COGNITIVE DEVELOPMENT OF TURKISH CHILDREN ON THE RELATION OF EVIDENTIALITY AND THEORY OF MIND

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ABSTRACT

COGNITIVE DEVELOPMENT OF TURKISH CHILDREN ON THE RELATION OF EVIDENTIALITY AND THEORY OF MIND

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For the first time a representative Theory of Mind (ToM) scale (Wellman & Liu, 2004) has been cast into three different linguistic forms in order to show the impact of evidential markers on ToM understanding. With Turkish children, we studied (i) a control form without explicit evidential markers, as conducted by Bayramoğlu & Hohenberger (2007), (ii) a verbal form with –DI (marking factuality in the past) and (iii) a verbal form with –MIS (marking hearsay in the past). To predict ToM performance of children, we also conducted a working memory task and two language tasks for complex syntax understanding.

Our analysis showed that Turkish children, ranging from 4 to 7 years of age, performed significantly better with the form –DI than the control form. Also one of

the language tasks which measures relative clause understanding was found to be a significant predictor of ToM performance. We conclude that evidential markers may help Turkish children in their online reasoning of ToM. We think that the relation between evidentiality and ToM may be understood clearer with cross-linguistic studies by varying the presence of evidentials and also their linguistic properties (i.e. lexical or morphological) while controlling the materials across languages.

Keywords: Theory of Mind (ToM), Evidentiality, ToM scale, Cognitive Development, Language.

ÖZ

TÜRK ÇOCUKLARINDA TANITLAMA KAVRAMI VE AKIL TEORİSİNİN BİLİŞSEL GELİŞİMİ

Özoran, Dinçer

Yüksek Lisans, Bilişsel Bilimler Bölümü

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Akıl Teorisini (AT) temsil eden bir ölçek (Wellman & Liu; 2004), tanıtlama belirticilerinin AT kavrayışına etkisini göstermek amacıyla ilk kez 3 dilbilimsel biçime ayrıldı. Türk çocuklarıyla yapılan çalışmada, Bayramoğlu & Hohenberger (2007) tarafından da uygulanmış olan tanıtlama belirticilerinin açıkça kullanılmadığı kontrol biçimi (i), görülen geçmiş zamanı belirten –DI fiil biçimi (ii) ve duyulan (aktarılan) geçmiş zamanı belirten –MIS fiil biçimi (iii) kullanıldı. Çocukların AT başarımlarını öngörebilmek için, bir işleyen bellek, iki tane de karmaşık söz dizimi algılayışı ile ilgili dil deneyi uygulaması yaptık.

Analiz sonuçları, yaşları 4 ila 7 arasında değişen Türk çocuklarının kontrol formuna nazaran –DI formu ile daha başarılı olduğunu göstermiştir. Ayrıca dil başarımını ölçen tamlama algılayışı deneyi AT başarımını kayda değer bir şekilde ön görebilmiştir. Biz de, tanıtlama beliticilerinin, Türk çocuklarının anlık AT

uslamlamalarına yardımcı olabildiği sonucuna vardık. Gelecekte, kültürlerarası çalışmaların, tanıtlama beliticilerinin kullanılması ve kullanılış biçimleri (ek yada kelime olarak) gibi koşulları değiştirerek yapılması sayesinde, AT ve Tanıtlama kavramları arasındaki ilişkinin daha net bir şekilde anlaşılacağını düşünüyoruz.

Anahtar Kelimeler: Akıl Teorisi, Şahitlik Kavramı, Akıl Teorisi ölçeği, Bilişsel Gelişim, Dil.

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LIST OF ABBREVIATIONS

ToM Theory of Mind
NOD Not-own desire (also diverse desire)
NOB Not-own belief (also diverse belief)
KI Knowledge ignorance
EFB Explicit false belief
CFB Contents false belief
AREN Apparent-real negative emotion
WM Working memory
WST Word span task
SRT Sentence repetition task
RMT Referent-matching task
WT Whorfian Theory

CHAPTER 1

INTRODUCTION

What is the relationship between language and thought? Which one determines the other? Or is there an inter-relation? A more specific question is: how do the development of concepts and the linguistic properties interact during language learning /acquisition? It is mostly accepted that pre-linguistic concepts help language learners to map novel words onto these conceptual representations. Nevertheless, we don't know much about how and to what extent these previously available concepts constrain language acquisition (Gleitman and Papafragou 2005; Papafragou et al. 2007).

There is a widely held view that child language reflects its non-linguistic conceptual complexity when we look at the available linguistic expressions that are used during language acquisition (see, e.g., Huttenlocher, Smiley, & Charney, 1983). So the structural complexity of speech of child can be a sign of the relevant developed non-linguistic concepts. One contrasting claim says that language is able to shape the non-linguistic concepts. This famous view is known as the Whorfian Theory (WT). According to WT, the systematic encoding of some conceptual differences in language acquisition, may force the learner to think about non-linguistic concepts consistent with these differences (Whorf, 1956). Recently, this view was revived by several studies suggesting that structural aspects of language can make available a base for an individual's "default conceptual representation" (Pederson et al., 1998,

p. 586). A further account states that the timing of the development of some concepts can depend on the properties of the language to which one is exposed.

Dominance of linguistic or non-linguistic concepts in language acquisition is a controversial subject where the direction of causality is not very well understood. The weak form of the WT, which claims perception-based cognitive differences between languages, has been frequently studied, e.g. for color naming (Berlin & Kay, 1969; Boynton and Olson, 1987; Kay and Maffi, 1999; Lindsey and Brown, 2002; Özgen & Davies, 2002; Roberson & Davidoff, 2000). In our investigations, however, we will address the strong form of the WT (language determines thought) where we will look for the consequences of a more abstract relation, namely "monitoring the origins of one's beliefs". The evidence for the source of our beliefs may come from our direct experiences, what we are told or what we infer from available information (Papafragou et al. 2007). This kind of reasoning about sources of information involves high-level cognitive processing and cognitive representations (Gentner & Boroditsky, 2001). Such reasoning is particularly important in the development of "Theory of mind". *Theory of mind* is known as "The ability to attribute to oneself and others mental states and to reason in terms of mental states" (Papafragou et al. 2007, p.255). It is a promising research area where we can observe the connection of language and these high-level mental representations.

Evidentiality as a linguistic category

According to Plungian (2001), evidential values can be represented in two main categories: direct and indirect (Table 1).

Table 1: types of evidences (Plungian 2001: p.353)

Direct Evidence	Indirect Evidence	
	Reflected Evidence (=Inferentials and presumptives)	**Mediated evidence** (=Quotatives)
Personal evidence		

The encoding of distinctions in source evidence is handled by *evidentiality* markers in languages. These markers can encode the information morphologically (e.g. Turkish, Korean) or lexically (English, French). In English, examples(1a) and (1b) indicate that the speaker has direct perceptual experience of John's singing, while (2a) and (2b) shows us that the source of evidence is indirect (hearsay in (a) and inference in (b)).

(1) a. **I saw** John sing.

b. **I heard** John sing.

(2) a. John was **allegedly** singing

b. John was **apparently** singing

In Turkish evidentiality is marked morphologically. The direct – indirect evidential distinction is also a part of the verbal system. In Turkish the indirect evidential marker is –MIS (Göksel, 2005; Gül, 2006). For direct evidence, there are a couple of markers used in Turkish such as –DI, -IR, -IYOR ((3a), (3b), and (3c)).

(3) a. Ali gel-**di**

'Ali came.' (I saw him coming.)

b. Ali gel-**iyor**

'Ali is coming.' (I see him coming.)

c. Ali gel-**miş**

'Ali came.' (I obtained the information from someone else or I inferred the event from available information).

The past suffix –DI is a marker that expresses the direct evidence of past in Turkish. But this suffix does not always carry the meaning of directness or first-hand evidence. It is also used to express non-witnessed past, like historical facts or generalizations (4a, 4b) (Göksel, 2005, p.385, p.387).

(4) a. 1920'lerde otomobil yaygın değil**di**.
'Cars **were** not common in the 1920s'
b. Bilgisayar hepimizin işini kolaylaştır**dı**.
'The computer **has made** things easier for all of us.'

In our stories –DI functions unambiguously as an evidential marker since it expresses the direct experience of the talking person. Here and after we will use **–MIŞ** (3b) and **–DI** (3a) as evidential markers.

(5) a. Ali gel-**di** (Ali came) (I saw him coming).
b. Ali gel-**miş** (Ali came) (I obtained the information from someone else or I inferred the event from available information).

In Theory of Mind (ToM) a subject has to evaluate the cognitive state of another person (his/her beliefs) by means of the available evidence for this state. This evaluation crucially takes the source of that information (whether the subject has direct or only indirect evidence for it) into account. Either lexical or morphological, evidentials give clues about that source of information. While studying possible effects of language on thought, linguistic distinctions of languages play an important role. In our case, languages that mark morphologically the evidence of source, like in Turkish, give us the opportunity to investigate possible cross-cultural differences in the acquisition of the evidentiality concept. Also research on the development of evidentiality in Turkish children will provide us consistency or the conflict with the previously mentioned studies.

CHAPTER 2

LITERATURE REVIEW

To study the relation between evidentiality and ToM understanding one should first look at the course of development of these concepts in children. Evidentiality is expressing the evidence for a statement via language. In other words giving a clue on source of information. Therefore we will first explain development of an evidential concept, source reasoning and then the acquisition of evidential markers. Later, we will refer to some specific studies about evidentiality and ToM on which we mainly based our study. Then, we will clarify the cognitive demands on ToM reasoning by mentioning the effect of memory and language.

2.1 Development of Source Reasoning

Studies concerning the ability of reporting explicitly the evidence for the beliefs in children showed that there is a shift from 3 year-old children to 4-5 year-old ones in verbally specifying the source of their beliefs. In other words, 3 years-olds are observed to be much poorer when compared to 4 or 5 years-olds in a typical task where the source of information about the content of a hidden box is asked for (Whitcombe & Robinson, 2000; O'Neill & Chong, 2001; Gopnik & Graf, 1988; Wooley & Bruell, 1996). According to some investigators, inferential understanding of source of information is accomplished only at the age of six (Sodian & Wimmer, 1987; Wimmer & Hogrefe et al., 1988). More detailed distinctions on the type of

inference (deductive, inductive and guesses) are obtained even much later (Pillow, 2002).

The need to examine in depth the relation between the development of source reasoning and the acquisition of linguistic evidentiality was realized by Papafragou et al. (2007). According to them "an intriguing possibility is that learners of languages with systematic (e.g. grammatical) markings of evidential distinctions may find such distinctions to be more salient than learners of languages where evidential distinctions are not encoded in the grammar." (p. 259). They conclude that, except for a few studies (Aksu-Koç 1988; and Choi, 1995) cross-cultural studies on the acquisition of evidentiality have rarely been undertaken.

2.2 Acquisition of Evidentiality

Evidence for the acquisition of evidential markers mostly comes from Aksu-Koç's original work on Turkish (Aksu-Koç, 1988, 2000; Aksu-Koç & Slobin, 1986). In Turkish, all past tense events are marked obligatorily either with **-DI** (direct access) or **–MIS** (indirect access: hearsay or inference) (e.g. in (3a)-(3b), p. 3).

In Turkish children –DI and –MIS (also known as -(I)MIS specifically for hearsay) utterances emerge between 2 and 3 years of age (Aksu-Koç; 1988). The mastery in production develops only between 3 years and 3 years and a half for –DI and 4 years and 4 years and a half for –MIS. On the other hand the perfection in comprehension is always achieved approximately one year later than production. The delay between appropriate usage of –DI and –MIS is explained by plurifunctionality of the latter one. Except its evidential usage, –MIS is also a form for telling stories -real or fictive-, for pretence play and for expressing psychological distance and surprise. These pragmatic functions may increase the ambiguity on –MIS for children and may slow down its acquisition (Slobin & Aksu; 1982). In one of her experiments Aksu-Koç (1988) found that Turkish children, even by the age of 6 years, cannot correctly use evidential markers for marking their inferences about

the source of information. Nor do six years olds appreciate “the relative certainty communicated by Turkish evidentials” (Aksu-Koç & Alıcı, 2000). Aksu-Koç (1988) concludes that the emergence of the appropriate usage of evidentials in Turkish is delayed by the subtleness of relative concepts about the nature of the information in children's minds.

