The effect of IST score remained nonsignificant, suggesting that it did not predict the variability in MLU beyond age, while age and NWR Task score significantly predicted MLU ($\beta = .32$, $p < .01$; $\beta = .56$, $p < .001$ respectively). The results indicated that as children grow up, MLU is greater for those who have higher verbal WM skills. In Model 3, the decrease in the magnitude of the influence of age as a predictor of MLU indicated that age influenced MLU both directly and indirectly through verbal WM skills. The results indicated that verbal WM partially mediated the relation between age and the MLU of the children's three longest sentences.

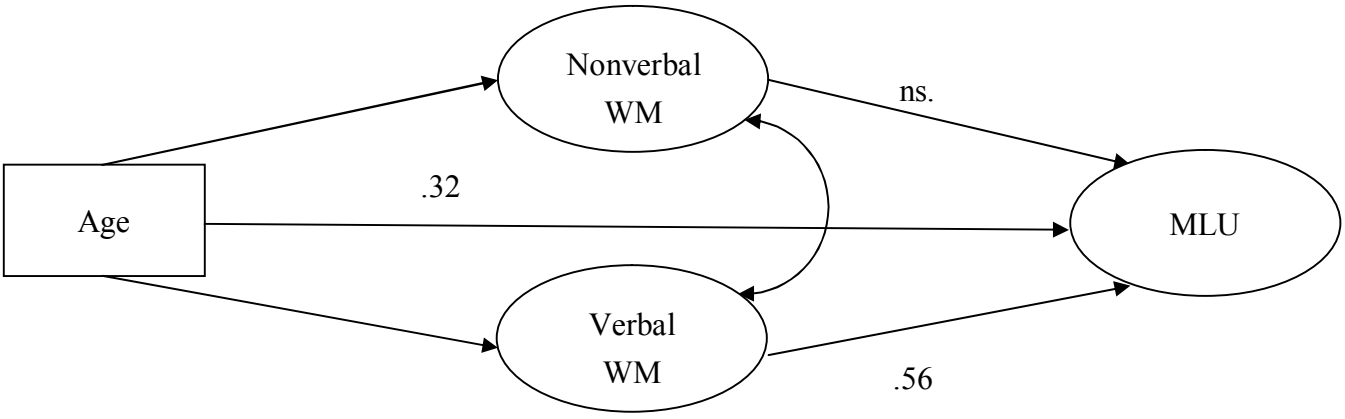

Figure 7. Relation of predictor variables to MLU

Table 6.12 Hierarchical regression analyses for age, IST and NWR Task scores predicting the MLU (*N*=77)

	Model 1			Model 2			Model 3		
Variables	B	SE B	ß	B	SE B	ß	B	SE B	ß
Age	.44	.06	.64***	.43	.08	.63***	.22	.08	.32**
IST				.06	.28	.03	-.14	.24	-.06
NWR Task							.15	.03	.56***
Adjusted R^2	.41			.40			.57		
F for change in R^2	53.05**			.05			30.66**		

Note. $p < .01$ **, $p < .001$ ***

Several children were observed to score lower in vocabulary size and IST compared to the remainig of the participants. Based on the TİGE-II norms, 7 children who scored below the 20th percentile for their age group in vocabulary size were identified. 4 of them scored below the 10th percentile and 3 of them scored between 10th and 20th percentiles. Another child (29 months old) who could only pass the trial level in the IST was also identified. In order to get a good estimate of the relation between the predictors and the outcome variable, a total of 8 children were excluded from the study and the three regression analyses on vocabulary size, morphosyntactic development and MLUs were repeated with the 84 remaining children. Results were similar to analyses conducted with 92 children. There was no change in the significance level of any predictor variables of the outcome.

Relation of the number of syllables to scores of morphosyntactic development and morphology knowledge

The number of correctly repeated non-words at each syllable length was calculated. Each child received four scores (out of 10), each one representing the number of correctly repeated 2-syllable, 3-syllable, 4-syllable and 5-syllabe non-words Then, morphosyntactic development score was regressed on age and these four scores of different syllable length non-words (Table 6.13). In Model 1, age was entered and accounted for 35% of the variance in morphosyntactic development score $F(1,75) = 41.71$, $p<.001$. As children's age increased, there was an increase in their score of morphosyntactic development score ($\beta = .60$, $p < .001$). In Model 2, when the four categories of each syllable length was added and the new model accounted for an additional 33% of the variance in morphosyntactic development score $F(5,71) = 30.03$, $p<.001$. However, only the effect of repeating two-syllable non-words was a significant predictor of morphosyntactic knowledge ($\beta = .50$, $p < .001$) and the magnitude of the effect of age was reduced in Model 2 ($\beta = .17$, $p = .06$).

Table 6.13 Hierarchical regression analyses for age and four scores of different syllable length non-words predicting morphosyntactic development (*N*=77)

	Model 1			Model 2		
Variables	B	SE B	ß	B	SE B	ß
Age	2.65	.41	.60***	.75	.40	.17**
2syll				2.88	.79	.50***
3syll				1.00	.94	.17
4syll				.60	.79	.10
5syll				-.33	-.05	-.05
Adjusted R^2	.35			.66		
F for change in R^2	48.74***			30.03		

Note. $p < .001$ ***, $p = .05$ **

The same analysis was conducted with the morphology score. The morphology score was regressed on age and the four syllable categories of the NWR Task (Table 6.14). In Model 1, age was entered and accounted for 30% of the variance in morphology knowledge $F(1,75) = 33.78$, $p<.001$. As children's age increased, there was an increase in their score of morphology knowledge ($\beta = .56$, $p < .001$). In Model 2, when the four categories of each syllable length was added, the new model accounted for an additional 31% of the variance in morphology score $F(5,71) = 24.35$, $p<.001$. However, only the effect of repeating two-syllable non-words was a significant predictor of morphological knowledge ($\beta = .50$, $p < .001$) and the effect of age became nonsignificant in Model 2 ($\beta = .36$, *ns*).

Table 6.14 Hierarchical regression analyses for age and and four scores of different syllable length non-words predicting morphological development (*N*=77)

	Model 1			Model 2		
Variables	B	SE B	ß	B	SE B	ß
Age	1.79	.31	.56***	.42	.31	.13
2syll				2.24	.61	.54***
3syll				.51	.72	.12
4syll				.43	.61	.10
5syll				-.17	.58	-.03
Adjusted R^2	.30			.61		
F for change in R^2	33.78***			24.35		

Note. $p < .001$ ***

Difference in the rate of repetition within the 4- and 5-syllable non-words group

Some of the non-words on the NWR Task ended with actual Turkish verbal and nominal inflections. It was analysed whether children have less difficulty in repeating these relatively familiar non-words compared to the other same length non-words. 4 words ending with Turkish verbal inflections (i.e. *keleyordu, horsulamak, şekirlemiş, çoralacak*) from 4-syllable non-words were identified as more familiar sounding non-words, therefore as less taxing on the working memory. The mean for these 4 familiar non-words (n = 77, M = .36, SD = .38) and the mean for the remaining 6 words were compared (n = 77, M = .36, SD = .36). The results showed that there was no significant difference between repeating 4 familiar non-words and the remaining 6 non-words. Children did not repeat these 4 familiar non-words better than the remaining non-words.

Same analysis was conducted with 5-syllable non-words. 7 words (i.e. *subuntalyordu, çöpatlımıyız, başıltanmasın, tümsütülmüş, yörtümlerecek, menindenlikte, urgatosyordu)* were identified as familiar sounding non-words because of the integration of inflectional morphemes. The mean for these 7 non-words (n = 77, M = .21, SD = 2.09) and the mean for the 3 remaining non-words (n = 77, M = .16, SD = .91) were compared. The results showed that there was a significant difference between the means of two groups of non-words (p<.05). Children repeated the 5-syllable non-words ending with Turkish inflections better than the remaining non-words.

Relation between IST and NWR Task scores

In order to explore the relationship between the two memory tasks, IST and NWR Task, children were categorized into three groups; those who could not repeat at all, those who could repeat 2- and 3- syllable non-words, and those who could repeat 4- and 5-syllable non-words. Children were grouped based on the number of non-words repeated. A child who had repeated less than 5 non-words was categorized in the no repeating group. A child who could repeat 5 or more non-words in either 2- and 3-syllables or 4- and 5-syllables was grouped accordingly. Then, the IST score of these three groups were compared.

Post-hoc tests revealed that there was no significant difference in terms of IST score between children who are in the no repeat group (n = 15, M = 2.81, SD = .33) and children who can repeat 2- and 3-syllable non-words (n = 23, M = 3.08, SD = .25). But there was a signficant difference between children who could not repeat (n = 15, M = 2.81, SD = .33) and children who could repeat 4- and 5-syllable non-words (n = 39, M = 3.34, SD = .22) (p<.001). Children in the 4- and 5-syllables group scored approximately .5 point higher in the IST. Children in the 2- and 3-syllables (n = 23, M = 3.08, SD = .25) and 4- and 5-syllables group (n = 39, M = 3.34, SD = .22) differed significantly from each other in terms of IST score (p<0.01). Children in the 4- and 5- syllables group had higher IST score compared to children

in the 2- and 3-syllables.

Effect of combinatorial use of morphemes in repeating 4- and 5- syllable non-words

It was also examined whether children who use multiple morphemes combinatorially are better in repeating the non-words ending with Turkish inflections compared to children who use only one morpheme or who do not use ny morphemes at all. Analysis was conducted for 4-syllable non-words that were identified as more familiar sounding non-words. There was a significant difference between the means of children who used multiple morphemes combinatorially (n = 55, M = .48, SD = .37) and children who use only one morpheme or who do not use any morphemes at all (n = 22, M = .06, SD = .19) (p<.001). Children who used multiple morphemes combinatorially had less difficulty in repeating the 4-syllable non-words that were ending with Turkish inflections.

Same analysis was conducted for 7 5-syllable non-words that were identified as more familiar sounding non-words. The results showed that there was a significant dfffference between the means of children who used multiple morphemes combinatorially (n = 55, M = .30, SD = .32) and children who use only one morpheme or who do not use any morphemes at all (n = 22, M = .00, SD = .00) (p<.001). Children who used multiple morphemes combinatorially were better at repeating the 5-syllable non-words that were ending with Turkish inflections.

It was also analysed how children who use only one morpheme or who do not use any morphemes at all and children who use multiple morphemes combinatorially performed on the less familiar sounding 4- and 5-sylablle words. Children who used multiple morphemes combinatorially were better at repeating less familiar sounding 4- (n = 55, M = .49, SD = .34) and 5-syllable non-words (n = 55, M = .22, SD = .34) compared to children who use only one morpheme or children who do not use any morphemes at all (n = 22, M = .05, SD = .16, n = 22, M = .00, SD = .00, respectively)

Using multiple morphemes combinatorially and working memory skills

Difference in the level of nonverbal WM skills in children who use only one or no morphemes and children who use multiple morphemes combinatorially was examined with one-way analysis of variance (ANOVA).

ANOVA results showed that the IST scores of children who use only one or who do not use any morphemes at all (n = 31, M = 2.5, SD = .93) and children who use multiple morphemes combinatorially (n = 61, M = 3.5, SD = 1.23) were significantly different, ($F(1,90) = 16.13$, $p < .001$). Children who used multiple morphemes combinatorially scored higher on IST than children who use only one morpheme or who use no morphemes at all.

Similarly, difference in the level of verbal WM skills in children who use only one or no morphemes and children who use multiple morphemes combinatorially was examined with ANOVA.

The results showed that the NWR task scores of children who use only one morpheme or no morphemes (n = 22, M = 4.6, SD = 6.8) and children who use multiple morphemes combinatorially (n = 55, M = 22.4, SD = 9.4) were significantly different, ($F(1,75 = 64.77$, $p <$ .001). Children who used multiple morphemes combinatorially scored higher on the NWR task than children who use only one morpheme or who use no morphemes at all.

The following part summarizes the findings of the study.

As expected, children's score on the two WM task, IST and NWR Task, were correlated. Children, who scored high in the IST, also scored high in the NWR Task.