Finally Aksu-Koç suggested that “it is necessary to make comparative studies between languages with and without evidentiality contrasts” where she points out necessity of cross-cultural investigations (1988, p. 203)

According to Papafragou et al. (2007), one important missing point of Aksu-Koç’s (1988) study was the absence of non-linguistic tasks. She argues that to look at objectively the development of evidential concepts, experiments should also be devised to examine evidentiality in language independent contexts, i.e. a context where evidential markers do not involve but the source of information is available in the development of events.

More recent work of Papafragou et al. was aimed to investigate the relation between linguistic evidentiality and non-linguistic source monitoring in early childhood. Their research was based on the previous work and findings of Choi (1995) who had conducted a longitudinal study on speech production of three young Korean-speaking children. In Korean, similarly to Turkish, evidential suffixes **–e** (direct evidence) and **–tay** (hearsay) indicate the evidence reference of the knowledge.

This study raises an essential question to be answered: Is there an observable difference between evidentiality-marked and -unmarked languages on the command of evidential concepts? More specifically the problem of this very study

was whether Korean children have more reliable evidential concepts than English peers, with respect to the practice of relevant grammatical aspects in Korean.

The resulting data supports that there is no cross-cultural difference between English and Korean children on understanding of the sources of knowledge. Contrarily, a more recent study by Aksu-Koç *et al*. (2009) showed that Turkish children who expose a language with evidential markers have better performance than their English peers on non-linguistic source monitoring at the age four (%40 vs. %24). Only at the age of 6, these counter-peers attain the level on source monitoring (%47 both). An important result obtained from these experiments is that it is hard to conclude that the practice of evidential grammar in early childhood helps the ability to reason about evidential sources. This is because the relation between linguistic and conceptual development seems to be "*tightly interlocked"* (Papafragou *et al.*, 2007, p. 284). As a result, it is proposed that language is only a useful way of encoding experience. The continuous encoding does not directly reshape the cognitive processes or functions but offers an alternative or optional encoding for organizing and tracking the experience (Papafragou, to appear).

2.3 Evidentiality and Theory of Mind

Theory of mind is widely known as the ability to attribute mental states to ourselves and to others (Astington and Dack 2008, Leslie 2001, Perner 1991). Evidential reasoning, the way we interpret the source of an utterance, seems to be a fundamental part of *theory of mind* abilities (Papafragou *et al.*, 2001), insofar as it helps us distinguish what we know from direct experience (representations of own knowledge) and what we know from other sources (representation of others' knowledge, as in hearsay).

It has been suggested that with various tasks we can observe different aspects of ToM such as beliefs, desires, intentions, knowledge, thoughts, and emotions (Wellman & Liu, 2004).

After adapting Wellman and Liu's ToM scale to Turkish, Turkish children at the age of 4 and 5 were examined by Bayramoğlu and Hohenberger (2007) to investigate further effects of culture. The tasks of Wellman scale *(adopted from Bayramoğlu & Hohenberger; 2007)* are explained in below.

Diverse Belief (also known as Not-Own Belief, NOB)

Child judges that two people (her/him-self vs. someone else) can have different beliefs about the same object when s/he does not know which belief is true: The child must predict where in two hiding places (bush or under the car) *the character* will look for his/her cat, knowing that *the character* holds the opposite belief from him/her.

Diverse desire (also known as Not-Own Desire, NOD)

Child judges that two people (herself vs. someone else) can have different desires about the same objects: The child must predict *the character*'s choice of snack which is opposite from his/her own preference (carrot or cookie).

Content False Belief (CFB)

Child judges another person's false belief about what is in a familiar container when s/he knows her/him-self what is in it, a bird: The child must judge what *the character*, who has never looked in the container, believes what is in it: a bird or pencils.

Knowledge Ignorance (KI)

Child judges another person's ignorance about the contents of a small box when she knows herself what is in the box: The child has to indicate whether *the character*, who has never seen inside, knows what is inside the box: a toy dog.

Real Apparent Emotion (AREN)

Child judges that a person can feel one but displays a different emotion: The child has to predict *the character*'s feelings as well as his overt expression (sad, neutral, happy face) when his/her aunt gives him/her an undesired present (book vs. toy car).

Explicit False Belief (EFB)

Child judges where a person with a mistaken belief will search: Knowing that *the character*'s mittens are in his/her backpack but that s/he believes them to be in the cupboard, the child has to predict where *the character* will search.

Although a cross-cultural study (including Euro-Canada, India, Peru, Samoa, and Thailand) found the universal milestone for false belief understanding at approximately 5 years of age (Callaghan, Rochat, Lillard, Claux, Odden, Itakura, Tapanya, & Singh, 2005) this may not be valid for all aspects of ToM. It has been shown that timely development of these aspects is subject to socio-cultural influences (Wellman *et al.*, 2006). Even though hardest tasks to perform was about others' false beliefs, emotions and desires and knowledge was somewhat easier for both Chinese children and their Western peers, the development scale was not identical for all. The study of Bayramoğlu & Hohenberger (2007) also supported these results by showing that the Turkish children had a better performance on the tasks tapping into others' knowledge and emotion but weaker performance on the task related with others' belief compared to western children. The researchers proposed that the better performances may be due to the usage of evidential markers in Turkish language.

Table 2: Performances of children from different nationality according to Wellman scale.

CHINESE	%
NOD	89
KI	79
NOB	71
CFB	54
EFB	49
AREN	37

US	%
NOD	95
NOB	84
KI	73
CFB	59
EFB	57
AREN	32

GERMAN	%
NOD	99
NOB	84
KI	74
EFB	57
CFB	47
AREN	38

TURKISH	%
KI	95
NOD	88
AREN	57
NOB	50
EFB	38
CFB	34

2.4 ToM and Working Memory

One view on ToM understanding argues that the commonly known shift from 3 to 4 years is at least partially related to a general cognitive maturation. (e.g. Frye, Zelazo, & Palfai, 1995; Hala & Russell, 2001, Carlson & Moses, 2001; as cited in Hala, 2009). Working memory, defined as "actively holding a number of things in mind", is a part of this general cognitive development (Hala, 2009, p.277). Olson (1993) theoretically argued that in a ToM task, the child, while trying to represent someone else's mental state, has to "hold in mind" the actual state of the event in task. This "hold in mind" is related to child's memory. This reasoning and holding is a kind of a dual task: holding the actual view while trying to figure out some else's mental state based on non–actual previous information. Subsequently, Gordon & Olson (1998) conducted a ToM study parallel with a memory task where children label simple items such as spoon, doll and toy car while they are counting or alternatively tapping their finger on a table. The children's performance in ToM tasks were found to be highly correlated (.64) with memory task performance. Additionally, on another study about ToM and executive functions such as inhibition and working memory, subjects had to choose an element from a number string according to the given rule (Dennis *et al.*; 2009). So they had to remember the rule, the items conforming the rule at the same time try to apply the rule to auditory stream of numbers. Again WM was found to be correlated with ToM performance. There are more studies that support the view that memory development is related

with ToM understanding (Davis & Pratt, 1995; Keenan, 1998 as cited in Hala 2009). In light of these findings, we decided to add verbal working memory tasks in order to control the children's capacity of holding and manipulating representations as for the ToM reasoning.

2.5 ToM and Complex Language

Language is thought to be related with ToM in two ways: one is in a semantic and pragmatic way and the other is syntactical. The first one is related with the language input to child, that is, the information about mental states, roles and point of views in conversations. The latter is about language skills like complex syntax to represent mental states (de Villiers & de Villiers, 2005). While expressing these mental states it is generally required to use complement clause such as (6).

(6) Mary thinks [*that the cat is under the car*].

A longitudinal study (Astington & Jenkins, 1999; de Villiers & Pyers, 2002), with children of age 3 and 4 showed that performance on processing of complement clauses were predictive on false belief reasoning. Also, other studies found an improvement in ToM performance when children were previously trained about syntactical elements related to the language about the mind (Hale and Tager-Flusberg, 2002; Lohmann & Tomasello, 2003). Similar studies were also conducted in Turkish with production of complement clauses (Aydın *et al.*; 2002). Researcher based their task on a specialized false belief verb of Turkish, *sanmak*, 'suppose' to led children construct a complement to be able to describe the source of information. Their results showed that the ToM performance of Turkish children were positively correlated with their complement construction.

CHAPTER 3

METHOD

3.1 Participants

The present study was conducted with children between 4 and 7 years of age. The sample of forty-three Turkish children (23 girls, 18 boys) with middle-class parents was gathered from Naz Preschool in Ankara, Turkey. The age of participants ranged from 3;6 (3 years 6 months) to7;5 (mean age of 5;6 and SD = 13.5 months).

3.2 Design

Each child received four tasks: one set of ToM tasks, one verbal working memory task, namely Word Span Task (WST), and two language tasks, namely the reference matching-task (RMT) and the sentence repetition task (SRT). The total session time varied from 1 hour to 1 hour and a half, depending on the age. As the total time was too long for one session, each child was tested in more than one session. The number of sessions varied depending on the age. With older ones 2 or 3 sessions were almost enough, but the younger ones were quickly getting bored and therefore we needed 4 or 5 sessions for them. Except sentence repetition task, all tasks were finished in one shot. The sessions continued for about 3 months.

3.2.1 Theory of Mind Tasks

Stimuli

We used a set of 6 ToM tasks reflecting the elements of the Wellman scale, namely others' beliefs, desires, knowledge and emotions.

The tasks were similar in their language, format and procedures. They were presented by using small toy figurines representing the target protagonist and pictures for explaining the situation in the scenario (pictures were adopted from the study of Kristen et al. (2006) with permission). In each task children are asked two important questions: a target question about the mental states or the behavior of the character in the scenario, namely the protagonist, and a contrast or control question about reality or expression or someone else's state, especially about the child's opinion. For achieving the task, the child has to suppress his / her own belief, desire or knowledge and tell the belief, desire or knowledge of the character of the scenario (Wellman, & Liu, 2004). The analyses of Wellman and Liu (2004) showed that there is a clear order of difficulty between these tasks, from easiest to hardest, that is from diverse desires to hidden emotion task (Table 3).

Table 3: order of difficulties according to Wellman's (2004) results

Task	Correct Answers
Diverse Desires	(95%)
Diverse Beliefs	(84%)
Knowledge Access	(73%)
Contents False Belief	(59%)
Explicit False Belief	(57%)
Belief Emotion	(52%)
Real-Apparent Emotion	(32%)

The scale developed by Wellman and Liu (2004) was first translated to Turkish by Bayramoğlu and Hohenberger (2007) to assess the development of Turkish children's theory of mind understanding. For adaptation, small toy figurines were given Turkish names (see Appendix A). Also some task materials were modified: in the knowledge- ignorance scenario, rather than a drawer, a small wooden box was used, and in the contents false belief scenario, rather than band-aid box with a toy pig inside, a pencil box was used with a toy bird inside. In the hidden emotion scenario's pre-training part, the emotion "okay" was translated as "normal" in order to give the meaning of "the feeling between happy and sad".

Language Versions

Our interest was to see if the markers with evidential meaning can change children's understanding of ToM. To measure this we added two more Turkish versions of ToM tasks (factor ToM-type) by changing the context of the stories from present time to past. In order to describe a past event the experimenter used in one version the evidential marker -DI for direct evidence and in the other –MIS for indirect evidence (hearsay) while telling the stories.

Neutral version *(present)*

The experimenter told the stories in the present context as a direct experience of the present event as in study of Bayramoğlu and Hohenberger (2007).

(7) Merve kutu-nun için-de ne ol-duğ-u-nu bil-iyor mu?
Merve box-GEN inside- what be- know-IMPF INT
-POSS.LOC. -VN[1]-3G.POSS-ACC
'Does Merve know what is inside the box?'