In the second hypothesis, the NWR Task was expected to predict vocabulary size of children beyond age. As expected, the NWR Task significantly predicted vocabulary size. Children who were able to repeat more non-words had a greater vocabulary size compared to children who scored lower in the NWR Task. As an exploratory question, the predictive role

of IST was investigated. IST was not a significant predictor of vocabulary size.

In addition, age was found to influence vocabulary size both directly and indirectly through verbal WM skills. It mediated the relation between verbal WM and vocabulary size.

In the third hypothesis, the NWR Task was expected to predict children's score on morphosyntactic development. Additionally, we explored whether IST was a significant predictor of morphosyntactic development. The results confirmed that the NWR Task predicted children's score on morphosyntactic development. The correlation analysis showed that both nonverbal WM and verbal WM scores were moderately correlated with the score of morphosyntactic development but nonverbal WM skills did not reach the significance level for predicting morphological score. Children who scored high on the NWR Task, scored high on the morphosyntactic part of TİGE-II.

In the fourth hypothesis, NWR Task was expected to predict children's score on the MLU. It would be explored whether IST was a predictor of morphosyntactic development. The results showed that NWR Task significantly predicted MLU, whereas IST was not found to be a predictor. Children who scored higher in NWR Task also had higher MLUs.

Some of the non-words in the NWR Task ending with Turkish inflections were expected to be repeated more than the other same-length non-words. Results showed that there was no difference within the 4-syllable non-word group. Children repeated the familiar sounding words same as the non-familiar sounding ones. Same analysis conducted within the 5-yllable non-word group revealed that there was a significant difference in the repetition rate of the familiar sounding non-words versus non-familiar sounding non-words. Children repated 5-syllable non-words that are ending with Turkish inflections better than the remaining non-words.

IST score of children who could repeat 2- and 3-syllable non-words, 4- and 5-syllable non-word and children who could not repeat any words were compared. Children who could

repeat 4- and 5- syllable non-words scored higher in the IST compared to the rest of the children. IST score of children who could not repeat any non-words and children who could repeat 2- and 3-syllable non-words were not different from each other.

There was a significant difference between children who used multiple morphemes combinatorially and children who use only one morpheme or who do not use any morphemes at all, in terms of the number of syllables repeated. Children who used multiple morphemes combinatorially were better at repeating the 4-and 5-syllable non-words that were ending with Turkish inflections compared to other children. They were also better in repeating less familar sounding 4- and 5-syllable non-words.

In the last hypothesis, it was proposed that children who started to use multiple morphemes combinatorially would score higher in the NWR Task and IST compared to children who use only one morpheme at a time or do not use any morphemes. Results confirmed that children who use multiple morphemes combinatorially scored higher on both tasks.

Chapter 7

DISCUSSION

The first section of this chapter summarizes the purpose of the present study and presents the main findings. In the second section, the contributions and the implications of the findings are discussed along with the limitations and suggestions for future studies.

7.1 Purpose of the study and summary of the main findings

The main purpose of this study was to investigate the relation between children's WM and language development. The association between the development of the two subcomponents of language, vocabulary size and morphosyntactic development, and the development of verbal and nonverbal WM skills were examined. More specifically, it was examined whether verbal and nonverbal WM skills predict different subcomponents of language.

7.1.1 Vocabulary size

Previous research has shown that verbal WM abilities significantly contributed to children's language development. Children with greater abilities to repeat non-words were found to have higher language abilities than children who were not able to repeat non-words (Adams, Burke & Willis, 1999). Results of the present study supported the previous findings and revealed that verbal WM skills contributed to children's vocabulary size. Children, who scored high on the verbal WM task, had a greater vocabulary size compared to children who scored low on this task. This finding is consistent with the view that verbal WM skills contribute to vocabulary acquisition. The maintenance of the new word in the WM in its phonological form leads to the long-term learning of that word (Gathercole & Baddeley,

1993). Gathercole and Adams (1994) proposed an alternate explanation for the link between the verbal WM and vocabulary size. Repeating a non-word can activate the representations of similar sounding word, therefore children with greater vocabulary knowledge could activate the representation of non-word easier than children with lower vocabulary size. For instance, if the child knows the word "*kedi*" (*cat*), it would be easier to process and repeat back the non-word "*pedi*". This explanation points to a reciprocal relationship between the verbal WM skills and vocabulary knowledge. Verbal WM skills contribute to maintaining new words and long-term learning which in turn, help repeating the non-words by relating them to already existing words that sound similar.

Additionally, findings showed that age influenced vocabulary size both directly and indirectly through verbal WM, suggesting that as children grow up, with the development of their verbal WM skills, their vocabulary size increases. With the increase of age, there are other factors that influence the increase of vocabulary size such as the size and the variety of vocabulary they hear. Children are more exposed to child-directed speech, language materials and they also learn new words by interacting with their peers.

In addition to the effect of verbal WM skills, this study examined the role of nonverbal WM skills on language development. There was no predictive role of nonverbal WM skills on vocabulary size. The results of the present study showed that there was a moderate correlation between nonverbal WM skills and both verbal WM skills and vocabulary size. However, nonverbal WM skills failed to predict vocabulary size independently of verbal WM skills and age. One explanation may be that vocabulary size was assessed based on the words children produced. Youngest children in the sample who were in the preproductive phase scored very low in the word checklist. Their score could have been underestimated reflection of their vocabulary knowledge. A combination of both expressive and receptive vocabulary assessment could give a comprehensive understanding of their vocabulary size and could

allow establishing a raletion between nonverbal WM skills and vocabulary size.

7.1.2 Development of Morphosyntactic Knowledge

The relation between the verbal WM skills of children and their knowledge about grammatical rules of the language was demonstrated in previous research (Adams & Gathercole, 1996). Children who scored high in the NWR Task used more complex structures in their spoken language. The findings of the present study confirmed the previous findings. Similar results were obtained with the morphological knowledge score. Children with better verbal WM skills scored higher in the morphosyntactic part of the TİGE-II. This indicates that verbal WM skills do not only contribute to novel word learning, but also to the grammatical rules that apply to combine words into more complex structures and receptivity to novel combinations.

Speidel (1989) proposed that children store correct syntactic forms by imitating adult's spoken language. These syntactic forms are first maintained in the verbal WM before they were transferred into LTM. The ability to maintain and imitate these forms contributes to children's development of morphosyntactic knowledge. As more forms are stored, the complexity of the language spoken by the child increases.

Nonverbal WM skills were also expected to predict the development of morphosyntactic knowledge. To achieve the IST, children have to sustain their attention to a sequence of sorting the toys. Even though children were not expected to follow the same order as the experimenter to receive a passing score, they were mostly following the order used by the experimenter to sort the objects. It was observed that children who were randomly sorting the toys, had more difficulty in completing the task and made more errors. Similarly, morphosyntactic knowledge requires a grammaticaly correct ordering of words and morphemes. It was explored whether children's score on the IST predicted their

morphosyntactic development. Although the correlation between the scores of IST and morphosyntactic development was moderate, nonverbal WM did not predict a significant proportion of the variance, as assessed in the regression analyses.

The score for morphosyntactic knowledge included the use of inflections and use of complex sentence structure. A new morphology score was obtained without including the complex sentence structure part. The results showed that age was no longer a significant predictor and the NWR Task score was the only significant predictor of the morphology score.

7.1.3 The mean length for utterances

Previous research (Adams & Gathercole, 1995) found evidence that children's verbal WM, assessed by the NWR Task, was related to their speech production abilities in terms of mean length of utterances. Children with greater abilities to repeat non-words used more morphemes in their sentences than children who were less able to repeat non-words. In this study, mothers reported their children's three longest sentences and the mean number of morphemes used in these three sentences was calculated. Results supported the previous findings and revealed that verbal WM skills significantly contributed to the children's MLUs. Children who scored high in verbal WM task used more morphemes in their sentences than children who scored low on the NWR Task.

It was also explored whether nonverbal WM skills would significantly contribute to children's use of morphemes. The results showed no evidence of such a relationship. Nonverbal WM skills did not predict MLUs beyond the effects of verbal WM skills and age. Children require other language related cognitive capacities in addition to working memory skills to understand the functions of grammatical rules before starting to use them, such as mapping different meaning to different inflections and case markings, and knowing when to

semantically produce negation or question forms.

7.1.4 Difference in the rate of repetition within the 4- and 5-syllable non-words group

As some of the non-words in the NWR Task ended with actual Turkish inflections, they could be easier to repeat compared to the other same-length non-words. When the repetition rate of the familiar sounding non-words was compared to the remaining same-length non-words, it was found that there was no difference for the 4-syllable non-words. However, the repetition rate for familiar sounding 5-syllable non-words and the remaining non-words was different. As the task became more taxing on the working memory capacity, there was a difference between the familiar sounding non-words and non-familiar sounding non-words. Children had more difficulty in repeating 5-syllable non-words that ended without any familiar inflections. The same result could be expected within the 4-syllable non-words. One reason that there was no difference between the familiar and non-familiar sounding 4-syllable non-words could be the order of the presentation of the non-words. The 4 non-words that were identified as familiar sounding were at the end of the 4-syllable non-words list. If a child coul not repeat 5 consecutive non-words, the task was ended. Therefore, many children were not presented all 4 of these familiar sounding non-words because of this stopping rule.

7.1.5 Relation between IST and NWR Task

The IST score of children who could repeat 2- and 3-syllable non-words, 4- and 5-syllable non-words and those who could not repeat were analysed. There was a significant difference between those who could not repeat and those who could repeat 4- and 5-syllable non-words. There was also a significant difference between those who could repeat 2- and 3-syllable non-words and those who could repeat 4- and 5-syllable non-words. No significant difference was found between those who could not repeat and those can repeat 2- and 3-syllable non-words. The IST score differed between the groups when the task was harder and

required higher mental capacity. Children who could repeat 4- and 5-syllable non-words scored higher compared to children who could repeat less.

7.1.6 Effect of combinatorial use of morphemes in repeating 4- and 5- syllable non-words

Children who used multiple morphemes combinatorially were better at repeating both familiar sounding and non-familiar sounding non-words belonging to 4- and 5-syllable categories. In other words, the familiarity of the non-words did not make the task any easier for those who were already using multiple morphemes combinatorially.

7.1.7 Using multiple morphemes combinatorially and working memory skills

Children's expressive language develops generally after some receptive language is accumulated. In the preverbal phase children receive much language input. Children begin to express words by imitating the sounds they hear. Expressing a word is a combination of phonological processing in which children segment, and assembeling the sounds they hear in the correct way to produce the target word. The ability for this phonological process contributes to long-term learning of new words and producing them. It was evidenced that children with better verbal WM skills produced more complex speech than children with poorer verbal WM skills (Adams & Gathercole, 1995). Consistent with previous findings, our results revealed that children who scored high in the NWR Task used more multiple morphemes combinatorially and children who used only one morpheme or no morphemes at all had lower verbal WM skills. For children with better phonological abilities, processing and using a new form of a word is easier compared to children with poorer verbal WM abilities, who may need more presentations of a new syntactic form to be able to process and reproduce it for speech production.

As an exploratory question, it was analysed whether children who used multiple

morphemes combinatorially differ from children who use only one morpheme or do not use any morphemes at all in terms of their nonverbal WM skills. In order to communicate properly, children have to learn the grammatical rules for combining morphemes into words. The nonverbal WM task used in this study required the child to follow the experimenter on how to sort the objects, a task that requires keeping multiple items in mind. The results confirmed the hypothesis that children who use multiple morphemes combinatorially have higher nonverbal WM skills. However, nonverbal WM skills were not found to influence vocabulary size, morphosyntactic development and MLUs. It is proposed that producing multiple morphemes combinatorially requires a higher mental capacity than producing words in their stem form. Children who had high nonverbal WM skills were able to produce more multiple morphemes combinatorially.

7.2 Strengths, Limitations and Future Directions

Many previous studies have revealed a relation between verbal WM and language development in English-speaking children. The present study revealed a relationship between the verbal WM abilities of 21- to 36-months old Turkish speaking children and their expressive language development reported by their caregivers, measured in terms of vocabulary size, morphosyntactic knowledge, MLUs, and the extent of using multiple morphemes combinatorially. In this study, the effect of nonverbal WM skills was also examined. Even though, nonverbal WM correlated moderately with all the language outcomes positively, it did not significantly predict these outcomes in the presence of age and verbal WM skills. Based on the moderate correlations found between the nonverbal WM skills and language outcomes, other measures of nonverbal WM may be considered for future research.