[1] VN: verbal noun marker.

-DI version *(past direct)*

In this version the stories were told as the event had happened in the past with experimenter's witness.

(8) Merve kutunun içinde ne olduğunu biliyor mu-y-**du**?
INT-COP-**PAST**
'Did Merve know what was inside the box?'

-MIS version *(hearsay)*

In this last version the stories were told as the event had happened again in the past but without experimenter's witness: The experimenter was told the event by a third person.

(9) Merve kutunun içinde ne olduğunu biliyor mu-y-**muş**?
INT-COP-**EV.PF**[2]
'Did Merve know what was inside the box?'

Each child was presented only one ToM-type. In the *neutral version*, Turkish present tense (imperfective) marker '–Iyor', aorist marker '–Ar' and for some cases future tense marker '–ecek' were used to describe the events. In minor cases the *neutral version* had to include markers (-DI, -MIS) to be able to describe the event correctly.

In the *–DI version*, to give a past context to ToM stories, we added the marker –DI to the verbs finishing with –Iyor as in the case of (2) to also keep the ongoing process meaning. Sentences with the aorist marker –Ar stayed as they are. Nominal sentences also received an additional –DI marker. We replaced the –ecek marker which we come across in ToM questions such as (where will she/he look?) with the maker –DI.

[2] Evidential perfective expresses both evidentiality and completion.

For the *–MIS version* we did the same modifications as for *–DI*, except the aorist marker –Ar which was followed by the marker -MIS.

Procedure

Children were tested in an empty room, on the floor with a couple of seats and toys around. The tasks of the scale was presented in one pre-determined order, that is, the diverse desire task was presented first, followed by diverse beliefs, knowledge access, explicit false belief, contents false belief, and real- apparent emotion task was presented last. For each story, children were presented a toy character representing the main character of the story. Also the event was described either with a picture or with a box to explain the context. For indirect experience of past version there was a second toy character rather than the main one, to present the third person who tells the event to the experimenter. The task time was between 15 - 20 minutes depending on the age of the children.

3.2.2 Word Span Task (WST)

Stimuli

The WST involves repetition of several one-syllabic Turkish words. The frequency in daily usage and easy pronunciation were the criterion while choosing words such as “saç, tuz and yurt” (hair, salt and country). Researchers constructed sets with 3 levels where the number of words varied from 2 to 8. A set of 2 words example is as follows (see Appendix B for the entire material):

1. top can (ball soul)
2. bil kürk (know fur)
3. ver tez (give quick)

Procedure

Children were to listen to a set of one-syllabic words then repeat the words in the exact order. The testing begins with a set of 2 then increases as long as the child correctly repeats at least two sets. This task is adopted from Gülten Ünal's Master Thesis (2008) with permission.

3.2.3 Reference-matching Task (RMT)

Stimuli

RMT focuses on comprehension of relative clauses (RC) in Turkish (Özge et al.; to appear). Originally, there were 32 experimental and 28 control items in the task. Due to time restrictions we decreased the number of items to 16 and 17 respectively. Experimental items consist of 2 types of semantically reversible RC, subject (10) and object (11). Control items were composed of subject (12) and object (13) RCs with animate agents or inanimate objects and subject RCs with intransitive verbs (14). Presentation type was identical for all items. Presentation sentences contained only the RC without any verbs.

(10) 8 items Ex.: Tavşanı öpen fare
'the mouse that is kissing the rabbit'

(11) 8 items Ex.: Farenin gıdıkladığı tavşan
'the rabbit the mouse is tickling'

(12) 4 items Ex.: Dondurma yiyen çocuk
'the child who is eating ice-cream '

(13) 7 items Ex.: Çocuğun tuttuğu dondurma
'the ice-cream the child is holding'

(14) 6 items Ex.: Uyuyan kuş
'the bird that is sleeping'

For lexical items, the frequencies, imageability, age of acquisition and morpheme length were also evaluated by Özge *et al.* (to appear) to have equal weight for each

aspect. The frequencies of animals were equal to 2 (except 3 animals among total 15; köpek, fil, koyun were used 4 times). This task, being inspired by Adani's (in press) study on Italian relative clauses, is adopted from Duygu Özge's PhD thesis (in progress) with permission.

Procedure

Children were told a RC sentence (not a complete sentence, i.e. without an ending verb) with a picture where 3 animals are in an action (e.g., a sheep kicking a cow that is kicking another sheep, Figure 1) and asked only to point to the animal expressed with the RC (see Appendix C for entire sentences). The position of the correct animal was nearly equally distributed between right (12 times), left (10 times) and centre (11 times).

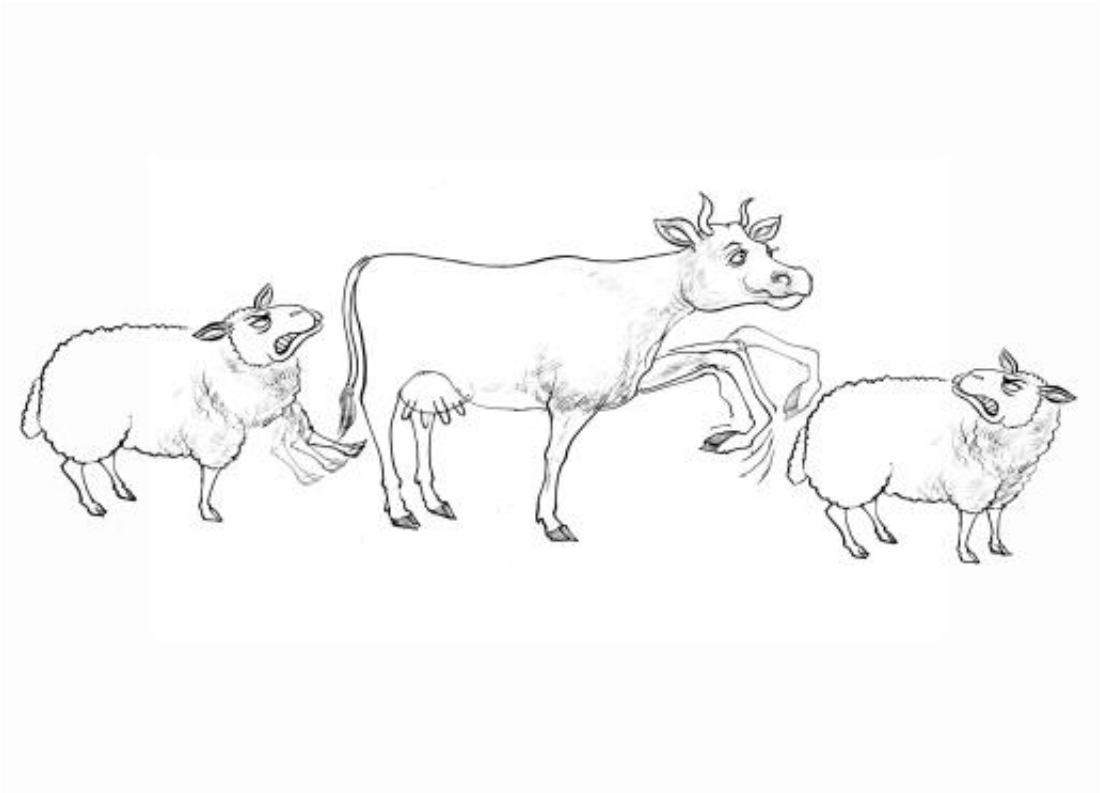

Figure 1: example picture for "Show me the sheep that the cow is kicking"

3.2.4 Sentence Repetition Task (SRT)

Stimuli

This task, also known as "reconstructive elicited imitation task", consists of 1 control (15) and 5 experimental items (16-20). Each experimental item was presented 4 times with a random order mixed with 5 control items. Experimental items contain ungrammatical sentences with missing suffixes. Example sentences with **bold missing markers** are shown below:

(15) Grammatical (control) sentence:
Maymun [ormanda koşarken] bir yüzük bulmuş.
'monkey had found a ring [while running in the forest].'

(16) ACC marker *-(y)ı* missing after -DIK in complement clause:
Deve [at-ın ineği öp-tüğ-ü**(n-ü)**] görünce şaşırmış.
horse-GEN kiss-DIK-3SG.POS**(-ACC)**
'The camel was surprised when he saw [that the horse was kissing the cow.]'

(17) 3SG.POS marker *–(s)ı(n)* missing after -DIK[3] in relative clause
[Kedi-nin hızlıca it-tik**(-i)**] bir kuzu suya düşmüş.
Cat-GEN push-DIK**(-3SG.POS)**
'The sheep [that the cat was pushing] had fallen in to water'

(18) 3SG.POS *–(s)ı(n)* marker missing before ACC *-(y)ı* in complement clause:
Maymun kuzu-nun kediyi gıdıkla-ma**(-sı-)**yı seyrederken şarkı söylemiş.
sheep-GEN tickle-CV**(-3SG.POS-)**ACC
' the monkey had sang while watching the sheep tickling the cat'

[3] Object relativizing particle of Turkish.

(19) GEN marker *-(n)ın* missing in first element of relative clause:

Kuzu**(-nun)** tatlıca öp-tüğ-ü bir kedi mutlu olmuş.

sheep-**GEN** kiss-DIK-3SG.POS

‘ the cat the sheep was kissing sweetly had been happy’

(20) 3SG.POS *–(s)ı(n)* marker missing after second element of relative clause:

Ördeğ-in güzel öğretmen**(-i)** ona aferin demiş.

duck-GEN teacher**(-3SG.POS)**

‘ duck’s beautiful teacher said him congratulations’

Testing sentences were composed of 6 or 7 lexical items and the length of control sentences varied from 4 to 9. This task is adopted from Duygu Özge’s PhD study (in progress).

Procedure

Children were told to repeat the sentences that are said to be taken from story books. The ungrammatical testing items and grammatical control items were presented orally with an appropriate speed (little slower than normal adult speech) and natural intonation. The children were informed to wait until the experimenter’s signal with hand in approximately in 3-4 seconds for repeating (see entire stimuli in Appendix D).

3.3 Hypotheses

In this study, we follow up on the possible role of evidential markers on ToM understanding of Turkish children. We want to investigate systematically whether evidential marking may facilitate performance in the ToM scale. Also, we wanted to find out whether various other cognitive variables predict ToM development.

Several ToM studies showed that the ToM understanding increases with age. In this respect we also hypothesize that older group will have significantly higher ToM scores than the younger group (**H1**). We expect that linguistically marking of evidentials in tasks will facilitate interpreting mental states, i.e. the ToM performance, in particular the stories marked with -DI (**H2**). We expect a possible interaction between age and story type so that the younger ones will particularly profit from an unambiguous story type (-DI version) and the older ones will also score high on the ambiguous ones (-MIS version) (**H3**). We also hypothesize that if one aspect of ToM mastery involves working memory (WM) support, WM should be positively correlated with ToM scores (**H4a**). Language understanding like complex syntax and embedding should also correlate positively with ToM (**H4b**).

CHAPTER 4

RESULTS

For our analysis we divided the subjects into two groups, a younger and older group. The age of the younger group ranged from 3;6 to 5;6 (mean age of 4;7 and SD = 7.2 months) and that of the older from 5;7 to 7;5 (mean age of 6;6 and SD = 5.8 months).

Table 4: Descriptive statistics for the main analysis

	Age				
Condition	***4**	***5**	****6**	****7** [4]	**TOT**
Neutral	3	5	3	3	**14**
DI	3	5	3	4	**15**
MIS	2	4	3	3	**12**
TOT	**8**	**14**	**9**	**11**	**41**
Mean age	3.96	4.98	6.01	6.85	**5.46**
SD	0.25	0.52	0.32	0.35	**1.11**

*younger group

**older group

In each ToM task there were one control and one target question. Child's performance was accepted as successful only if both questions were answered correctly. For each successful task, we added 1 point to a child's total ToM score, therefore maximum score was 6.

[4] Seven years old children were 1st grade primary school students.