The fact that this sample was composed of very young children, may be a misleading factor in revealing the relationship between WM skills and language outcomes as the

language of the young children are still developing. The use of measures that address their receptive language skills besides their expressive language skills could reflect a better understanding of the link between language skills and nonverbal WM skills.

Finally, children's score on the vocabulary size, morphological development, MLUs and the use of multiple morphemes combinatorially were based on the information reported by their mothers. There was no direct data collected from the child for assessing their language development. This may be affected by the mothers' tendency to overestimate or undersestimate their children's abilities. In order to have a rather objective estimate of children's language abilities, measured in terms the number of words, MLUs, and syntactic complexity, recording children's spontaneous speech during a structured play session is proposed for future research.

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Appendix A

Copy of Announcement of the Study

KOÇ ÜNİVERSİTESİ

Sayın Anne/Baba,

Çocuklarınızın dil gelişimi ile akılda tutma becerilerinin nasıl geliştiğini merak ediyor musunuz? Bu alanda yapılan araştırmalar bize çocukların dil becerileriyle akılda tutma becerilerinin ilişkili olduğunu gösteriyor. Biz de benzer bir araştırmayı Türkçe konuşan çocuklarla gerçekleştirmek istiyoruz.
Sizi ve çocuğunuzu Koç Üniversitesi'nde Dil ve İletişim Gelişimi ile ilgili araştırmamızın bir parçası olmaya davet ediyoruz. Çalışmamızda 20-36 aylık çocukların bir kerelik laboratuarımıza gelip araştırma görevlimizle birlikte oynayacakları oyun sırasında oyuncakları ayırırken akılda tutma ve yapılanı tekrarlama yeteneklerini gözlemleyeceğiz. Aynı zamanda sizinle birlikte çocuğunuzun dil gelişimini değerlendirmemizi sağlayacak bir anket dolduracağız. Bu testler çocuğunuzun hafıza ve dil becerilerinin gelişimi hakkında hem sizin, hem de bizim fikir edinmemizi sağlayacaktır. Tabii ki bütün çalışma boyunca çocuğunuzun yanında kalabileceksiniz. Görüşme sonunda çocuğunuzun performansı ile ilgili sözlü geribildirimi verilecektir.
Bu araştırmada doğru ya da yanlış yoktur. Çocuğunuzun yaptığı her şey bizim için çok önemli ve değerli! Siz de çocuklarınızın bize ne kadar çok şey öğrettiğini görünce şaşıracaksınız.
Eğer 20-36 ay arası bir çocuğun velisi değilseniz, bu yaş aralığında çocuğu olduğunu bildiğiniz ailelere araştırmamızla ilgili bilgileri ulaştırabilirseniz çok seviniriz.
Çocuğunuz 20 aylıktan küçükse, ilerleyen aylarda çalışmamıza katılmak için de şimdiden iletişime geçebilirsiniz.
Araştırmamıza katılmak için easael@ku.edu.tr adresine mail gönderebilir, 0532 445 69 69 no'lu numaradan bizi arayabilir veya zarfın içindeki katılım formunu okul yönetimine ulaştırabilirsiniz.
Araştırma bulgularının dökümü, anonim bilgiler içerecek; tüm katılımcıların kimlikleri tanınmasına izin vermeyecek şekilde gizlenecektir. Siz ya da çocuğunuz bu araştırmaya katılmayı ya da anketteki soruları yanıtlamayı reddedebilirsiniz. Çalışmadan istediğiniz herhangi bir anda neden göstermeden çekilme hakkına sahipsiniz. Araştırmamız tamamen ücretsizdir.

İlgi gösterdiğiniz ve bize zaman ayırdığınız için teşekkür ederiz.

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Appendix B

Copy of Application Form

KOÇ ÜNİVERSİTESİ

Dil ve İletişim Gelişimi Çalışmaları Ekibi

KAYIT FORMU	
Çocuğunuzun Adı/Soyadı	
Çocuğunuzun Doğum Tarihi	
Çocuğunuzun Cinsiyeti	
*Tercih edilen randevu gün ve saatleri	
Velinin Adı/Soyadı	
Çocuğunuz yuvaya/kreşe gidiyor mu?	
Sizin ve eşinizin eğitim durumu?	
Sizin ve eşinizin meslekleri?	
Başka çocuğunuz var mı, varsa isim ve doğum tarihi?	
Evde çocuğunuzla Türkçe'den başka bir dil kullanıyor musunuz?	
Mail Adresiniz	
Size ulaşabileceğimiz telefon numarası	
Size nasıl ulaşabiliriz?	
Araştırmamızı nereden duydunuz?	
Belirtmek istediğiniz bir durum varsa lütfen yazınız.	

* Tercih edilen randevu gün ve saatleri sütununa çocuğunuzu haftaiçi mi haftasonu mu okulumuza getirmeyi tercih ettiğinizi ve çocuğunuzun yemek&uyku saatleri dışındaki saatleri yazarsanız randevuyu ona göre ayarlayabiliriz.

Çocuğun Adı-Soyadı: _____ **Cinsiyeti:**_____

Doğum Tarihi:_____ **Tarih:** _____

Anketör:_____ **Katılımcı Kodu:** _____

"16-36 ay arasında bebekler pek çok sözcük anladıkları gibi pek çok sözcüğü de kullanmaya başlarlar. Daha sonra da sözcükleri yan yana getirip, ekler takıp cümle kurar ve iletişime geçerler. 15 ayı kapsayan bu yaş diliminin başındaki ve sonundaki çocuklar arasında dil gelişimi açısından önemli farklılıklar görülür. Ayrıca her çocuğun gelişim hızı da farklıdır. Bu anket dil gelişimi açısından çok farklılık gösteren bu yaş dilimindeki çocuklar için düzenlenmiştir. O yüzden soracağım sözcükler ve cümle yapıları henüz sizin çocuğunuz tarafından kullanılmıyor olabilir. Dolayısıyla bunun bir sorun olduğunu düşünmenize gerek yoktur."

"Bir sorunuz var mı?" (soru varsa cevaplandırınız)

"Peki, o zaman başlayabiliriz."

BÖLÜM I: ÇOCUKLARIN KULLANDIĞI SÖZCÜKLER

Aşağıdaki liste küçük çocukların sözcük dağarcığında sıklıkla yer alan sözcükleri içermektedir. Ben size çocuğunuzun bu listedeki sözcüklerden hangilerini kullandığını soracağım. Çocuğunuz bir sözcüğü burada yazıldığından farklı söylüyorsa (örneğin, *balık* yerine *bayık* veya *çay* yerine *tay*), bu yine de onun sözcüğü bildiği anlamına gelmektedir. Unutmayın ki aşağıdaki liste farklı yaş gruplarındaki birçok çocuğun kullandığı sözcüklerden oluşmaktadır. Bu nedenle eğer çocuğunuz şu an yalnızca bir kaçını biliyorsa bu bir sorun değildir.

(ANKETÖR: "Söylüyor" ve "kullanıyor" sözcüklerini dönüşümlü olarak kullanabilirsiniz.)

1. ÇEŞİTLİ SESLER VE HAYVAN SESLERİ (13)					
	söyler		söyler		söyler
Cee	O	Havhav	O	Uf	O
Cıss	O	Hop/Hoppa	O	Vak vak	O
Çufçuf	O	Mee	O	Vınn	O
Düt	O	Pisi-pisi	O		
Ham	O	Şişt	O		

2. HAYVANLAR (41)					
	söyler		söyler		söyler
Arı	O	Horoz	O	Maymun	O
Aslan	O	İnek	O	Ördek	O
At	O	Kaplan	O	Örümcek	O
Ayı	O	Karga	O	Papağan	O
Balık	O	Karınca	O	Sincap	O
Baykuş	O	Kartal	O	Sinek	O
Böcek	O	Keçi	O	Tavşan	O
Deve	O	Kedi	O	Tavuk	O
Domuz	O	Koyun	O	Timsah	O
Eşek	O	Köpek	O	Yavru	O
Fare	O	Kurbağa	O	Zebra	O
Fil	O	Kuş	O	Zürafa	O
Geyik	O	Kurt	O	Kuzu	O
Hayvan	O	Leylek	O		

3. TAŞITLAR (14)					
	söyler		söyler		söyler
Ambulans	O	İtfaiye	O	Traktör	O
Araba	O	Kamyon	O	Tren	O
Bisiklet	O	Kayık	O	Uçak	O
Gemi/Vapur	O	Motosiklet	O	Yelkenli	O
Helikopter	O	Otobüs	O		

4. OYUNCAKLAR (20)					
	söyler		söyler		söyler
Balon	O	Kalem	O	Oyuncak	O
Bebek	O	Kitap	O	Pazıl/Yap-boz	O
Blok	O	Kova	O	Robot	O
Boya	O	Kukla	O	Top	O
Davul	O	Kürek	O	Tüfek	O
Defter	O	Lego	O	Uçurtma	O
Düdük	O	Masal	O		

5. YİYECEK VE İÇECEKLER (66)					
	söyler		söyler		söyler
Armut	O	Karpuz	O	Pizza	O
Ayran	O	Kayısı	O	Poğaça	O
Bal	O	Kek	O	Portakal	O
Balık	O	Ketçap	O	Reçel	O
Bisküvi	O	Kiraz	O	Sakız/Çiklet	O
Börek	O	Kola	O	Salam	O
Cips	O	Köfte	O	Salatalık	O
Çay	O	Kurabiye	O	Simit	O
Çikolata	O	Limon	O	Soğan	O
Çilek	O	Lokum	O	Sosis	O
Çorba	O	Makarna	O	Su	O
Dolma	O	Mandalina	O	Sucuk	O
Domates	O	Meyve	O	Süt	O
Dondurma	O	Mısır	O	Şeker	O
Ekmek	O	Muhallebi	O	Tarhana	O
Elma	O	Muz	O	Tost	O
Et	O	Nar	O	Tuz	O
Fasulye	O	Nohut	O	Üzüm	O
Fıstık	O	Pasta	O	Yemek	O
Gazoz	O	Patates	O	Yoğurt	O
Ispanak	O	Peynir	O	Yumurta	O
Kahve	O	Pilav	O	Zeytin	O

6. GİYSİLER (32)					
	söyler		söyler		söyler
Ayakkabı/Pabuç	O	Eldiven	O	Palto	O
Bez (çocuk bezi)	O	Eşofman	O	Pantolon	O
Bilezik	O	Etek	O	Pijama	O
Bluz	O	Fanila/Atlet	O	Şapka	O
Bot	O	Gecelik	O	Şort	O
Ceket	O	Gözlük	O	Taç	O
Cep	O	Kazak	O	Tayt	O
Çizme	O	Kemer	O	Terlik	O
Çorap	O	Küpe	O	Tişört	O
Don/Külot	O	Mont	O	Toka	O
Elbise	O	Önlük	O		

7. VÜCUT BÖLÜMLERİ (27)					
	söyler		söyler		söyler
Ağız	O	Dil	O	Kol	O
Ayak	O	Diş	O	Kulak	O
Bacak	O	Diz	O	Parmak	O
Baş/Kafa	O	El	O	Popo	O
Bıyık	O	Göbek	O	Saç	O
Boğaz	O	Göz	O	Tırnak	O
Boyun	O	Kalp	O	Vücut	O
Burun	O	Karın	O	Yanak	O
Çene	O	Kirpik	O	Yüz/Surat	O

8. KÜÇÜK EV EŞYALARI (33)					
	söyler		söyler		söyler
Anahtar	O	Çöp	O	Perde	O
Ayna	O	Emzik	O	Radyo	O
Bant (plaster)	O	Havlu	O	Resim	O
Bardak	O	İlaç	O	Saat	O
Battaniye	O	Kağıt	O	Sabun	O
Bıçak	O	Kaşık	O	Süpürge	O
Biberon	O	Kumanda	O	Şemsiye	O
Çanta	O	Lamba/Işık	O	Tabak	O
Çatal	O	Mendil	O	Tarak	O
Çaydanlık	O	Pamuk	O	Telefon	O
Çekiç	O	Peçete	O	Ütü	O