In general, gender effect is not expected in ToM performance. A special study for gender effect in ToM showed a weak advantage for young girls (Charman et al., 2002). First, by running an ANOVA, we looked at the gender effect (18 boys, 23 girls in our sample), including age and ToM-type as factors for ToM-score. As expected, gender was not significant ($F(1,30)=1.691$, $p=.203$).

Then we continued our main analysis by collapsing our data across gender. To investigate the effects of age and ToM-type on ToM-scores, we conducted an independent factorial ANOVA with the factors (1) Age group (younger, older) and (2) ToM-type (Neutral, -DI, -MIS) as between-subjects factors. Results showed that there was a significant main effect of age ($F(1,35)=4.189$, $p<0.05$) on children's ToM understanding. Figure 2 shows the details of this effect. This main effect implies that ToM performance increases significantly from ages 4 and 5 to 6 and 7.

Table 5: Descriptive statistics for main analysis.

Dependent Variable: ToM scores

tom type	Age group	Mean	Std. Deviation	N
neutral	younger	2.75	.463	8
	older	3.83	1.329	6
	Total	3.21	1.051	14
DI	younger	3.88	1.458	8
	older	5.14	1.069	7
	Total	4.47	1.407	15
MIS	younger	4.17	1.169	6
	older	4.17	1.602	6
	Total	4.17	1.337	12
Total	younger	3.55	1.224	22
	older	4.42	1.387	19
	Total	3.95	1.359	41

There was also a significant main effect of ToM-type ($F(2,35)=3.749$, $p<0.05$). Games-Howell *post hoc* test revealed that children performed significantly better with ToM stories marked with –DI than with neutral marking ($p<.05$). The parallel development of –DI and neutral version in figure 2 shows this effect clearly.

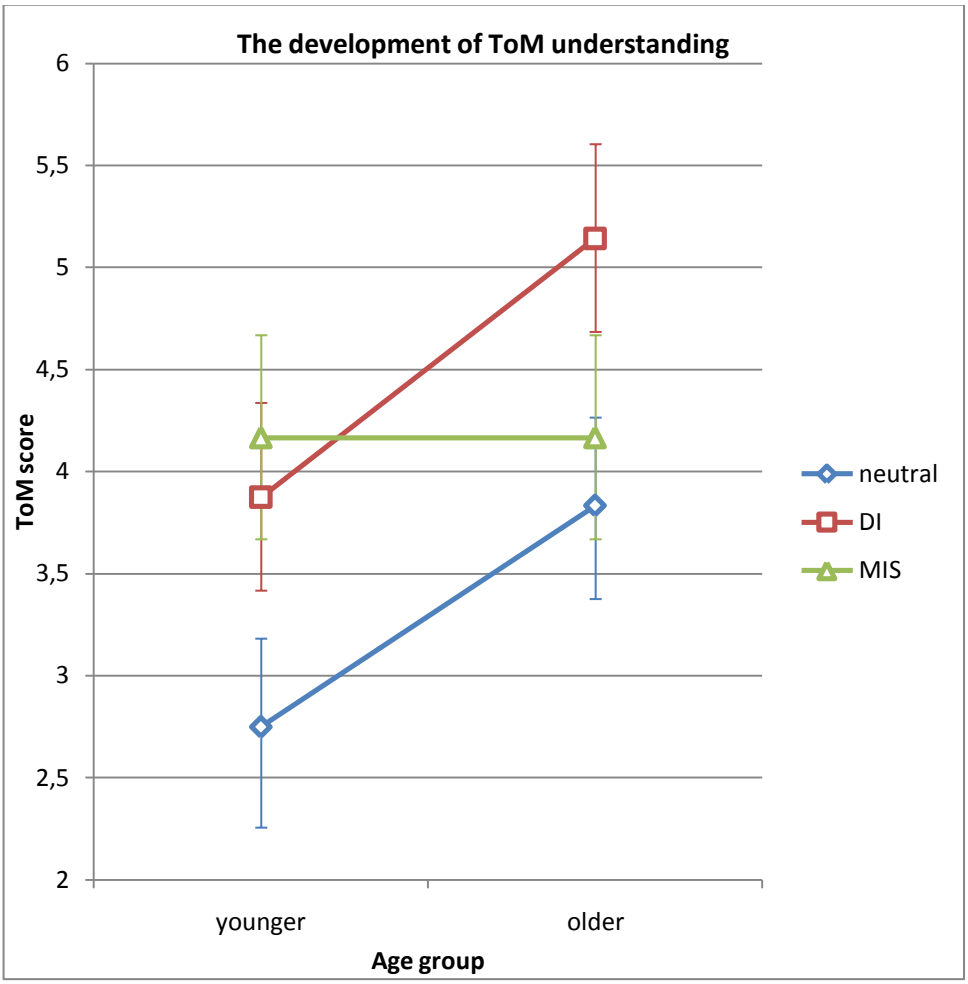

Figure 2: the development of ToM performance for different ToM types (error bars represent SEs)

According to the figure, the –MIS version is not affected by age. Both younger and older group seem to perform equally successful in this version. To see this relation more clearly we re-analyzed the data by increasing the age level from 2 (younger, older) to 4 (4, 5, 6, 7 years old) (see Table 5).

Table 6: Descriptive statistics for ToM performance across 4 age levels.

Descriptive Statistics

Dependent Variable: ToM scores

tom type	age_group2	Mean	Std. Deviation	N
neutral	4 years old	2.67	.577	3
	5 years old	2.80	.447	5
	6 years old	3.67	2.082	3
	7 years old	4.00	.000	3
	Total	3.21	1.051	14
DI	4 years old	4.00	1.000	3
	5 years old	3.80	1.789	5
	6 years old	4.67	1.528	3
	7 years old	5.50	.577	4
	Total	4.47	1.407	15
MIS	4 years old	4.00	.000	2
	5 years old	4.25	1.500	4
	6 years old	3.33	1.155	3
	7 years old	5.00	1.732	3
	Total	4.17	1.337	12
Total	4 years old	3.50	.926	8
	5 years old	3.57	1.399	14
	6 years old	3.89	1.537	9
	7 years old	4.90	1.101	10
	Total	3.95	1.359	41

According to the results, the age effect on ToM understanding was not significant ($F(3, 29)=2.20$, $p=.111$). Another important issue can be observed in Figure 3 in the development of the -MIS version. We see a “dip” for 6 years olds after 4 and 5 years olds which is followed by a steep development for 7 years old. Again the development of understanding the –DI and neutral versions have practically parallel pattern.

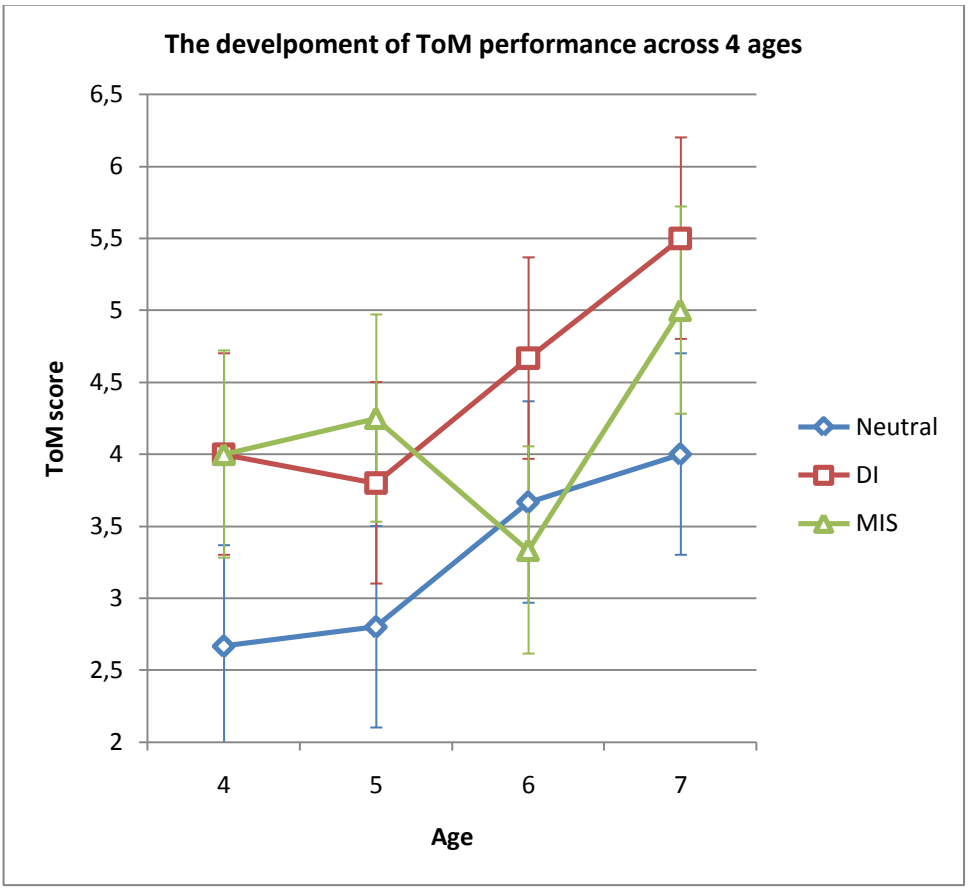

Figure 3: The development of ToM performance of children from 4 to 7 years old. (SEs are shown by error bars)

Further analysis on the additional Tasks (WST, SRT, RMT)

For the verbal Working Memory and the two complex language tasks we first controlled if there was a gender effect. We ran 3 three independent factorial ANOVAs with age (younger, older) and gender (boys, girls) as factors. The results showed that the effect of gender on WST, SRT and RMT was insignificant (p=.832, p=.974, p=.958). For the following analysis we merged the data across gender.

To see the difference between the young and the older group we conducted an independent sample t-test with WST, SRT and RMT scores.

Table 7: Statistics for the additional tasks for 2 age groups

Group Statistics

	Age group	N	Mean	Std. Deviation	Std. Error Mean
Word-span task	younger	21	3.29	.644	.140
	older	18	3.42	.493	.116
Sentence repetition	younger	18	10.33	5.739	1.353
	older	18	15.50	5.639	1.329
Relative clause picture task	younger	22	24.41	4.250	.906
	older	18	28.83	2.854	.673

On average, the older group (M=15.50, SE=1.32) performed better than the younger group (M=10.33, SE=1.35) for SRT ($p<.05$) and also for RMT the older group (M=28.83, SE=.673) was better than younger group (M=24.41, SE=.906) ($p<.001$). On WST there was no significant difference between the performance of the younger (M=3.29, SE=.140) and the older group. (M=3.42, SE=.116).

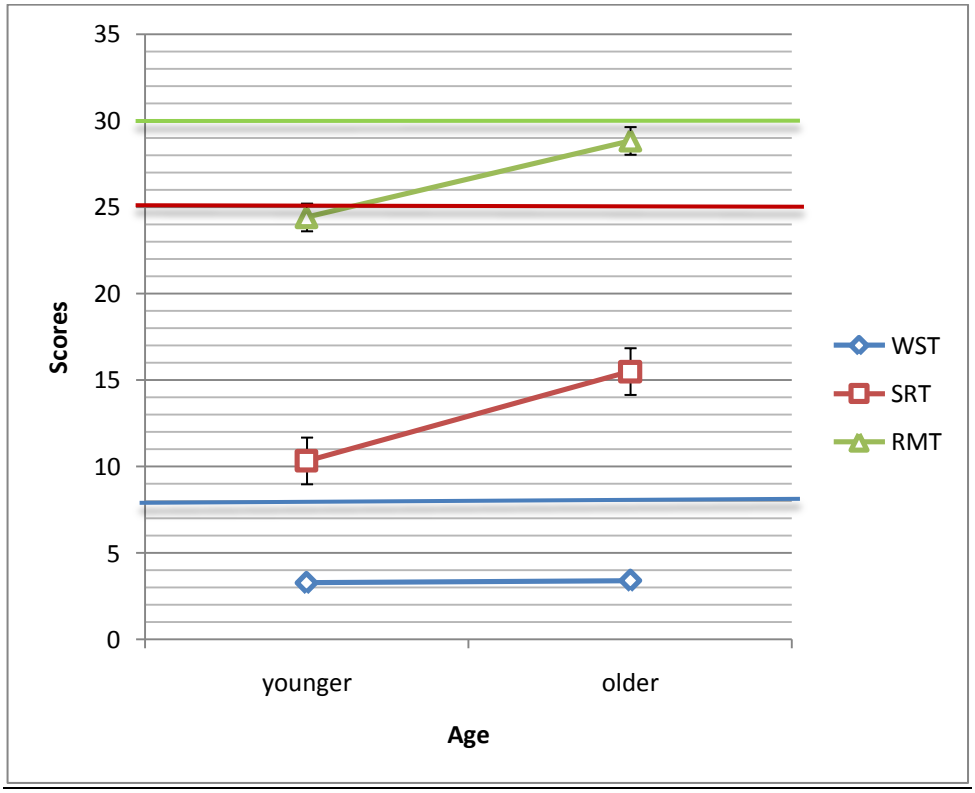

Figure 4: The development of verbal Working Memory and complex language across 2 age groups.
(performance scales for the tasks are as follows: WST 0-8, SRT 0-25, and RMT 0-33)

To see the development of the additional tasks across age in more detail, we applied a one-way independent ANOVA with factor Age (4, 5, 6 and 7 years old) for WST, SRT and RMT scores. The effect of age was not significant for WST but we observed a significant age effect for SRT ($F(3,32)=$, $p<.001$) and for RMT ($F(3,36)=$, $p<.01$) (see figure 5, Table 8)

Table 8: Statistics for verbal WM and complex language across 4 ages

Descriptives

		N	Mean	Std. Deviation	Std. Error
Word-span task	4 years old	7	3.29	.488	.184
	5 years old	14	3.29	.726	.194
	6 years old	9	3.50	.500	.167
	7 years old	9	3.33	.500	.167
	Total	39	3.35	.575	.092
Sentence repetition	4 years old	5	5.00	2.915	1.304
	5 years old	13	12.38	5.237	1.452
	6 years old	9	18.44	4.667	1.556
	7 years old	9	12.56	5.126	1.709
	Total	36	12.92	6.189	1.032
Relative clause picture task	4 years old	8	22.75	4.528	1.601
	5 years old	14	25.36	3.934	1.051
	6 years old	9	28.11	2.759	.920
	7 years old	9	29.56	2.920	.973
	Total	40	26.40	4.272	.675

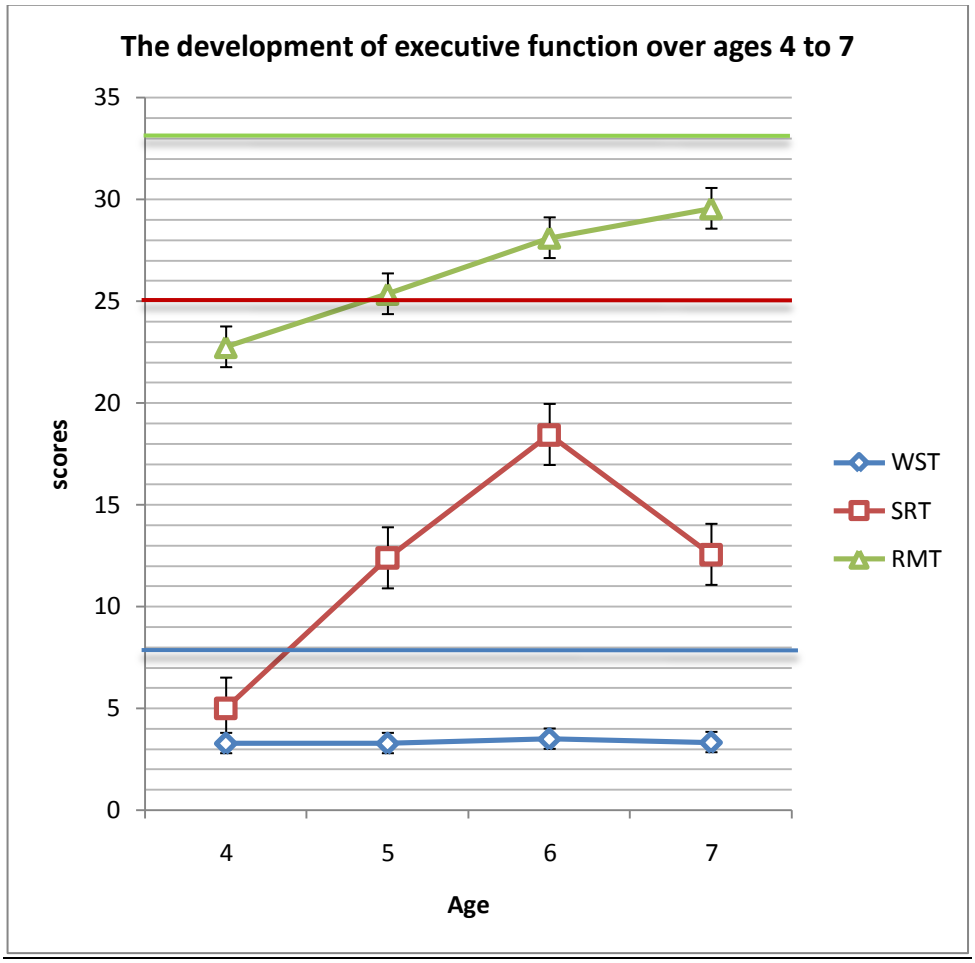

Figure 5: The development of verbal WM and complex language across 4 ages.

In both analysis, with either 2 levels or 4 levels of age, we observe a development for SRT and RMT. The constant performance for WST may be due to the range of the scale. 93% of the children were successful to remember at most 3 or 4 elements that we cannot differentiate them by their WM performance.

Regression between ToM-scores and WST and RMT

We excluded SRT results due to the complexity of the task for younger children. Most of the children from 4 to 5 years old of age couldn't perform the task. Therefore we ran a regression to find out the predictors of ToM-score by putting 2 blocks with first WST and then RMT. The model was significant with two predictors

by explaining 20% of the variance. But only the contribution of the RMT was significant (p<.05) (Table 7).

Table 9: Results of regression analysis.

Model Summary

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	Change Statistics				
					R^2 Change	F Change	df1	df2	Sig. F Change
Step1	.205(a)	.042	.016	1.334	.042	1.629	1	37	.210
step 2	.450(b)	.202	.158	1.235	.160	7.220	1	36	.011

a Predictors: (Constant), Word-span task
b Predictors: (Constant), Word-span task, Relative clause picture task

ToM and Task Comprehension

One can claim that the children can fail in the ToM task not because they can't take another person's mental perspective but because they don't understand the task, i.e. the story. Obviously this maybe the case for younger children, but some of the stories contain a control question to check memory of the children to understand if they have a correct representation of the reality while attributing the mental state of the story's main character. In 3 of ToM stories (Knowledge Ignorance, Explicit and Contents False Belief) we had this kind of questions. To control the explained problem, we created a memory-score to rate children's understanding of the story. For correct responses children got 1 point (i.e. maximum memory-score was 3).

To investigate the effect of ToM-type on story understanding (memory-score) we conducted an independent factorial ANOVA first with 2 levels of age like we did for the ToM-scores. Both ToM-type and age group were insignificant ($F(2,34)=975$, $p=.387$; $F(1,34)=.004$, $p=.948$) (figure 6).

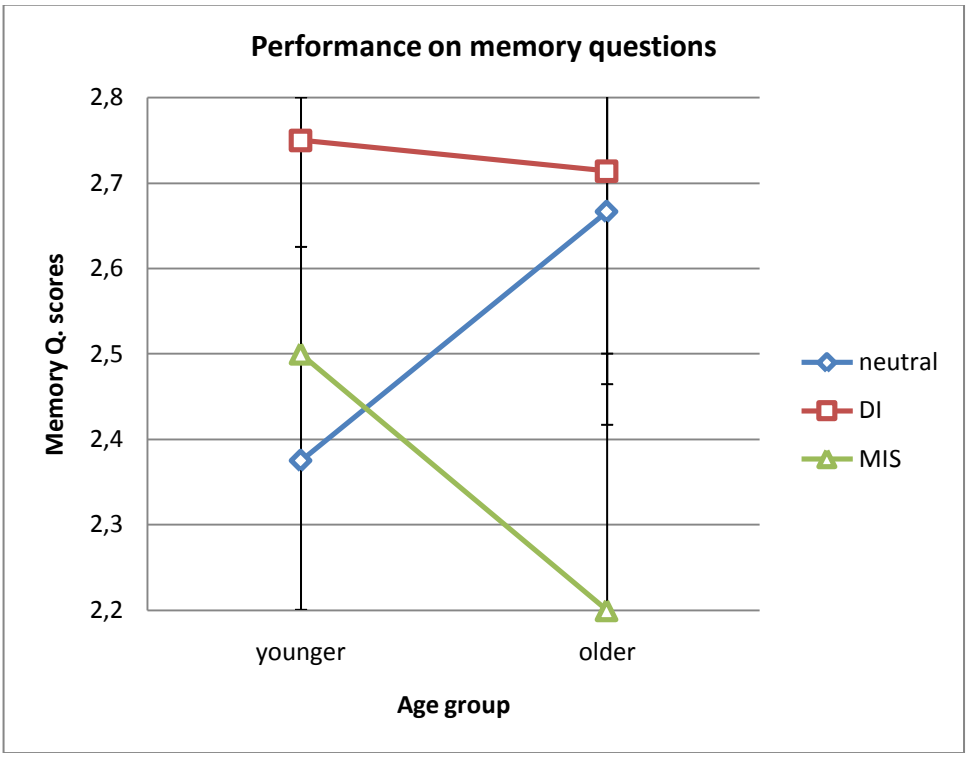

Figure 6: The development of performance on memory questions for 2 ages groups.

For further analysis, by increasing the levels of age, we ran again an independent factorial ANOVA with between factors age (4, 5, 6 and 7 years old) and ToM-type. ToM-type was again insignificant but this time there was a main effect of age ($F(3,28)=5.56$ $p<.01$). Games-Howell *post hoc* test revealed that 5 years old children performed significantly better than 4 years old ($p<.05$).(Figure 7).

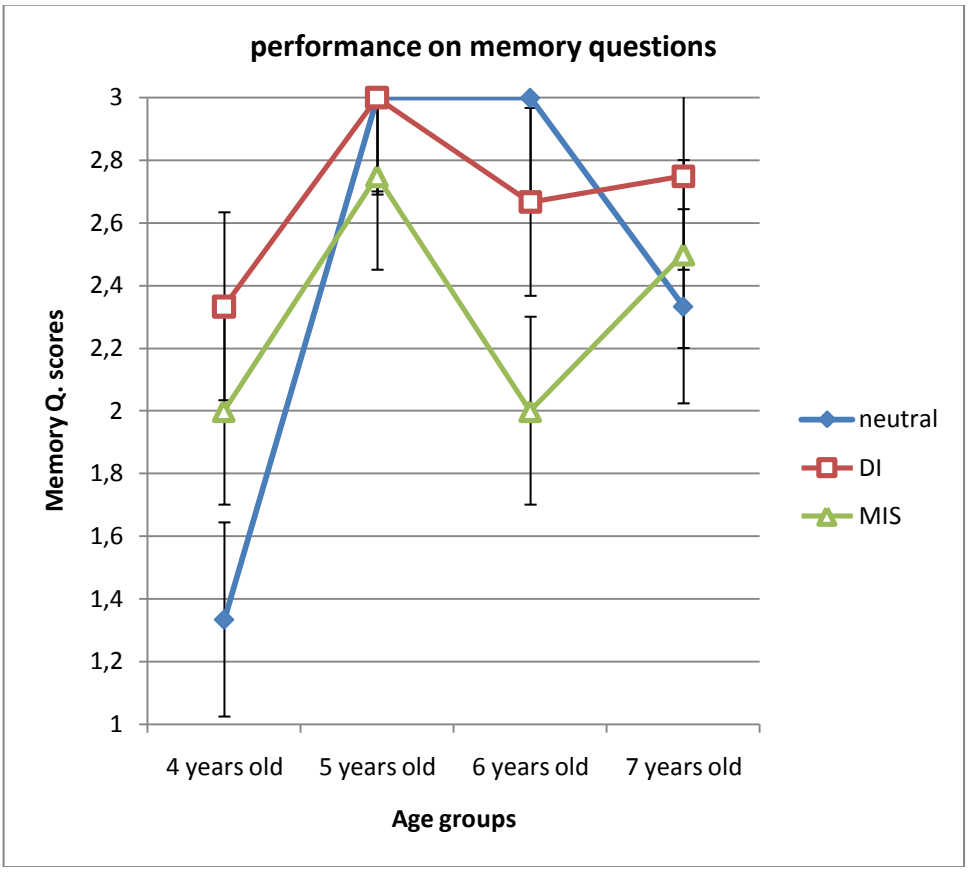

Figure 7: development of performance on memory questions across 4 ages.