9. MOBİLYALAR VE ODALAR (27)					
	söyler		söyler		söyler
Balkon	O	Kapı	O	Salon	O
Banyo	O	Koltuk	O	Sandalye/İskemle	O
Bilgisayar	O	Lazımlık/Oturak	O	Sehpa	O
Buzdolabı	O	Masa	O	Televizyon/TV	O
Dolap	O	Merdiven	O	Tuvalet	O
Duş	O	Mutfak	O	Yatak	O
Fırın	O	Ocak	O	Yastık	O
Halı	O	Oda	O	Yorgan	O
Kalorifer	O	Pencere	O	Zil	O

10. EVİN DIŞI (37)					
	söyler		söyler		söyler
Ay/Aydede	O	Dünya	O	Salıncak	O
Ağaç	O	Fotoğraf	O	Sokak	O
Ateş	O	Garaj	O	Taş	O
Bahçe	O	Göl	O	Tekerlek	O
Bulut	O	Güneş	O	Toprak	O
Bayrak	O	Kar	O	Toz	O
Çamur	O	Kaydırak	O	Trafik	O
Çiçek	O	Kaza	O	Yağmur	O
Çimen	O	Kozalak	O	Yangın	O
Dağ	O	Köprü	O	Yaprak	O
Dal	O	Kum	O	Yol	O
Duman	O	Odun	O		
Duvar	O	Ot	O		

11. GİDİLECEK YERLER (25)					
	söyler		söyler		söyler
Atta	O	Hastane	O	Park	O
Bakkal	O	İş	O	Pazar	O
Cami	O	Komşu	O	Piknik	O
Çarşı	O	Köy	O	Plaj	O
Dışarı	O	Kreş/Yuva	O	Sinema	O
Deniz	O	Maç	O	Sirk	O
Düğün	O	Market	O	Tiyatro	O
Dükkan	O	Okul	O		
Ev	O	Orman	O		

12. İNSANLAR (32)					
	söyler		söyler		söyler
Abi	O	Çocuk	O	Oğlan	O
Abla	O	Dede	O	Öğretmen	O
Adam	O	Doktor	O	Palyaço	O
Amca	O	Erkek	O	Polis	O
Anne	O	Gelin	O	Prenses	O
Anneanne	O	Hala	O	Tamirci	O
Arkadaş	O	Kadın	O	Teyze	O
Asker	O	Kardeş	O	Yenge	O
Baba	O	Kendi ismi	O		
Babaanne	O	Kız	O		
Bebek	O	Kral	O		
Berber/Kuaför	O	Nine	O		

13. OYUNLAR VE RUTİNLER (40)					
	söyler		söyler		söyler
Aferin	O	Hadi	O	Şaka	O
Alkış	O	Hayır	O	Şarkı	O
Alo	O	Hoşgeldiniz	O	Tabii	O
Ayıp	O	İyi geceler	O	Takla	O
Banyo	O	Kahvaltı	O	Tamam	O
Bay-bay	O	Kaka	O	Teşekkür/Mersi/Sağol	O
Çiş	O	Kucak	O	Uyku	O
Dikkat	O	Lütfen	O	Var	O
Doğumgünü	O	Mama	O	Yarış	O
Efendim	O	Merhaba	O	Yazık	O
Evcilik	O	Müzik	O	Yeter	O
Evet	O	Ninni	O	Yok	O
Güle-güle	O	Saklambaç	O		
Günaydın	O	Sürpriz	O		

14. EYLEM SÖZCÜKLERİ-I (90) Toplam (146)					
	söyler		söyler		söyler
Acı (canı)	O	Çek	O	Hastalan	O
Acık	O	Çevir	O	Hatırla	O
Aç	O	Çıkar	O	Isır	O
Açıl	O	Çiz	O	Islan	O
Ağla	O	Dağıt	O	İç	O
Al	O	Dinle	O	İn	O
Anla	O	Dokun	O	İste	O
Anlat	O	Doy	O	İt	O
Ara	O	Dön	O	Kaç	O
Atla	O	Döv	O	Kal	O
At	O	Dur	O	Kaldır	O
Bağır	O	Duy	O	Kalk	O
Bağla	O	Dök	O	Kana	O
Bak	O	Düş	O	Kapan	O
Bas	O	Düzelt	O	Kapat	O
Başla	O	Elle	O	Karıştır	O
Beğen	O	El salla	O	Kay	O
Bekle	O	Ez	O	Kes	O
Benze	O	Gel	O	Kır	O
Bırak	O	Getir	O	Kırıl	O
Bil	O	Gez	O	Kirlet	O
Bin	O	Gıdıkla	O	Kokla	O
Bit	O	Gir	O	Kon	O
Bitir	O	Git	O	Konuş	O
Boya	O	Giy	O	Kop	O
Boz	O	Giydir	O	Kopar	O
Bul	O	Gör	O	Kork	O
Büyü	O	Göster	O	Koş	O
Çağır	O	Götür	O	Koy	O
Çalış	O	Gül	O	Kurtar	O

14. EYLEM SÖZCÜKLERİ-II (56)					
	söyler		söyler		söyler
Küs	O	Sık	O	Ver	O
Oku	O	Sıkış	O	Vur	O
Ol	O	Sil	O	Yak	O
Otur	O	Sok	O	Yan	O
Oyna	O	Sor	O	Yap	O
Öğret	O	Söyle	O	Yapış	O
Öl	O	Sus	O	Yat	O
Öp	O	Susa	O	Yaz	O
Ört	O	Süpür	O	Ye	O
Özle	O	Şişir	O	Yedir	O
Patla	O	Tak	O	Yık	O
Pişir	O	Tara	O	Yıkıl	O
Sakla	O	Taşı	O	Yıka	O
Salla	O	Topla	O	Yıkan	O
Sallan	O	Tut	O	Yırt	O
Sarıl	O	Uç	O	Yorul	O
Say	O	Unut	O	Yut	O
Sev	O	Uyan	O	Yürü	O
Seyret	O	Üzül	O		

15. TANIMLAMAYA YARDIMCI SÖZCÜKLER (61)					
	söyler		söyler		söyler
Acı	O	İğrenç	O	Sessiz	O
Açık	O	İki	O	Sıcak	O
Ağır	O	İyi	O	Siyah	O
Az	O	Kahverengi	O	Soğuk	O
Beyaz	O	Kapalı	O	Şirin	O
Boş	O	Karanlık	O	Tatlı	O
Büyük	O	Katı	O	Temiz	O
Cadı	O	Kırık	O	Ters	O
Canavar	O	Kırmızı	O	Turuncu	O
Cici	O	Kısa	O	Uzun	O
Cüce	O	Kirli	O	Yapışkan	O
Çirkin	O	Kocaman	O	Yavaş	O
Delik	O	Komik	O	Yeşil	O
Dolu	O	Koyu	O	Yumuşak	O
Ekşi	O	Kötü	O	Yüksek	O
Eski	O	Kuru	O	Zor	O
Güzel	O	Küçük	O	Yaramaz	O
Hasta	O	Mor	O	Yaş	O
Hazır	O	Pis	O	Yeni	O
Hızlı	O	Sarı	O		
Islak	O	Sert	O		

16. ZAMANLA İLGİLİ SÖZCÜKLER (13)					
	söyler		söyler		söyler
Akşam	O	Hemen	O	Sonra	O
Bazen	O	Ondan sonra	O	Şimdi	O
Bugün	O	Öğlen	O	Yarın	O
Dün	O	Önce	O		
Gece	O	Sabah	O		

17. ZAMİRLER (21)					
	söyler		söyler		söyler
Bana	O	Siz	O	Onun	O
Ben	O	Sizin	O	Kimse	O
Benim	O	Şu	O	Sana	O
Bu	O	Kendi	O	Biri	O
Biz	O	Kendim	O	Şey	O
Bizim	O	O	O		
Sen	O	Ona	O		
Senin	O	Onlar	O		

18. SORU SÖZCÜKLERİ (12)					
	söyler		söyler		söyler
Hangi	O	Ne	O	Nereye	O
Kaç tane	O	Ne zaman	O	Nerede	O
Kim	O	Neden	O	Nereden	O
Nasıl	O	Ne kadar	O	Niye	O

19. YER BİLDİREN SÖZCÜKLER (21)					
	söyler		söyler		söyler
Altında	O	Geride	O	Önünde	O
Arasında	O	İçeride	O	Şurada	O
Arkasında	O	İçinde	O	Uzak	O
Aşağıda	O	İleride	O	Üstünde/Üzerinde	O
Burada	O	Karşıda	O	Yakın	O
Dışarıda	O	Orada	O	Yanında	O
Dışında	O	Ortada	O	Yukarıda	O

20. BELİRLEYİCİ SÖZCÜKLER (23)					
	söyler		söyler		söyler
Aynı	O	En	O	İşte	O
Başka	O	Galiba	O	Öbürü	O
Belki	O	Gibi	O	Öteki	O
Bile	O	Her	O	Tam	O
Biraz	O	Hep	O	Tek	O
Böyle	O	Hepsi	O	Yine/Gene	O
Çok	O	Hiç	O	Zaten	O
Daha	O	Hiçbiri	O		

21. BAĞLAÇLAR (7)					
	söyler		söyler		söyler
Ama	O	Diye	O	Ve	O
Çünkü	O	O zaman	O		
De/da	O	Sonra	O		

B. ÇOCUĞUNUZ SÖZCÜKLERİ NASIL KULLANIYOR?

1. Çocuğunuz geçmiş olaylar hakkında konuşuyor mu? Örneğin, geçen hafta parka gitmiş olan bir çocuk daha sonra "salıncak", "kaydım", "kum" gibi sözcükler söyleyebilir. Çocuğunuz bunu yapıyor mu?

   Henüz değil O Bazen O Çoğu zaman O

2. Çocuğunuz hiç yakın gelecekte yapılacak bir şey hakkında konuşuyor mu? Örneğin, bir yolculuğa çıkmak üzere evden ayrılırken "araba", "çuf çuf", demek, ya da parka giderken "sallan" demek gibi?

   Henüz değil O Bazen O Çoğu zaman O

3. Çocuğunuz hiç o anda orada bulunmayan bir şey, örneğin kaybolmuş bir oyuncak, evde olmayan bir kişi hakkında konuşuyor mu?

   Henüz değil O Bazen O Çoğu zaman O

4. Çocuğunuz, siz o anda odada bulunmayan bir şeyi sorduğunuzda anlıyor mu? Örneğin, "ayın nerede", "terliklerin nerede" dediğinizde bunu almaya odasına gidiyor mu?

   Henüz değil O Bazen O Çoğu zaman O

5. Çocuğunuz bir eşyayı eline alıp veya gösterip o eşyanın o anda orada bulunmayan sahibinin ismini söylüyor mu? Örneğin, anne odada yokken annenin terliğine işaret edip "anne" demek gibi?

   Henüz değil O Bazen O Çoğu zaman O

BÖLÜM II. CÜMLELER ve DİL BİLGİSİ

A. SÖZCÜK EKLERİ

1. Şu anda olmakta olan bir olay hakkında konuşurken "bakıyor, koşuyor, ağlıyor" örneklerinde olduğu gibi fiillerin sonuna "-iyor" takısı ekleriz. Çocuğunuz bunu yapmaya başladı mı?

   Henüz değil O Bazen O Çoğu zaman O

2. Henüz tamamlanmış veya geçmişte olmuş olaylar hakkında konuşurken "öptü, açtı, itti" örneklerinde olduğu gibi fiillerin sonuna "-di" takısı ekleriz. Çocuğunuz bunu yapmaya başladı mı?

   Henüz değil O Bazen O Çoğu zaman O

3. Geçmişte tamamlanmış ancak olurken görmediğimiz olaylar hakkında konuşurken "açmış, kırılmış, bozulmuş" örneklerinde olduğu gibi fiillerin sonuna "-miş" takısı ekleriz. Çocuğunuz bunu yapmaya başladı mı?

   Henüz değil O Bazen O Çoğu zaman O

4. Genelde hep olan veya yapılması uygun görülen durumlar hakkında konuştuğumuzda "sever, içer, uyur" örneklerinde olduğu gibi fiillerin sonuna "-er" takısı ekleriz. Çocuğunuz bunu yapmaya başladı mı?