One other way of understanding the comprehension of children is to look at the cases where the children fail in target (ToM) question but pass control. Table 10 shows that 66% of the children who failed in target question were successful in control questions.

Table 10: Number of correct/false answers to memory and target questions.

Memory Q	Target Q	# of cases
TRUE	TRUE	73
	FALSE	14
FALSE	TRUE	32
	FALSE	7
	tot[5]	126

[5] Each child has 6 couple of answers for 6 ToM tasks. As there were 41 children the total is 41x6=126

Our sample size does not allow us for finer analysis, but these results can give the idea that children mostly understood the task questions even though they failed on target questions.

Guttman Scale

This method of analyzing the data is useful when there is a successive progression on the performances across tasks. First we should order the tasks from easy to hard depending on the total success percentage. To fit a child's performance in the ordered tasks (scale), the child should be successively passing tasks, however, once s/he fails he/she should continue to fail in the following tasks. In the table below you can see the difficulty levels of ToM tasks across the presentation type and the fitting subject percentage separately for the three conditions.

Table 11 : Comparison between ToM-type performances across ToM scale.

MIS	
NOD	100%
NOB	92%
KI	83%
AREN	50%
CFB	50%
EFB	42%
FIT	**67%**
Range[6]	58

DI	
NOD	87%
KI	87%
AREN	73%
CFB	73%
EFB	67%
NOB	60%
FIT	**33%**
Range	27

NEUTRAL	
NOD	86%
KI	86%
NOB	57%
AREN	50%
CFB	29%
EFB	14%
FIT	**43%**
Range	72

The –MIS version fits best with the data (67%). The range is big enough and the tasks are well spaced in their difficulty. For the –DI version, the data does not seem to fit (33%). The range of –DI is only 27%, i.e., the scale is too much squeezed. The few differences between the 6 tasks show us the effectiveness of this presentation type in facilitating ToM understanding. In the neutral version, the first two (87% both) and the third and fourth (57% and 50%) tasks seem to be interchangeable in

[6] Range is the % difference between the hardest and the easiest task in aToMm-Type. (e.g. for MIS, it is 100-42=58)

their level of difficulty. These two ties explain the modest fit of the data to the Guttman scale (43%).

CHAPTER 5

DISCUSSION AND CONCLUSIONS

In this study, we tried to examine the impact of the understanding of evidential morphemes in Turkish children on the understanding of *theory of mind* tasks. We investigated the hypothesis that the grammaticalized markers of evidentiality (-DI and –MIS) in Turkish can affect ToM understanding of Turkish children.

For the first time, a representative ToM Scale has been cast into 3 different linguistic forms in order to show the impact of evidential markers in Turkish: a control form without explicit evidential markers, a form with –DI (marking factuality in the past) and a form with –MIS (marking hearsay in our study).

Parallel with previous findings of Bayramoğlu & Hohenberger (2007), we observed a significant age effect in ToM scores. The *older* group was better than *younger* group, that is, ToM understanding increases over time, as hypothesized in **H1**.

Our analysis showed that the children who were told the stories in the past context with direct experience marker -DI were significantly better than the ones who heard the stories in present context in both age groups, thus, **H2** was confirmed. Why is the presentation type *–DI* better than the neutral one, for understanding of ToM?

Children need clearer and longer clues to have strengthened their representations. Adults don't need strong clues; they bring it with them and actualize their background information. Children may not use of background. They need obvious clues. That is the effect of the development. Slobin argues that speaker of language

expose linguistic structures and properties of that language in every utterance and in the course of development they have to understand and sort out the appropriate usage of these properties (Gleitman & Papafragou; 2005). In English, an embedding with an evidential proposition (P) has the structural form: X says that P (de Villiers & Pyers; 2002). The person X expresses evidence about P with the help of English sentence structure. In Turkish this is done both structurally with the help of lexical evidentials and also morphologically via markers pointing source of information such as –DI and –MIS. Thus, an additional clue is present in the language. This additional information supplied by markers may have different evidential values. A suggestibility study of Aydın & Ceci (2009) states that children tend to change their thoughts and memories when they are encountered with a stronger form of evidence (-DI) than a previous weaker one (-MIS). While –DI reflects the direct evidence of experimenter, -MIS has a second hand meaning which may be ambiguous. The first marker tends to carry more reliable information than the latter marker. Thus, ambiguous evidential value of marker -MIS might be confusing for children rather than helping them appreciates the flexibility of thought. As a result, the additional morphological clue may be helpful with only form –DI, which is exactly the strong structural format that is necessary in ToM understanding of children.

Our claim that younger children will profit more from an unambiguous story type "–DI" was not confirmed. Younger group performed equally with forms –DI and –MIS. It is stated that the particle -MIS is plurifunctional: marking perfection, quotation and evidentiality (Aksu-Koç, 1988). This makes the fully acquisition of this particle somewhat difficult. We have also mentioned that even at 6 years of age children did not have adult like performance with -MIS (Aksu-Koç & Alıcı, 2000). -MIS does not develop until after 6 years of age, when children's performance speeds up and catches up with that of DI. This speed up from six to seven years old was not-significant therefore we can conclude that our third hypothesis (**H3**) which states

the profit of type –DI and late steep development of -MIS was not confirmed with significant results.

4 and 5 years old children had hard time to perform SRT task. Most of them were unsuccessful. First we may think that this may be due to their memory restrictions. But verbal WM task showed no difference between age groups. Most probably this result shows that children had no or very limited access to the linguistic structures therefore they failed to perform, that is, younger children abandoned the task, so we were not be able to test if SRT was a good predictor or not, thus, **H4b** could not be fully tested. We also found that the referent-matching task was a good predictor for ToM scores, thus **H4b** was partially confirmed. RMT has a similar trend with age. As SRT cannot give us clues about effects of complex syntax, the causal relation between age and RC understanding seems structurally parallel and stays undetermined.

We also couldn't find any relation between WST levels and ToM scores of the children, possibly due to limited scale, i.e. similar performances between age groups. So, the WM task was not a good predictor for ToM understanding as reported in Bayramoğlu & Hohenberger (2007). The problem with WST may be due to its structure which does not offer a dual performance, i.e. hold something in mind and reason at the same time. The children only repeat the words in order which makes it a generic recalling task. It thus measures verbal memory capacity without evaluation which is absolutely needed for comparison with ToM reasoning. This task helped us to evaluate the unperformable structure of the SRT, which is not probably due to lag of memory to recall sentence but the complex structure. In fact, we considered also to use a listening span task (LST) which exactly fits is a good *dual task* working memory task. Task requires to judge true false value of the given set of propositional sentences (e.g. cats bark, a lemon is yellow) then subsequently recall the last word of them. It is a hard task to perform even for adults. At the end of the trial period we decided to abandon the task seeing that the children under age 5

and a half could not first understand and then perform the task. As a result, we could not confirm the **H4a** with our design.

These results are very relevant to Language and Thought discussion. A Whorfian might conclude as stronger form of the theory. However one should be cautious about the linguistic part. Training on communication verbs such as *say* and *tell*, that one must construct a complement with, to express aspectual position, affected positively the ToM performance (Hale and Tager-Flusberg, 2002; Lohmann & Tomasello, 2003). Thus, language seems to provide an *online* representational advantage rather than a permanently reshaping relative processes and functions (Gleitman & Papafragou; 2005). In the same way, a language may profit from linguistic marking if the clue about source of information is present linguistically, in other word if the clues are *online*. Specifically the relation between Language and ToM reasoning is still not clear. In the one hand de Villiers (2002) argue that language is a precursor for ToM understanding, that is, children must first understand the presented complex verbal information, than interpret and express the other's mental states. On the other hand, it is also argued that children before age of 4 cannot perform even a non-verbal FB task. At this point Roeper (2007) states that ToM is about representations whether if it is verbal or non-verbal (visual). In both cases children have to have the representation of the actual and the previous case. He concludes that ToM is related with computing representation not concepts.

Limitations and Future Studies

We prepared additional tasks for the comprehension and production of suffixes -DI and –MIS in evidential meanings but we could not conduct them because of time limitations. The Ideal format with 4 age groups (4, 5, 6 and 7) and 3 ToM-types require a good number of subjects with which we could not study; hence, we had to

divide the sample in to two age groups, which subsequently prevented us to obtain finer results from analysis.

For future studies we propose a cross-cultural work, with more control tasks like comprehension and production of evidential grammar, where the presentation of tasks may first vary from use to non-use of linguistic evidentials then also vary from use of lexical evidentials to morphological ones the affect of evidentials in understanding of ToM.

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APPENDICES

Appendix A: 3 versions of ToM Tasks and other materials

Differences of version DI and MIS from neutral one are marked with **bold** characters.

*Diverse Desire (***NEUTRAL***)*

Props: Small figurine of a man plus colored realistic drawings of carrot on one half and cookies on the other.

Story: Bak bu Osman (place figure next to Picture, midway between two items). Osman'ın karnı acıkmış ve canı bir şeyler yemek istiyor. Burada Osman'ın yiyebileceği 2 şey var: havuç (point) ve bisküvi (point).

Own Desire: Sen en çok hangisini seviyorsun? Havucu (point) mu, yoksa bisküviyi (point) mi?

_____havuç _____bisküvi

If carrot: Peki, bu çok güzel bir seçim. AMAAA Osman aslında bisküvi sever (don't point). Havuç sevmiyor. Onun en çok sevdiği şey bisküvi.

If cookie: Peki, bu çok güzel bir seçim, AMAAA Osman aslında havuç seviyor (don't point). Bisküvi sevmiyor. Onun en çok sevdiği şey havuç.

Question: Tamam, şimdi yemek yeme zamanı. Osman sadece bunlardan birini seçebilir. Sadece birini. Osman (point to Osman) sence hangisini seçecek?

Havucu mu, bisküviyi mi?

Havuç_____ Bisküvi_____

*Diverse Desire (***-DI***)*

Props: Small figurine of a man plus colored realistic drawings of carrot on one half and cookies on the other.

Story: Bak bu Osman (place figure next to Picture, midway between two items). **Geçen gün Osman'la beraberdik,** Osman'ın karnı acık**tı** ve canı bir şeyler yemek iste**di**. Burada Osman'ın yiyebileceği 2 şey var**dı**: havuç (point) ve bisküvi (point).

Own Desire: Sen en çok hangisini seviyorsun? Havucu (point) mu, yoksa bisküviyi (point) mi?

_____havuç _____bisküvi

If carrot: Peki, bu çok güzel bir seçim. AMAAA Osman aslında bisküvi sever (don't point). Havuç sevmiyor. Onun en çok sevdiği şey bisküvi.

If cookie: Peki, bu çok güzel bir seçim, AMAAA Osman aslında havuç sever (don't point). Bisküvi sevmiyor. Onun en çok sevdiği şey havuç.

Question: Yemek yeme zamanı **gelince**, Osman sadece bunlardan birini seç**ti**. Sadece birini. Osman (point to Osman) sence hangisini seç**ti**?

Havucu mu, bisküviyi mi?