   Henüz değil O Bazen O Çoğu zaman O

5. Gelecekte yapmayı planladığımız durumlar hakkında konuşurken "gideceğiz, alacağız, oynayacağız örneklerinde olduğu gibi fiillerin sonuna "-ecek" takısı ekleriz. Çocuğunuz bunu yapmaya başladı mı?

   Henüz değil O Bazen O Çoğu zaman O

6. Çocuğunuz, "baba geldi mi, ayı orda mı" örneklerinde olduğu gibi soru sorarken "-mi" soru ekini kullanmaya başladı mı?

   Henüz değil O Bazen O Çoğu zaman

7. Çocuğunuz, "süt istemem, et yemem" örneklerinde olduğu gibi olumsuzluk ifade etmek için "-me" ekini kullanmaya başladı mı?

   Henüz değil O Bazen O Çoğu zaman O

8. Sahip olduğumuz bir şey hakkında konuştuğumuzda kimin olduğunu belirtmek için "anahtarım", "topum" ve "bebeğim" örneklerinde olduğu gibi sözcüklere "-im" takısını ekleriz. Çocuğunuz bunu yapmaya başladı mı?

   Henüz değil O Bazen O Çoğu zaman O

9. Çocuğunuz bir şeyi birisine vermekten bahsederken (örneğin, yediği elmasından "babaya", "anneye" vermek istediğini belirtmek için) "-e", "-a" takısını kullanmaya başladı mı?

   Henüz değil O Bazen O Çoğu zaman O

10. Çocuğunuz bir şeyin nerede olduğunu söylerken (örneğin, oyuncak ayısının "yatakta" ya da kalemin "masada" olduğunu belirtmek için) "-da" ekini kullanmaya başladı mı?

Henüz değil O Bazen O Çoğu zaman O

11. Çocuğunuz bir şeyi ona vermenizi istediği zaman (örneğin birlikte oynadığınız bir nesneyi "bebeği" "kalemi" istemek için) "-i" takısını kullanmaya başladı mı?

Henüz değil O Bazen O Çoğu zaman O

B. ÇOCUĞUNUZ ŞU ANA KADAR BİRDEN FAZLA SÖZCÜĞÜ AYNI CÜMLE İÇİNDE KULLANMAYA BAŞLADI MI? ÖRNEĞİN; "anne otur", "baba gel", "top at", "su ver" gibi:

Henüz değil O Bazen O Çoğu zaman O

C. ÇOCUĞUNUZ ŞU ANA KADAR SÖZCÜKLERE EK TAKMAYA BAŞLADI MI?

ÖRNEĞİN; "bu-nu/bu-na", "düş-tü/düş-üyor" gibi:

Henüz değil O Bazen O Çoğu zaman O

D. ÖRNEKLER: Çocuğunuzdan bu güne kadar duyduğunuz en uzun üç cümleyi aşağıya yazınız.

1. _____

2. _____

3. _____

Eğer yukarıdaki B ve C sorularının hepsine annenin cevabı "henüz değil" ise, lütfen burada soruları sormayı/ cevaplamayı bırakın. Eğer annenin kimi cevabı "bazen" ya da "çoğu zaman" ise, lütfen soruları cevaplamaya devam edin.

E. İSİMLERE GELEN DURUM EKLERİ

Şimdi size çocukların öğrendikleri isim eklerini bazı sözcüklerle örnekleyerek okuyacağım. Sizden çocuğunuzun kullandığı ekleri belirtmenizi istiyorum. Çocuğunuz bu ekleri örnekte görülen sözcüklerle değil başka sözcüklerle kullanıyor olabilir, siz yanıtınızı eki düşünerek veriniz. Öğrenmek istediğimiz, "baba-dan, masa-dan, ev-den, araba-dan" örneklerinde olduğu gibi "–dan" ekini kullanıyor mu? **(ANKETÖR: diğer ekler için de aynı şekilde örnekleyerek okuyunuz; ek örneklemelerde kullanılabilecek isimler: kaşık, top, anne)**

Baba	Masa	Ev	Araba	
baba-dan	masa-dan	ev-den	araba-dan	O
baba-yla	masa-yla	ev-le	araba-yla	O
baba-nın	masa-nın	ev-in	araba-nın	O
baba-lar	masa-lar	ev-ler	araba-lar	O

F. FİİL EKLERİ

Şimdi size çocukların öğrendikleri fiil eklerini bazı sözcüklerle örnekleyerek okuyacağım. Bunlardan çocuğunuzun kullandığını duyduğunuz ekleri bana söylemenizi istiyorum. Çocuğunuz bu ekleri örnekte verilen sözcüklerle değil başka sözcüklerle kullanıyor olabilir, siz yanıtınızı eki düşünerek veriniz. Öğrenmek istediğimiz, "gel-sene, aç-sana, ver-sene" örneklerinde olduğu gibi "–sana" ekini kullanıyor mu? **(ANKETÖR: diğer ekler için de aynı şekilde örnekleyerek okuyunuz; ek örneklemelerde kullanılabilecek fiiller: öp, koş, ye)**

Gel	Aç	Ver	
gel-sene	aç-sana	ver-sene	O
gel-elim	aç-alım	ver-elim	O
gel-sin	aç-sın	ver-sin	O
gel-miş-ti	aç-mış-tı	ver-miş-ti	O
gel-iyor-muş	aç-ıyor-muş	ver-iyor-muş	O
gel-se	aç-sa	ver-se	O

Şimdi size aynı fiillerle başka örnekler okuyacağım. Çocuğunuzun bu ekleri de kullanıp kullanmadığını değerlendirmenizi istiyorum. Çocuğunuz bu ekleri örnekte görülen sözcüklerle değil başka sözcüklerle kullanıyor olabilir, siz yanıtınızı eki düşünerek veriniz. Öğrenmek istediğimiz, "gel-ebil-ir, aç-abil-ir, ver-ebil-ir" örneklerinde olduğu gibi "–ebil" ekini kullanıyor mu? **(ANKETÖR: diğer ekler için de aynı şekilde örnekleyerek okuyunuz; ek örneklemelerde kullanılabilecek fiiller: öp, koş, ye)**

Gel	Aç	Ver	
gel-ebil-ir	aç-abil-ir	ver-ebil-ir	O
gel-meli	aç-malı	ver-meli	O
gel-me-di	aç-ma-dı	ver-me-di	O
gel-e-me-di	aç-a-ma-dı	ver-e-me-di	O

Şimdi de şu sözcükleri değerlendirmenizi istiyorum. Çocuğunuz bu örneklere benzer sözcükler kullanıyor mu? Siz yanıtınızı eki düşünerek veriniz. Öğrenmek istediğimiz, "iç-il-ir, aç-ıl-ır, ver-il-ir" örneklerinde olduğu gibi "–il" ekini kullanıyor mu? **(ANKETÖR: diğer ekler için de aynı şekilde örnekleyerek okuyunuz; ek örneklemelerde kullanılabilecek fiiller: öp, koş, ye)**

İç	Aç	Yap	
iç-il-ir	aç-ıl-ır	yap-ıl-ır	O
iç-il-mez	aç-ıl-maz	yap-ıl-maz	O
iç-ir	aç-tır	yap-tır	O

G- KARMAŞIK CÜMLE YAPILARI

Aşağıda çeşitli durumlar örneklenmiş ve bu durumlarda çocuğunuzun kullanıyor olabileceği cümleler verilmiştir. Lütfen her bir durum için çocuğunuzun şu andaki konuşma biçimine en yakın olan örneği belirtiniz.

(ANKETÖRE: Anne farklı bir cümle yapısı verirse lütfen yazınız)

1. Annesini ararken aşağıdakilerden hangisini söyler?

Anne	O
Anne nerde?	O
Hiçbirini demiyor	O

2. Bir yere gitmek istediği zaman aşağıdakilerden hangisini söyler?

Eve gidelim/Parka gidelim/Attaya gidelim	O
Eve gitmek istiyorum/Parka gitmek istiyorum/Attaya gitmek istiyorum	O
Hiçbirini demiyor	O

3. İki şeyi bir arada istediğinde (örneğin hem süt hem bisküvi istediğinde) aşağıdakilerden hangisini söyler?

Bisküvi istiyorum, süt istiyorum/Bebek istiyorum, top istiyorum	O
Bisküvi ve süt istiyorum/Bebek ve top istiyorum.	O
Hiçbirini demiyor	O

4. Bir şeyin sebep ve sonucunu (örneğin düştüğü için ağladığını) belirtmek için aşağıdakilerden hangisini söyler?

Düştüm, ağladım/Bastım, çaldı	O
Düşünce ağladım/Basınca çaldı	O
Hiçbirini demiyor	O

5. Bir şeyi ne amaçla yaptığını anlatmak için aşağıdakilerden hangisini söyler?

Aldık, sevinsin/Öptüm, ağlamasın	O
Sevinsin diye aldık/Ağlamasın diye öptüm	O
Hiçbirini demiyor	O

6. Ne yapacağını anlatırken:

Yemek yiycem, uyuycam/Oynuycam, yatıcam	O
Yemekten sonra uyuycam/Oynadıktan sonra yatıcam	O
Hiçbirini demiyor	O

7. Olaylar arasındaki ilişkiyi anlatırken aşağıdakilerden hangisini söyler?

Koştum, düştüm/Oynadım, kırdım	O
Koşarken düştüm/Oynarken kırdım	O
Hiçbirini demiyor	O

8. Olaylar arasındaki ilişkiyi anlatırken aşağıdakilerden hangisini söyler?

Topumu alıyım, geliyim/Açayım bakıyım	O
Topumu alıp geliyim/Açıp bakıyım	O
Hiçbirini demiyor	O

9. Kendi yapmadığı bir olayı anlatırken aşağıdakilerden hangisini söyler?

Kırdı/Açtı	O
Kırıldı/Açıldı	O
Hiçbirini demiyor	O

DİĞER EKLEMELER

TİGE ENVANTERİ DEMOGRAFİK BİLGİ FORMU

İl Kodu:_____ **İlçe:**_____

Anketör :_____ **Katılımcı Kodu:**_____

Merhaba,

Biz 8 ay - 36 ay arasındaki çocuklar hakkında bir araştırma yapıyoruz. Adresinizi Muhtar (veya duruma göre Sağlık Ocağı'ndan) aldık. Bu araştırmayı, İstanbul'dan Yeditepe ve Koç, Adana'dan Çukurova, Ankara'dan Hacettepe ve Ankara, Eskişehir'den Anadolu Üniversiteleri yürütüyor. Bu araştırmanın amacı, 8-36 aylar arasındaki çocukların aydan aya gelişen ortalama dil ve iletişim becerilerini incelemektir. Araştırmada sizinle yaklaşık 1.5-2 saat sürecek bir görüşme yapmak istiyoruz. Sizinle yaptığımız bu görüşme Türkiye'de 3000 anneyle daha yapılıyor. Bu görüşme sırasında çocuğunuzun dil gelişimi ile ilgili ayrıntılı bir anket dolduracağız. Çocuğunuzun anlayabildiği ve söyleyebildiği sözcüklere odaklanacağız. Ayrıca size aileniz hakkında birkaç soru da soracağız.

Görüşmemiz sırasında sizden aldığım bilgiler yalnızca dil gelişimi konusunda çalışan araştırma ekibimiz tarafından görülecek. Sizin isminiz tamamen saklı tutulacak. Eğer bu görüşme için bize izin verirseniz çok memnun oluruz. Eğer görüşmemiz sırasında herhangi bir sorunuz varsa ben elimden geldiği kadar yanıtlamaya çalışırım. Yanıtlayamadığım soruları da araştırma ekibine yönlendirebilirim. Görüşmemizi tamamladığımızda çocuğunuza küçük bir hediye takdim edeceğim.

B0.1 Bizimle görüşmeyi kabul ediyor musunuz?

1> Evet 2>Hayır

B0.2 Eğer şu anda vaktiniz yoksa sizinle daha sonra görüşmek için bir randevu alabilir miyim?