Havuç_____ Bisküvi_____

*Diverse Desire (***-MIŞ***)*

Props: Small figurine of a man plus colored realistic drawings of carrot on one half and cookies on the other.

Story: Bak bu Osman **ve Dilek** (place figure next to Picture, midway between two items). **Geçen gün Dilek'le konuştum, geçenlerde Osman'la berabermiş**. Osman'ın karnı acıkmış ve canı bir şeyler yemek iste**miş**. Burada Osman'ın yiyebileceği 2 şey var**mış**: havuç (point) ve bisküvi (point).

Own Desire: Sen en çok hangisini seviyorsun? Havucu (point) mu, yoksa bisküviyi (point) mi?

_____havuç _____bisküvi

If carrot: Peki, bu çok güzel bir seçim. AMAAA Osman aslında bisküvi sever**miş** (don't point). Havuç sevmiyor. Onun en çok sevdiği şey bisküvi.

If cookie: Peki, bu çok güzel bir seçim, AMAAA Osman aslında havuç sever**miş** (don't point). Bisküvi sevmiyor. Onun en çok sevdiği şey havuç.

Question: Yemek yeme zamanı **gelince**. Osman sadece bunlardan birini seç**miş**. Sadece birini. Osman (point to Osman) sence hangisini seç **miş-tir**?

Havucu mu, bisküviyi mi?

Havuç_____ Bisküvi_____

Diverse Belief **(NEUTRAL)**

Props: Small figurine of a girl plus colored realistic drawings of bushes on one half and a car that was parked in front of apartments on the other side.

Story: Bak bu Dilek (place figure on the table next to picture midway between two items). Ayşe kedisini bulmak istiyor. Kedisi **ya** çalılıkların içinde **ya da** arabanın altında.

Own Belief: Ne düşünüyorsun? Sence kedi nerede? Çalılıklarda mı (point), arabanın altında mı (point)?

_____çalılık _____araba

If bushes: Pekala, bu çok güzel bir fikir. AMAAA Ayşe kedisinin arabanın altında olduğunu düşünüyor (don't point). Kedinin arabanın altında olduğunu düşünüyor.

If car: Pekala, bu çok güzel bir fikir. AMAAA Ayşe kedisinin çalılıklarda olduğunu düşünüyor (don't point). Kedinin çalılıklarda olduğunu düşünüyor

Question: Peki, Ayşe (point to Ayşe) kedisini bulmak için nereye bakacak?

Çalılıklara mı, yoksa arabanın altına mı?

Çalılık _____ Araba_____

Diverse Belief **(-DI)**

Props: Small figurine of a girl plus colored realistic drawings of bushes on one half and a car that was parked in front of apartments on the other side.

Story: Bak bu Ayşe (place figure on the table next to picture midway between two items). **Geçen gün Ayşe'le beraberdik**. Ayşe kedisini bulmak istiyor**du**. Kedisi **ya** çalılıkların içinde**ydi ya da** arabanın altında**ydi**

Own Belief: Ne düşünüyorsun? Sence kedi nerede**ydi**? Çalılıklarda mı (point), arabanın altında mı (point)?

_____çalılık _____araba.

If bushes: Pekala, bu çok güzel bir fikir. AMAAA Ayşe kedisinin arabanın altında olduğunu **düşünüyordu** (don't point). Kedinin arabanın altında olduğunu düşünüyor**du**.

If car: Pekala, bu çok güzel bir fikir. AMAAA Ayşe kedisinin çalılıklarda olduğunu **düşünüyordu** (don't point). Kedinin çalılıklarda olduğunu düşünüyor**du**

Question: Peki, Ayşe (point to Ayşe) kedisini bulmak için sence nereye bak**tı**?

Çalılıklara mı, yoksa arabanın altına mı?

Çalılık _____ Araba_____

Diverse Belief **(-MIŞ)**

Props: Small figurine of a girl plus colored realistic drawings of bushes on one half and a car that was parked in front of apartments on the other side.

Story: Bak bu Ayşe (place figure on the table next to picture midway between two items). **Geçen gün Dilek'le konuştum, geçenlerde Ayşe'le berabermiş**. Ayşe kedisini bulmak istiyor**muş**. Kedisi **ya** çalılıkların içinde**ymiş ya da** arabanın altında**ymiş**

Own Belief: Ne düşünüyorsun? Sence kedi nerede**ydi**? Çalılıklarda mı (point), arabanın altında mı (point)?

_____çalılık _____araba.

If bushes: Pekala, bu çok güzel bir fikir. AMAAA Ayşe kedisinin arabanın altında olduğunu düşünüyor**muş** (don't point). Kedinin arabanın olduğunu düşünüyor**muş.**

If car: Pekala, bu çok güzel bir fikir. AMAAA Ayşe kedisinin çalılıklarda olduğunu düşünüyor**muş** (don't point). Kedinin çalılıklarda olduğunu düşünüyor**muş**

Question: Peki, Ayşe (point to Ayşe) kedisini bulmak için sence nereye bak**mıştır**?

Çalılıklara mı, yoksa arabanın altına mı?

Çalılık _____ Araba_____

Knowledge- Ignorance **(Neutral)**

Props: Small figurine of a girl plus a small nondescript box that a toy tog can fit in.

Experimenter: Bak burada bir kutu var (keep finger over the box).

Question: Sence kutunun içinde ne var (point to box)?

Child: (If the child gives an answer) _____

Experimenter: (With drama) Hadi açıp görelim bakalım. Aaaa bak bir köpek var içinde!

(open the box to show the dog)

(Close the drawer to restrict view again after a pause)

Post-view Question: Peki… söyle bakalım, ne vardı kutunun içinde?

Child: _____ (If child makes an error here, show contents inside again until child gets this question correct)

Experimenter: Merve kutunun içini hiç görmedi. (Take Merve out) Ve işte Merve geliyor.

Question: Peki… Merve kutunun içinde ne olduğunu biliyor mu?

Evet_____ Hayır_____

Merve kutunun içinde ne olduğunu gördü mü?

Evet_____ Hayır_____

Knowledge- Ignorance **(-DI)**

Props: Small figurine of a girl plus a small nondescript box that a toy tog can fit in.

Experimenter: Bak burada bir kutu var (keep finger over the box).

Question: Sence kutunun içinde ne var (point to box)?

Child: (If the child gives an answer) _____

Experimenter: (With drama) Hadi açıp görelim bakalım. Aaaa bak bir köpek var içinde!

(open the box to show the dog)

(Close the drawer to restrict view again after a pause)

Post-view Question: Peki… söyle bakalım, ne vardı kutunun içinde?

Child: _____ (If child makes an error here, show contents inside again until child gets this question correct)

Experimenter: **Dün Merve ile beraberdik** (Take Merve out)**.** Merve kutunun içini hiç görmedi .

Question: Peki… **Dün,** Merve kutunun içinde ne olduğunu biliyor mu**ydu**?

Evet_____ Hayır_____

Merve, **Dün** kutunun içinde ne olduğunu gördü mü?

Evet_____ Hayır_____

*Knowledge- Ignorance (-***MIŞ***)*

Props: Small figurine of a girl plus a small nondescript box that a toy tog can fit in.

Experimenter: Bak burada bir kutu var (keep finger over the box).

Question: Sence kutunun içinde ne var (point to box)?

Child: (If the child gives an answer) _____

Experimenter: (With drama) Hadi açıp görelim bakalım. Aaaa bak bir köpek var içinde!

(open the box to show the dog)

(Close the drawer to restrict view again after a pause)

Post-view Question: Peki… söyle bakalım, ne vardı kutunun içinde?

Child: _____ (If child makes an error here, show contents inside again until child gets this question correct)

Experimenter: **Dün Dilekle konuştum** (show toy character), **geçen Mervele berabermiş** (Take Merve out)**.** Merve, **dün** kutunun içini hiç görme**miş**.

Question: Peki… **Dün,** Merve kutunun içinde ne olduğunu biliyor mu**ymuş**?

Evet_____ Hayır_____

Merve, **Dün** kutunun içinde ne olduğunu gör**müş** mü?

Evet_____ Hayır_____

Explicit False Belief **(Neutral)**

Props: Small figurine of a boy plus colored realistic drawing of closet on one half and backpack on the other.

Story: Bak bu Emre. Dilek eldivenlerini arıyor. Emre'nin eldivenleri ya çantasında (point), yada dolapta (point). ASLINDA Emre'nin eldivenleri (gerçekten de) sırt çantasında (point and pause). AMA Emre eldivenlerinin dolapta olduğunu düşünüyor (point).

Questions: Peki, Emre eldivenleri için nereye bakacak?

Sırt çantasına mı, dolabına mı?

Sırt çantasına_____ Dolabına_____

Emre'nin eldivenleri gerçekte nerede? Sırt çantasında mı dolabında mı?

Sırt çantasında_____ Dolabında_____

Explicit False Belief **(-DI)**

Props: Small figurine of a boy plus colored realistic drawing of closet on one half and backpack on the other.

Story: Bak bu Emre. **Geçen gün** Emre eldivenlerini arıyor**du**. Emre'nin **eldivenleri** ya **çantasındaydı** yada **dolaptaydı.** ASLINDA Emre'nin eldivenleri gerçekten de sırt çantasında**ydı** (point and pause). AMA Emre eldivenlerinin dolapta olduğunu düşünyor**du** (point).

Questions: Peki, sence, Emre eldivenleri için nereye bak**tı**?

Sırt çantasına mı, dolabına mı?

Sırt çantasına_____ Dolabına_____

Emre'nin eldivenleri gerçekte nerede**ydi**? Sırt çantasında mı dolabında mı?

Sırt çantasında_____ Dolabında_____

Explicit False Belief (**-MIŞ**)

Props: Small figurine of a boy plus colored realistic drawing of closet on one half and backpack on the other.

Story: Bak bu Dilek ve Emre. **Geçen gün Dilekle konuştum. Geçen hafta Emre ile berabermiş.** Emre eldivenlerini arıyor**muş.** Emre'nin eldivenleri ya **çantasındaymış** yada **dolaptaymış.** ASLINDA Emre'nin eldivenleri (gerçekten de) onun sırt çantasında**ymış** (point and pause). AMA Emre eldivenlerinin dolapta olduğunu düşünüyor**muş** (point).

Questions: Peki, sence, Emre eldivenleri için nereye bak**mıştır**?

Sırt çantasına mı, dolabına mı?

Sırt çantasına_____ Dolabına_____

Emre'nin eldivenleri gerçekte nerede**ymiş**? Sırt çantasında mı dolabında mı?

Sırt çantasında_____ Dolabında_____

Contents False Belief **(neutral)**

Props: Small figure of a boy plus a Standard pencil box that a toy bird can fit in.

Experimenter: Bak bu bir kalem kutu

Question: Sence bu kalem kutusunun içinde ne var? Ne dersin?

Experimenter: (With drama) Peki açalım bakalım ne varmış içinde… Aaaa gerçekte bir kuş varmış içinde. (Pour bird out)

(Close the pencil box to restrict view again after a pause)

Post-view Question: Tamam, ne vardı kutunun içinde?

Child: _____ (If the child makes an error here, show contents inside again until child gets this question correct)

Experimenter: Can bu kalem kutunun içinde ne olduğunu hiç görmedi. (Take Can out) Ve işte şimdi Can geliyor.

Question: Peki, Can bu kalem kutunun içinde ne olduğunu düşünür? Kalem mi, kuş mu?

(Reiterate choice again if the child still does not answer)

Kalem_____ Kuş_____

Can kalem kutunun içinde ne olduğunu gördü mü?

Evet_____ hayır_____

Contents False Belief **(-DI)**

Props: Small figure of a boy plus a Standard pencil box that a toy bird can fit in.

Experimenter: Bak bu bir kalem kutu

Question : Sence bu kalem kutusunun içinde ne var? Ne dersin?

Experimenter: (With drama) Peki açalım bakalım ne varmış içinde… Aaaa gerçekten bir kuş varmış içinde. (Pour bird out)

(Close the pencil box to restrict view again after a pause)

Post-view Question: Tamam, ne vardı kutunun içinde?