1> Evet 2>Hayır (ANKETE SON VER)

Randevu günü: _____/_____/20____ (GÜN-AY-YIL)

Randevu saati: _____

Bu görüşme ile ilgili bize zaman ayırdığınız için çok teşekkür ederiz.

Araştırma ekibimiz:

Ekip Üyeleri	**İş telefonu**	**Cep telefonu**	**E-posta**
Prof. Dr. Ayhan Koç	0216- 578 0890	0542- 574 2542	koc@boun.edu.tr
Doç. Dr. Aylin Küntay	0212- 338 1409	0546 -224 1251	akuntay@ku.edu.tr
Doç. Dr. Funda Acarlar	0312 3633350 / 3002	0532-7267965	acarlar@education.ankara.edu.tr
Doç. Dr. Figen Turan	0312-3051526 / 122	0532-7153243	fturan@hacettepe.edu.tr
Prof. Dr. Seyhun Topbaş	0222-3352337	0532-7324684	stopbas@anadolu.edu.tr
Doç. Dr. İlknur Maviş	0222-3352337	0532-4809807	imavis@anadolu.edu.tr
Doç. Dr. Hatice Sofu	0322-3386084 / 2793	0532-4867772	hasofu@cu.edu.tr

BÖLÜM 01-ÇOCUK İLE İLGİLİ BİLGİLER	
Çocuğun adı soyadı:	_____ *C1*
Cinsiyet:	_____ *C2*
Çocuğun doğum tarihi:	_____/_____/_____ (YIL/AY/GÜN)
Çocuğun yaşı:	_____/_____/_____ (YIL/AY/GÜN) *C3*
Anket tarihi:	_____/_____/_____ (YIL/AY/GÜN)

BÖLÜM 02. KİŞİSEL BİLGİLER

Annenin adı - soyadı	: …… ……
Adres	: …… ……
Telefon no (Ev/Cep)	: …… ……
Anketin yapıldığı il ismi	: …… ……
Anketör adı	: …… ……
Anket başlangıç saati	: …… ……
Anket bitiş saati	: …… ……

Soru	**BÖLÜM 03-DEMOGRAFİK SORULAR**		
1	Doğum tarihinizi öğrenebilir miyim? (Doğum tarihi bilinmiyor ise yaşı) Kaç yaşındasınız?	Gün……..…. Ay…….……Yıl……. Yaş:_____	*C4*
2	Nerede doğdunuz? Merkez il mi, ilçesi veya köyü mü?	1> Metropol, büyük şehir merkezi (İstanbul, Ankara, İzmir, Bursa, Adana) 2> Şehir (merkez) 3> Kasaba 4> Köy 5> Yurtdışı (**yazınız**) …… ……	*C5*
3	Bugüne kadar en uzun yaşadığınız yer? _____	1> Metropol, büyük şehir merkezi (İstanbul, Ankara, İzmir, Bursa, Adana) 2> Şehir 3> Kasaba 4> Köy 5> Yurtdışı (**yazınız**) …… ……	*C6*
4	Şu an oturduğunuz şehirde kaç yıldır yaşıyorsunuz?	……YIL	*C7*
5	Evde _____ [ÇOCUĞUN İSMİ] ile Türkçeden başka bir dil kullanılıyor mu? Evet ise "hangi dil? "	1> Hayır → 9. soruya geçiniz 5> Almanca 2> Kürtçe 6> Fransızca 3> Arapça 7> Diğer _____ 4> İngilizce	*C8*

6	Siz çocuğunuzla en çok hangi dilde konuşuyorsunuz? **(TEK CEVAP)**	1>Türkçe 2> Kürtçe 3> Arapça 4> İngilizce 5>Almanca 6>Fransızca 7>Diğer _____	*C9*
7	Kim çocuğunuzla Türkçeden başka dilleri konuşuyor?	1>Baba 2>Kardeş 3>Anneanne, babaanne 4> Diğer _____	*C10*
8	Çocuğunuzun bu dili ne kadar öğreneceğini düşünüyorsunuz? (ANKETÖR: Şıkları okuyun)	1> Türkçeden daha iyi 2> Türkçe kadar 3> Türkçeden daha az	*C11*
9	Anne baba birlikte mi?	1> Evet 2>Hayır Cevap **Evet** ise; Kaç yıldır evlisiniz ? Yıl	*C12* *C13*
10	Şimdi size çocuklarınız hakkında birkaç soru soracağım. Toplam kaç tane çocuğunuz var?	**(Yazınız)**	*C14*

11

(ANKETÖR: Lütfen en büyük çocuktan başlayarak aşağıdaki tabloyu doldurun)

	İsim	**Doğum tarihi Gün/Ay/Yıl veya**	**Cinsiyet**	**Okula gidiyor mu?**	**Kaçıncı sınıfa devam**	**Şu an sizinle mi yaşıyor?**
1. çocuk	_____ **Yazınız**	___/___/___ _____ *C15a*	1> Kız 2> Erkek *C15b*	1>Evet 2>Hayır *C15c*	_____ **Yazınız** *C15d*	1>Evet 2>Hayır *C15e*
2. çocuk	_____ **Yazınız**	___/___/___ _____ *C16a*	1> Kız 2> Erkek *C16b*	1>Evet 2>Hayır *C16c*	_____ **Yazınız** *C16d*	1>Evet 2>Hayır *C16e*
3. çocuk	_____ **Yazınız**	___/___/___ _____ *C17a*	1> Kız 2> Erkek *C17b*	1>Evet 2>Hayır *C17c*	_____ **Yazınız** *C17d*	1>Evet 2>Hayır *C17e*

	4. çocuk	_____ **Yazınız**	___/___/___ _____ *C18a*	1> Kız 2> Erkek *C18b*	1>Evet 2>Hayır *C18c*	_____ **Yazınız** *C18d*	1>Evet 2>Hayır *C18e*
	5. çocuk	_____ **Yazınız**	___/___/___ _____ *C19a*	1> Kız 2> Erkek *C19b*	1>Evet 2>Hayır *C19c*	_____ **Yazınız** *C19d*	1>Evet 2>Hayır *C19e*
	6. çocuk	_____ **Yazınız**	___/___/___ _____ *C20a*	1> Kız 2> Erkek *C20b*	1>Evet 2>Hayır *C20c*	_____ **Yazınız** *C20d*	1>Evet 2>Hayır *C20e*
	7. çocuk	_____ **Yazınız**	___/___/___ _____ *C21a*	1> Kız 2> Erkek *C21b*	1>Evet 2>Hayır *C21c*	_____ **Yazınız** *C21d*	1>Evet 2>Hayır *C21e*
	8. çocuk	_____ **Yazınız**	___/___/___ _____ *C22a*	1> Kız 2> Erkek *C22b*	1>Evet 2>Hayır *C22c*	_____ **Yazınız** *C22d*	1>Evet 2>Hayır *C22e*
	9. çocuk	_____ **Yazınız**	___/___/___ _____ *C23a*	1> Kız 2> Erkek *C23b*	1>Evet 2>Hayır *C23c*	_____ **Yazınız** *C23d*	1>Evet 2>Hayır *C23e*
	10. çocuk	_____ **Yazınız**	___/___/___ _____ *C24a*	1> Kız 2> Erkek *C24b*	1>Evet 2>Hayır *C24c*	_____ **Yazınız** *C24d*	1>Evet 2>Hayır *C24e*

12	Eğitim durumunuz, yani en son bitirdiğiniz sınıf nedir?	**(Yazınız)**	*C25*
13	Eşinizin eğitim durumu, yani en son bitirdiği sınıf nedir?	**(Yazınız)**	*C26*
14	Evinizde tüm çocuklar dahil kaç kişi yaşıyor?	**(Yazınız)**	*C27*
15	Evinizde siz, eşiniz ve çocuklarınız dışında başka bireyler var mı? (Bakıcı dahil)	1>Evet 2>Hayır → **Bölüm 04'e geçiniz.**	*C28*
16	Bu kişinin/kişilerin çocuğa göre akrabalık ilişkisi nedir?	1> Dayı 5>Anneanne/babaanne 2> Teyze 6>Dede 3> Amca 7>Bakıcı 4> Hala 8>Diğer_____	*C29*

Soru	BÖLÜM 04- ÇOCUĞUN SAĞLIĞI ANKETİ		
	Görüşmemizin bundan sonraki kısmı _____ [ÇOCUĞUN İSMİ] konusunda. Size hem _____ [ÇOCUĞUN İSMİ] hakkında hem de ona annelik yaparken yaşadığınız deneyimler konusunda bazı sorular sormak istiyorum.		
1	Hamileliğiniz süresince, doğumdan önce, kontrol için doktora gittiniz mi?	1> Evet 2> Hayır → **3. soruya geçiniz.**	*C30*
2	Yapılan kontroller sırasında veya doğum anında doktorunuz bebekle ilgili herhangi bir problem olduğunu ya da olabileceğini söyledi mi? Evet ise "Nedir?"	1> Evet _____ _____ **Annenin söylediği gibi aynen yazınız.** 2> Hayır	*C31* *C32*
3	Çocuğunuz hamileliğinizin kaçıncı haftasında doğmuştu? (Anne hafta olarak bilmiyorsa/hatırlamıyorsa doğum zamanı yazılır.)	____ _____ _____ **Ay** **Hafta** **Gün** Bilmiyorum / Hatırlamıyorum **1>** Zamanında **2>** Erken **3>** Geç	*C33*
4	Çocuğunuzun doğum ağırlığı neydi? **(Anne Doğum kilosunu bilmiyorsa / hatırlamıyorsa)** Doğduğunda kilosu normale göre nasıldı?	_____ kg _____ gr Bilmiyorum / Hatırlamıyorum **1>** Düşük **2>** Yüksek **3>** Normal	*C34*
5	Çocuğunuzun soğuk algınlığı gibi geçici hastalıklar hariç, günlük yaşamını etkileyen herhangi bir sağlık problemi var mı?	1> Evet 2> Hayır → **7. soruya geçiniz**	*C35*
6	Bu problemin ne olduğunu bize söyleyebilir ya da tarif edebilir misiniz?	_____ _____ **Annenin söylediği gibi aynen yazınız**	*C36*
7	Genel olarak çocuğunuzun sağlığını nasıl değerlendirirsiniz? **(ANKETÖR: Anne orta, zayıf, kötü şıklarından birini seçerse ve nedenini daha önce belirtmemişse neden diye sorunuz)** _____	1>Çok İyi 2>İyi 3>Orta 4>Zayıf 5>Kötü	*C37*

BÖLÜM 05. TİGE ENVANTERİ

Soru	BÖLÜM 06- ÇOCUK BAKIMI BÖLÜMÜ		
	Bazı anneler iş, okul, kurs ya da başka sebeplerle çocukları ile sürekli olarak beraber olamazlar. Bu durumda çocuklara anneleri dışında düzenli bir şekilde bakan başka birisi ya da birileri vardır. Bazı çocuklar da düzenli bir şekilde yuvaya ya da kreşe giderler. Şimdi soracağım sorular _____ [ÇOCUĞUN İSMİ] nin siz yokken birlikte vakit geçirdiği kişiler ve yerler hakkında.		
1	Doğduğundan beri çocuğunuza sizden başka bakmış olan kişileri düşünün. Çocuğunuza en az birkaç ay boyunca **<u>düzenli olarak</u>** (yani birkaç ay boyunca en az haftada birkaç gün ve günde 2 saatten fazla) bakan kimse oldu mu?	*1>Evet* *2>Hayır* → **Soru 3 e geçin.**	C38
	Şimdi çocuğunuza düzenli olarak bakmış olan kişiler ya da gittiği yuvalar hakkında birkaç şey öğrenmek istiyorum. Çocuğunuza doğduğundan bugüne kadar bakmış olan kişileri sırası ile düşünüp bu soruyu ona göre cevaplamanızı istiyorum. Eğer çocuğunuza aynı anda birden fazla kişi baktıysa, lütfen çocuğunuz en çok kiminle vakit geçirdiyse onu belirtin.		

2		Çocuğunuza Bakım Sağlayan Kişi/ Yuva	Bu kişinin/ yuvanın bakma süresi	Kişi ise	Bu kişinin bakma yeri	
	1	1>Kişi 2>Yuva *C39a*	Kaç aylıktan kaç aylığa baktı? _____ Toplam süre: Yıl …… Ay ……. *C39b*	1>Akraba (Yakınlık derecesini yazınız) _____ 2>Bakıcı *C39c*	1>Çocuğun evinde 2>Bakan kişinin evinde 3>Diğer_____ *C39d*	
	2	1>Kişi 2>Yuva *C40a*	Kaç aylıktan kaç aylığa baktı? _____ Toplam süre: Yıl ……. Ay…….. *C40b*	1>Akraba (Yakınlık derecesini yazınız) _____ 2>Bakıcı *C40c*	1>Çocuğun evinde 2>Bakan kişinin evinde 3>Diğer_____ *C40d*	
	3	1>Kişi 2>Yuva *C41a*	Kaç aylıktan kaç aylığa baktı? _____ Toplam süre: Yıl ……. Ay…….. *C41b*	1>Akraba (Yakınlık derecesini yazınız) _____ 2>Bakıcı *C41c*	1>Çocuğun evinde 2>Bakan kişinin evinde 3>Diğer_____ *C41d*	

	4	1>Kişi 2>Yuva *C42a*	Kaç aylıktan kaç aylığa baktı? _____ Toplam süre: Yıl ……. Ay……. *C42b*	1>Akraba (Yakınlık derecesini yazınız) _____ 2>Bakıcı *C42c*	1>Çocuğun evinde 2>Bakan kişinin evinde 3>Diğer_____ *C42d*	
	5	1>Kişi 2>Yuva *C43a*	Kaç aylıktan kaç aylığa baktı? _____ Toplam süre: Yıl ……. Ay……. *C43b*	1>Akraba (Yakınlık derecesini yazınız) _____ 2>Bakıcı *C43c*	1>Çocuğun evinde 2>Bakan kişinin evinde 3>Diğer_____ *C43d*	
3	Çocuğunuz şu anda kreşe veya yuvaya gidiyor mu?			1>Evet 2>Hayır → **Bölüm 07'ye geçin.**		*C44*
4	Çocuğunuz şu anda kreşe ya da yuvaya haftada kaç gün gidiyor?			_____ GÜN		*C45*
5	Çocuğunuz kreşte veya yuvada ne kadar süre kalıyor?			1> Tam gün 2> Yarım gün 3> 1-2 Saat 4> Diğer_____		*C46*
6	Çocuğunuzun sınıfında aşağı yukarı kaç çocuk var?			1> 5 veya daha az 2> 6-10 3> 11-15 4> 16-20 5> 21 veya daha fazla 6> Emin değilim / bilmiyorum		*C47*

8-16 ay yaş grubuna aşağıdaki sorulardan yalnız ilk 8 tanesi (1-8) sorulacaktır.
16-36 ay yaş grubuna tüm sorular (1-15) sorulacaktır.

Soru	BÖLÜM 07a- HOME MÜLAKATI		
	Sizin _____ [ÇOCUĞUN İSMİ] ile birlikte yaptığınız şeyler ve evde koyduğunuz kurallar anne-çocuk ilişkisini oluşturan önemli şeylerdir. Şimdi bunlar hakkında size birkaç soru sormak istiyorum. **(ANKETÖR: Cevap şıklarından her birisi okunacaktır.)**		
1	**Çocuğunuz günde en az bir öğün yemeği babası, siz ve varsa kardeşleriyle birlikte yiyor mu?**	**1>Evet** **2>Hayır**	*C48*
2	**Evinize en az haftada bir kere gazete ya da dergi alıp siz okuyor musunuz?**	**1>Evet alıyoruz ve okuyorum** **2>Evet alıyoruz ama ben okumuyorum** **3>Hayır almıyoruz** **4>Okuma-yazma bilmiyor.**	*C49*
3	**Evde siz ya da aileden başka birisi çocuğunuza ne sıklıkta kitap okur?**	**1>Her gün mutlaka okunur.** **2>Haftada bir kaç kere okunur.** **3>Haftada bir kere okunur** **4>Nadiren (haftada bir kereden daha az) okunur** **5>Hiç okunmaz** **6>Okuma-yazma bilinmiyor.**	*C50*
4	**Çocuğunuz günde yaklaşık kaç saat televizyon karşısında geçirir?**	**_____ saat**	*C51*
5	**Geçtiğimiz bir yıl içinde çocuğunuzla birlikte, başka bir yere (köy, kasaba, yayla ya da başka bir şehir) gezmeye gittiniz mi?**	**1>Evet, birkaç kere** **2>Evet, bir kere** **3>Hayır**	*C52*
6	**Geçtiğimiz bir yıl içinde çocuğunuzu herhangi bir gösteriye (hayvanat bahçesi, sirk, müze, çocuk tiyatrosu, kukla gösterisi gibi) götürdünüz mü?**	**1>Evet, birkaç kere** **2>Evet, bir kere** **3>Hayır**	*C53*
7	**Çocuklar bazen insanın sabrını çok zorlayabilir. Geçtiğimiz hafta içinde böyle bir durum olduğunda kaç kere çocuğunuza vurmak, şaplak atmak, sarsmak veya çimdiklemek gibi fiziksel bir ceza verdiniz?**	**1>Böyle bir durum olmadı** **2>Böyle durumlar oldu ama fiziksel ceza vermedim** **3>Bir kere fiziksel ceza verdim** **4>İki veya daha fazla kere fiziksel ceza verdim**	*C54*
8	**Çocuğunuz bir şeye kızdığında ya da öfkelendiğinde ne yaparsınız?**	**1>Hiçbir şey yapmam, sakinleşmesini beklerim** **2> Onu oyalamaya veya dikkatini başka bir şeye çekmeye çalışırım** **3>Onu yalnız kalabileceği bir yere yollarım** **4>O gün için sevdiği bir şeyi (çikolata, geç yatma, televizyon seyretme v.b.) yasaklarım.** **5>Onu fiziksel olarak cezalandırırım (örneğin, vururum, sarsarım, çimdik atarım, kulağını çekerim).** **6>Onunla konuşur, sorunu anlamaya ve çözmeye çalışırım.** **7>Bağırır, kızdığımı sözlerimle ifade ederim.** **8>Diğer (yazınız) _____** **_____**	*C55*

9	Çocuğunuz eğer kızgınlıkla ve o anki öfkesiyle size vurursa, ne yaparsınız?	1>Hiçbir şey yapmam, sakinleşmesini beklerim 2>Onu oyalamaya veya dikkatini başka bir şeye çekmeye çalışırım 3>Onu odasına veya bir köşeye yollarım 4>O gün için sevdiği bir şeyi (çikolata, geç yatma, televizyon seyretme v.b.) yasaklarım. 5>Onu fiziksel olarak cezalandırırım (örneğin, vururum, sarsarım, çimdik atarım, kulağını çekerim). 6>Onunla konuşur, sorunu anlamaya ve çözmeye çalışırım. 7> Bağırır, kızdığımı sözlerimle ifade ederim. 8>Diğer (**yazınız**) _____	*C56*
10	Çocuğunuza şarkı, şiir veya tekerleme öğrenmesi için yardımcı oluyor musunuz?	1>Evet, her fırsatta 2>Evet, arada sırada 3>Henüz Değil	*C57*
11	Çocuğunuza bir yeri ya da bir şeyi tarif edebilmesi için altında, üstünde, yanında, arkasında, daha büyük, daha küçük gibi terimleri öğretiyor musunuz?	1>Evet, her fırsatta 2>Evet, arada sırada 3>Henüz değil	*C58*
12	Çocuğunuza renkleri öğrenmesi için yardımcı oluyor musunuz?	1>Evet, her fırsatta 2>Evet, arada sırada 3>Henüz değil	*C59*
13	Çocuğunuza sayıları öğrenmesi için yardımcı oluyor musunuz?	1>Evet, her fırsatta 2>Evet, arada sırada 3>Henüz değil	*C60*
14	Harfleri öğrenmesi için çocuğunuza yardımcı oluyor musunuz? (Örneğin, adını nasıl yazacağını göstermek ya da harflerle ilgili bir soru sorduğunda cevaplamak ve göstermek vb.)	1>Evet, her fırsatta 2>Evet, arada sırada 3>Henüz değil	*C61*
15	Çocuğunuza kare, üçgen, yuvarlak vb. gibi basit şekillerin isimlerini öğrenmesi için yardımcı oluyor musunuz?	1>Evet, her fırsatta 2>Evet, arada sırada 3>Henüz değil	*C62*

Soru	BÖLÜM 07b- HOME GÖZLEME DAYANAN MADDELER		
	Çocuğa yönelik materyaller		
1	Çocuğun değişik renkleri (renk kontrastları) olan, farklı büyüklükleri ve şekilleri ayrıştıran oyuncakları var.	1>Evet 2>Hayır	*C63*
2	Çocuğun en az bir tane yapbozu var.	1>Evet 2>Hayır	*C64*
3	Evde çocuğun yaşına uygun müzik çalabilmek için en az iki tane kaset ya da CD si (SİDİ si) var.	1>Evet 2>Hayır	*C65*
4	Çocuğun yaratıcılığını destekleyecek (bloklar, legolar, oyun hamuru gibi) oyuncakları var.	1>Evet 2>Hayır	*C66*
5	Çocuğun el becerilerini destekleyen oyunları veya oyuncakları var (ipe dizmek için boncuk, küçük bloklar, oyuncak bebeğe giydirmek için giysiler, vb.).	1>Evet 2>Hayır	*C67*
6	Çocuğun, sayıları öğrenmesine yardımcı olan oyuncakları veya oyunları var.	1>Evet 2>Hayır	*C68*
7	Çocuğun en az üç tane çocuk kitabı var.	1>Evet 2>Hayır	*C69*
8	Evdeki herkesin okuyabileceği en az on kitap görünür şekilde duruyor.	1>Evet 2>Hayır	*C70*
9	Çocuğun kullanabileceği boya, tebeşir veya kalem gibi malzemeleri var.	1>Evet 2>Hayır	*C71*
	Dil için uyarma		
10	Çocuğun, hayvanların isimlerini öğrenmesine yardımcı olan oyuncakları var.	1>Evet 2>Hayır	*C72*
11	Anne çocuğa lütfen, teşekkür ederim, özür dilerim gibi basit nezaket cümlelerini öğretiyor/öğretmiş.	1>Evet 2>Hayır	*C73*
12	Anne, çocuğun anlattıklarını dinliyor ve onu konuşması için teşvik ediyor.	1>Evet 2>Hayır	*C74*
13	Çocuk kendi isteklerini (örneğin kahvaltıda reçel-ekmek yemek istiyorum gibi) ifade ediyor.	1>Evet 2>Hayır	*C75*
14	Anne çocukla konuşurken doğru bir dilbilgisi ve telaffuz kullanıyor.	1>Evet 2>Hayır	*C76*
15	Annenin ses tonu, çocuğa olumlu duygular (sıcaklık, şefkat, sevgi vb) taşıyor.	1>Evet 2>Hayır	*C77*
16	Anne (içerik açısından) çocukla yetişkinle konuşur gibi konuşuyor.	1>Evet 2>Hayır	*C78*
17	Anne çocuğun ifadesinde eksik kalan yerleri tamamlıyor .	1>Evet	*C79*

		2>Hayır	
	Fiziksel Çevre		
18	Yaşanan ev güvenli görünüyor.	1>Evet 2>Hayır	*C80*
19	Dışarıdaki oyun alanı güvenli görünüyor.	1>Evet 2>Hayır	*C81*
20	Dairenin içi karanlık ya da boğucu (sıkıcı).	1>Evet 2>Hayır	*C82*
21	Çevre estetik olarak güzel gözüküyor.	1>Evet 2>Hayır	*C83*
22	Evde, kişi başına en az 10 m^2 alan düşüyor. (3 metre x 3 metre veya daha fazla)	1>Evet 2>Hayır	*C84*
23	Odalar, mobilyalarla aşırı derecede dolu.	1>Evet 2>Hayır	*C85*
24	Ev, makul düzeyde temiz.	1>Evet 2>Hayır	*C86*
25	Ev, asgari düzeyde dağınık (bulaşık, kalmış yiyecek, kaldırılmamış kıyafet yığınları yok).	1>Evet 2>Hayır	*C87*
	Sıcaklık ve kabul		
26	Anne, çocuğu ziyaret sırasında en az 5 dakika kadar kendine yakın olacak şekilde tuttu.	1>Evet 2>Hayır	*C88*
27	Anne, çocukla ziyaret sırasında en az iki kere sohbet etti.	1>Evet 2>Hayır	*C89*
28	Anne, çocuğun sorularını ve isteklerini sözel olarak cevaplandırdı.	1>Evet 2>Hayır	*C90*
29	Anne, genellikle çocuğun konuşmalarına sözel olarak cevap verdi.	1>Evet 2>Hayır	*C91*
30	Anne, çocuğu ziyaret sırasında en az iki kere kendiliğinden övdü (“aferin,” “güzel yaptın,” vb.).	1>Evet 2>Hayır	*C92*
31	Anne, ziyaret sırasında çocuğu en az bir kere okşadı, öptü, sevdi veya kucakladı.	1>Evet 2>Hayır	*C93*
32	Anne, ziyaret sırasında çocuğun bir becerisini (örneğin, yemeğini kendi yiyebilmesi) ya da sevdiği bir şeyi gösterebilmesi için çocuğa destek oldu.	1>Evet 2>Hayır	*C94*
33	Anne, ziyaretçiyi çocuğa tanıttı.	1>Evet 2>Hayır	*C95*
34	Çocuğun yaptığı resim, boyama, yapıştırma ya da proje gibi faaliyetler evde bir yerde sergilenmiş.	1>Evet 2>Hayır	*C96*

	Çocuğa katı disiplin uygulamak		
35	Anne, çocuğa karşı ziyaret sırasında bir kereden fazla sert konuştu, onu azarladı veya aşağıladı.	1>Evet 2>Hayır	*C97*
36	Anne, ziyaret sırasında çocuğu fiziksel olarak kısıtladı (kollarını tutarak hareketini engellemek, istemediği halde kucağa alarak uzaklaştırmak, kolundan çekmek, vb.)	1>Evet 2>Hayır	*C98*
37	Anne, ziyaret sırasında çocuğu fiziksel olarak cezalandırdı (vurmak, kulak çekmek, çimdiklemek, vb.).	1>Evet 2>Hayır	*C99*

Soru	**BÖLÜM 08 – HANE GELİR-GİDER ANKETİ**		
	Son olarak size evinizin geçimi ile ilgili birkaç sorum olacak.		
1	Şu anda para kazanmak amacıyla herhangi bir şey yapıyor musunuz?	1>Evet 2>Hayır → **soru 3'e geçin**	*C100*
2	Ne iş yapıyorsunuz?	**(Yazınız)** .... **Soru 4'e geçin**	*C101*
3	Şimdi sayacaklarımdan hangisi size en uygun olandır?	1>Emekli 2>Ev kadını 3>Öğrenci veya kursa gidiyor 4>İş arıyor, bulsa çalışmak istiyor 5>Gönüllü çalışıyor	*C102*
4	Şu anda eşiniz çalışıyor mu?	1>Evet 2>Hayır → **soru 6'ya geçin**	*C103*
5	Ne iş yapıyor?	**(Yazınız)**	*C104*
6	Evinizde para kazanmak için çalışan kişi sayısı (siz dahil) nedir?	**(Yazınız)** _____	*C105*
7	Oturduğunuz ev size mi ait?	1>Evet → **soru 10'a geçin** 2>Hayır	*C106*
8	Oturduğunuz eve kira ödüyor musunuz?	1>Evet 2>Hayır	*C107*
9	Oturduğunuz ev lojman mı?	1>Evet 2>Hayır	*C108*

Şimdi size bazı şeyler sayacağım. Bunlara evde sizinle yaşayan kişilerden kimin sahip olduğu önemli değildir.

Evinizde bu gerecin olup olmadığı önemli bizim için. Her biri için "sahibiz", "sahip değiliz" seçeneklerinden birini söyleyiniz.

		Sahibiz	Sahip Değiliz	
10	1. Televizyon	1	2	*C109*
	2. Video/VCD Oynatıcı	1	2	*C110*
	3. Kredi Kartı	1	2	*C111*
	4. Bilgisayar	1	2	*C112*
	5. İnternet bağlantısı	1	2	*C113*
	6. Araba	1	2	*C114*
	7. Buzdolabı	1	2	*C115*
	8. Çamaşır makinesi	1	2	*C116*
	9. Bulaşık makinesi	1	2	*C117*
	10. LCD/Plazma televizyon	1	2	*C118*
	11. Mikro dalga fırın	1	2	*C119*
	12. Yurt içi ve/veya yurtdışında tatil imkanı	1	2	*C120*
	13. Yazlık ev	1	2	*C121*

11	Evinizde yaşayan tüm kişilerin, yiyecek-içecek, kira, gaz, elektrik, ulaşım, okul, taksitler, doktor veya ilaç gibi pek çok masrafları olabilir. Bunların hepsini toplayacak olursak, evinizde yaşayan kişilerin aylık toplam masrafları ne kadardır? (ANKETÖRE: Eğer kendisi söylemezse şıkları okuyun.) 1> 650 TL'den az 2> 650 TL-1200 TL arası 3>1200-3000 TL arası 4> 3000-5000 TL arası 5> 5000 TL'den fazla	…… YTL	*C122*

Sizin tanıdığınız ve 8-36 aylar arasında doğmuş bir çocuğu olan anne biliyorsanız bizi yönlendirir misiniz?

……

……

……

……

ANKETÖRE:

BÖLÜM 09-ANKETÖRÜN ANNEYE DAİR GÖZLEMLERİ

	Lütfen bu soruları annenin görüşme sırasındaki tutum ve davranışlarını göz önüne alarak doldurunuz..		
1	Katılımcının görüşmeye olan ilgisini nasıl değerlendirirsiniz?	5> Çok ilgiliydi 4> İlgiliydi 3> Biraz ilgiliydi 2> İlgili değildi 1> Çok ilgisizdi	*C123*
2	Katılımcı soruları ne derece anladı?	5> Tümünü anladı 4> Çoğunu anladı 3>Bazı soruları anlamadı 2> Çoğunu anlamadı 1> Hiçbirini anlamadı	*C124*
3	Katılımcı soruları cevaplarken ne derece dikkat gösterdi?	5> Çok dikkatliydi 4> Dikkatliydi 3>Bazen dikkatli değildi 2> Dikkatsizdi 1> Çok dikkatsizdi	*C125*
4	Katılımcı soruları cevaplarken ne kadar içten (samimi) cevaplar verdi?	3> Çoğunlukla içten (samimi) cevaplar verdi 2> Ara sıra içten (samimi) cevaplar verdi 1> İçten (samimi) cevaplar vermedi	*C126*
5	Katılımcı görüşme sırasında herhangi bir soruya/bölüme kayda değer bir tepkide bulundu mu?	1>Evet 2> Hayır → **8'e geçiniz**	*C127*
6	Hangi soruya / sorulara?	.....	*C128*
7	Ne gibi tepkiler? (kısaca yazınız)	.....	*C129*
8	Anketteki herhangi bir bölümü yarıda kesmek zorunda kaldınız mı?	1>Evet 2> Hayır → **Anket bitti**	*C130*
9	Hangi bölümü/ bölümleri?	.....	*C131*
10	*Neden?*	.....	*C132*

Appendix E
Copy of

Imitation Sorting Task Scoring Sheet

Level 2

Set 1			**Set 2**			**Set 3**		
Kırmızı lego adam	Pembe kase		Ananas	Etekli kadın		Kiraz	Çiçekli boya kabı	
Set 4			**Set 5**					
Kinder mavi canavar	Futbol topu		Pembe şişe	Mor ahtapot				

Level 3

Set 1			**Set 2**			**Set 3**		
Prenses	Sarı üzüm Kırmızı sandalye		Turuncu halka Pembe askı	Pasta		Mavi fincan	Ayıcık mum U harfi	
Set 4			**Set 5**					
Pembe kaşık Pembe dolap	Spiderman		Yıldız kalıp	Basket düdük Toybox				

Level 4

Set 1			**Set 2**			**Set 3**		
Pembe sandalye Sarı servis tabağı	Elips Mor fil		Aletli kırmızı lego Beyaz tabak	Sarı boya kabı Turuncu kapak		Yarım portakal Mor sepet	Mavi ayı Sarı yol işareti	
Set 4			**Set 5**					
Beyaz havuç Kırmızı raket	Pembe sedir Saman balyası		Pembe masa ayağı Mavi yaratık	Kırmızı boya kabı Diş fırçası				

Level 5

Set 1			**Set 2**			**Set 3**		
Pooh	M harfi		Biberonlu bebek	Sarı çilekli lego		Sarı pusula	V harfi	
Sarı bıçak	Patates		Beyaz boru	Tart		Mor ayı	Soğan	
	Kırmızı boya kabı		Pembe tabak				Bez balık	
Set 4			**Set 5**					
Mor çiçek	Yeşil boya kabı		Sarı yol işareti	Ağaç				
Kırmızı lego	Kırmızı sandalye		Mavi kano	Pasta Dilimi				
Sarı tava				Kinder sarı oyuncak				

Level 6

Set 1			**Set 2**			**Set 3**		
Mavi tabak	Beyaz çiçek		İtfaiyeci	Mavi kepçe		Tencere kapağı	Mısır	
Sarı kepçe	Domates		Salatalık	Sarı lego		(yeşil) Dalmaçyalı	Pembe çırpıcı	
Tavşan	Kalp kalıp		Beyaz dolap	Papağan		Makara	Mavi yumurta	
Set 4			**Set 5**					
Mor boya kabı	Yeşil ekran		Yeşil çubuk	Mavi canavar				
Sarı anahtarlık	Gri kedi		Pembe aski	Domuz				
Pembe yumurta	Havuç		Mavi tencere	Sarı lego boru				

Level 7

Set 1			**Set 2**			**Set 3**		
Sarı balık	Tabure		Cımbız	Ağaç		Yeşil kutu	Mavi sepet	
Kahverengi masa	Bıçak		Karpuz	Hippo		Siyahlı adam	Makas	
Mavi hayvan	Pembe Kapak İnek		Yatak At	Spiderman		Sarı mavi işaret	Elmalı lego Bardak adam	

Set 4			**Set 5**		
Mor Tencere Sarı mıknatıs Ördek Çalışma masası	Yeşil yaprak Mavi boya kutusu Sandalyede bebek		Pembe aynalı masa Ördek kalıp Pembe çatal	Yeşil tabak Mor balık Mavi ayna Sarı çit	

Level 8

Set 1			**Set 2**			**Set 3**		
Bez balık	Mavi boya kabı		Sarı tencere	Bej dolap		Mor çiçek	Mavi yaratık	
Mavi lego	İtfaiyeci		Yeşil tarak	Beyaz çiçek		Yarim yumurta	Kırmizi tartı	
Pembe kaşık	Beyaz tabak		Foto makinesi	Yemek masası Mor vagon		Muzlar	Pembe sandalye	
Sarı hayvan	Askı		Pembe tartı			Futbol topu	Pembe çatal	

Set 4			**Set 5**		
Pembe sepet	Çilek kabı		Çilek	Mısır	
Sarı ayı	Puzzle		Havuç	Biber	
Mavi kapak	Papağan		Soğan	Karpuz	
Anahtarlık	Gergedan		Patlıcan	Domates	

Appendix F

Copy of

NON-WORD REPETITION TASK

Practice item

Baba

2 syllable-words	**4 syllable-words**
Desa	Manapartak
Moru	Usulbakta
Pedi	Güntülümde
Lerte	Yaşıpalam
Kotav	Kirseneti
Meşni	Nikanita
Darkat	Keleyordu
Bortu	Horsulamak
Tarkas	Şekirlemiş
Niğden	Çoralacak

3 syllable-words	**5 syllable-words**
Atardan	Yörtümlerecek
Feriden	Subuntalyordu
Yalkoma	Çöpatlımıyız
Atnasın	Başıltanmasın
Siltarsa	Tümsütülmüş
Remzeldi	Ikışyanaylı
Tabardak	Kılıflomata
Velerden	İkirinvedi
Mazında	Menindenlikte
Gimizde	Urgatosyordu