Child: _____ (If the child makes an error here, show contents inside again until child gets this question correct)

Experimenter: **Dün Can'la beraberdik**. Can bu kalem kutusunun içini hiç görmedi.

Question: Peki, **sence,** Can bu kalem kutusunun içinde ne olduğunu düşün**dü**? Kalem mi, kuş mu?

(Reiterate choice again if the child still does not answer)

Kalem_____ Kuş_____

Can, kalem kutusunun içinde ne olduğunu gördü mü?

Evet_____ hayır_____

Contents False Belief **(-MIŞ)**

Props: Small figure of a boy plus a Standard pencil box that a toy bird can fit in.

Experimenter: Bak bu bir kalem kutu

Question: Sence bu kalem kutusunun içinde ne var? Ne dersin?

Experimenter: (With drama) Peki açalım bakalım ne varmış içinde… Aaaa gerçekten bir kuş varmış içinde. (Pour bird out)

(Close the pencil box to restrict view again after a pause)

Post-view Question: Tamam, ne vardı kutunun içinde?

Child: _____ (If the child makes an error here, show contents inside again until child gets this question correct)

Experimenter: **Dün Dilek** Can'la berabermiş. Can bu kalem kutusunun içini hiç görme**miş**.

Question: Peki, **sence,** Can bu kalem kutusunun içinde ne olduğunu düşün**müştür**? Kalem mi, kuş mu?

(Reiterate choice again if the child still does not answer)

Kalem_____ Kuş_____

Can, kalem kutusunun içinde ne olduğunu gör**müş** mü?

Evet_____ hayır_____

Appearance Reality Pre-training ***(Same for Neutral, DI and MIS)***

Props: Picture showing drawing of a boy's head (not face or expression). Emotion scale: a strip of three simple "faces" (bare-bones "smiley"-type black and white faces of just circular outline plus simple eyes and line-like mouths) : one happy, one sad and (in the middle of strip) one neutral.

Experimenter: Şimdi ben sana bir çocuk hakkında bir hikaye anlatacağım (Take out emotion scale). Bu hikayede bu çocuk kendini mutlu da hissediyor olabilir (point), üzgün de hissediyor olabilir (point) ya da ne mutlu ne üzgün sadece normal de hissediyor olabilir.

Şimdi bana gösterebilir misin, bu yüzlerden hangisi

Üzgün?

Normal?

Mutlu?

(Train child if child makes a mistake)

Experimenter: Tamam, şimdi hikayeye geçelim. Hikayeyi anlattıktan sonra bu çocuğun gerçekte ne hissettiğini (pat own chest) ve yüzündeki ifadeyi soracağım (pat own cheek). Onun nasıl hissettiği (pat own chest) ile yüzündeki ifade (pat own cheek) aynı da olabilir farklı da olabilir.

(At this point the emotion scale is pushed to one side. The child does not have to answer the target question by pointing at the scale. The scale remains inside but out of the way just to provide a visual reminder of the warm up, unless the child is unusually nonverbal.)

Appearance Reality Emotion Negative **(neutral)**

Experimenter: Bu hikaye Mert hakkında (show toy character). Mert'in teyzesi gittiği bir yolculuktan daha yeni dönmüş. Bu yolculuğa çıkmadan önce de Mert'e gittiği yerden bir oyuncak araba getireceğine dair söz vermiş.

AMA oyuncak araba yerine bir kitap getirmiş. Halbuki Mert kitapları sevmiyor (slow pace). Mert'in asıl istediği şey oyuncak bir araba.

AMAA Mert ne hissettiğini saklamak zorunda, çünkü eğer teyzesi Mert'in gerçek duygularını öğrenirse ileride ona bir daha hiçbir şey almaz.

Memory check: Mert'in teyzesi ona ne almıştı? _____

(correct answer: a book… If the child gets the answer wrong, tell the story again)

Peki, eğer teyzesi Mert'in gerçekte ne hissettiğini öğrenirse ne yapar? _____

(correct answer: she will never buy anything for Matt anymore… If the child gets the answer wrong, tell the story again)

Question: Peki, Mert aslında ne hissetmiştir teyzesi ona kitabı verdiğinde (pat own chest)?

Mutlu mu, üzgün mü, normal mi? (Note: the examiner should not show any feelings)

(Reiterate choice again if the child still does not answer)

Mutlu_____ Üzgün_____ Normal_____

Peki, Sence Mert nasıl gözükmeye çalışmıştır teyzesi ona kitabı verdiğinde (pat own cheek)? Mutlu mu, üzgün mü, normal mi? (Note: the examiner should not show any feelings)

(Reiterate choice again if the child still does not answer)

Mutlu_____ Üzgün_____ Normal_____

*Appearance Reality Emotion Negative (***-DI***)*

Experimenter: Bu hikaye Mert hakkında (show toy character) **Geçen gün Mert'le beraberdik**. Mert'in teyzesi gittiği bir yolculuktan daha yeni dönmüş. Bu yolculuğa çıkmadan önce de Mert'e gittiği yerden bir oyuncak araba getireceğine dair söz vermiş.

AMA oyuncak araba yerine bir kitap getirmiş. Halbuki Mert kitapları sevmez (slow pace). Mert'in asıl istediği şey oyuncak bir araba**ydı**.

AMAA Mert ne hissettiğini saklamak zorunda**ydı**, çünkü eğer teyzesi Mert'in gerçek duygularını öğrenirse ileride ona bir daha hiçbir şey almaz**dı**.

Memory check: Mert'in teyzesi ona ne almış? _____

(correct answer: a book… If the child gets the answer wrong, tell the story again)

Peki, eğer teyzesi Mert'in gerçekte ne hissettiğini **öğrense** ne yapar**dı**? _____

(correct answer: she will never buy anything for Matt anymore… If the child gets the answer wrong, tell the story again)

Question: Peki, Mert gerçekte **sence** ne hisset**ti** teyzesi ona kitabı verdiğinde (pat own chest)?

Mutlu mu, üzgün mü, normal mi? (Note: the examiner should not show any feelings)

(Reiterate choice again if the child still does not answer)

Mutlu_____ Üzgün_____ Normal_____

Peki, **sence** Mert nasıl gözükmeye çalış**tı,** teyzesi ona kitabı verdiğinde (pat own cheek)? Mutlu mu, üzgün mü, normal mi? (Note: the examiner should not show any feelings)

(Reiterate choice again if the child still does not answer)

Mutlu_____ Üzgün_____ Normal_____

*Appearance Reality Emotion Negative (***-MIŞ***)*

Experimenter: Bu hikaye Mert hakkında (show toy character) **Dün Dilekle konuştum. Geçen gün Mert'le berabermiş**. Mert'in teyzesi gittiği bir yolculuktan daha yeni dönmüş. Bu yolculuğa çıkmadan önce de Mert'e gittiği yerden bir oyuncak araba getireceğine dair söz vermiş.

AMA oyuncak araba yerine bir kitap getirmiş. Halbuki Mert kitapları sevmez (slow pace). Mert'in asıl istediği şey oyuncak bir araba**ymış**.

AMAA Mert ne hissettiğini saklamak zorunda**ymış**, çünkü eğer teyzesi Mert'in gerçek duygularını öğrenirse ileride ona bir daha hiçbir şey almaz**mış**.

Memory check: Mert'in teyzesi ona ne almış? _____

(correct answer: a book… If the child gets the answer wrong, tell the story again)

Peki, eğer teyzesi Mert'in gerçekte ne hissettiğini öğrenirse ne yapar**mış**? _____

(correct answer: she will never buy anything for Mert anymore… If the child gets the answer wrong, tell the story again)

Question: Peki, Mert gerçekte **sence** ne hissetmiştir teyzesi ona kitabı verdiğinde (pat own chest)?

Mutlu mu, üzgün mü, normal mi? (Note: the examiner should not show any feelings)

(Reiterate choice again if the child still does not answer)

Mutlu_____ Üzgün_____ Normal_____

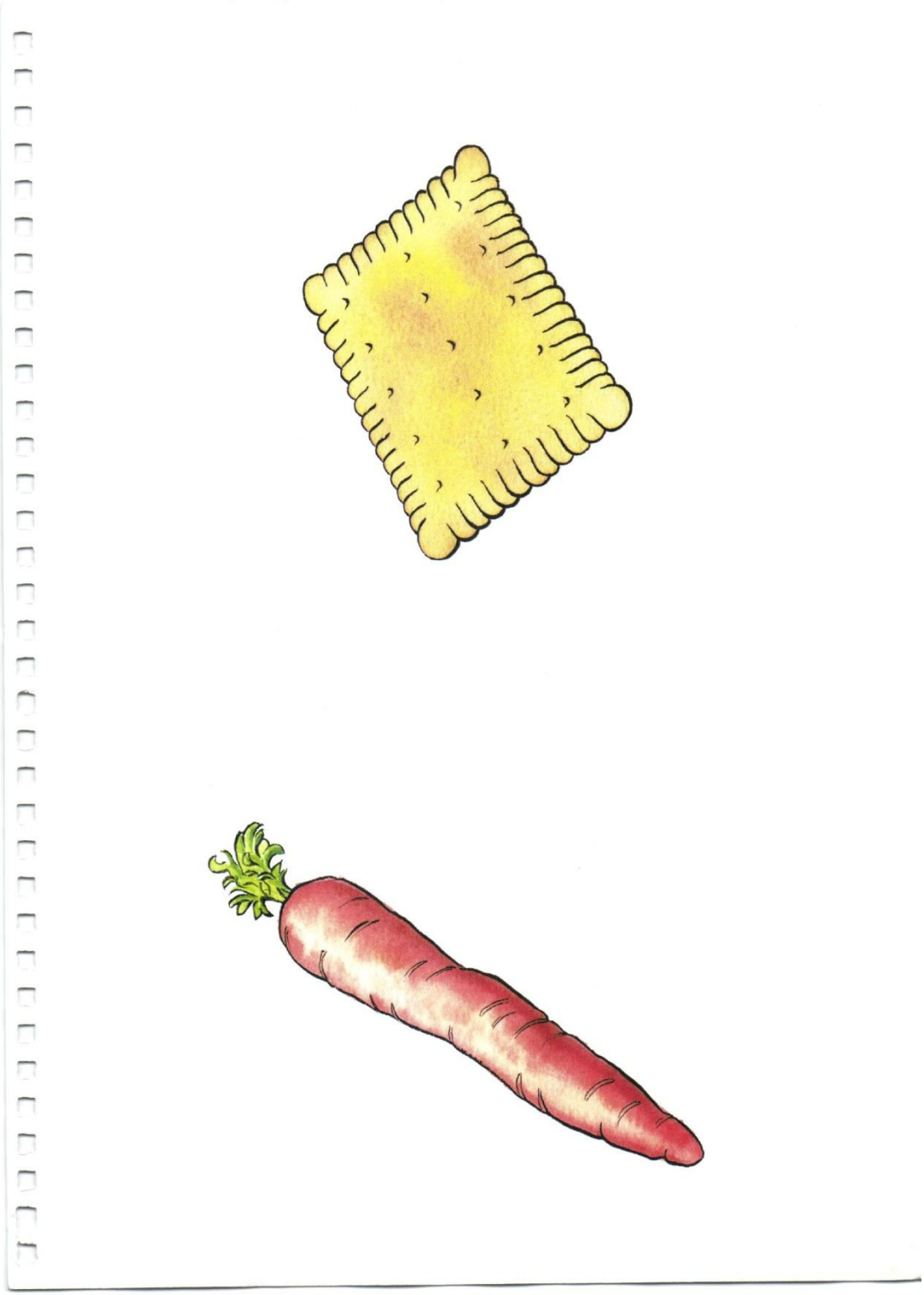
Peki, **sence** Mert nasıl gözükmeye çalışmıştır, teyzesi ona kitabı verdiğinde (pat own cheek)? Mutlu mu, üzgün mü, normal mi? (Note: the examiner should not show any feelings)

(Reiterate choice again if the child still does not answer)

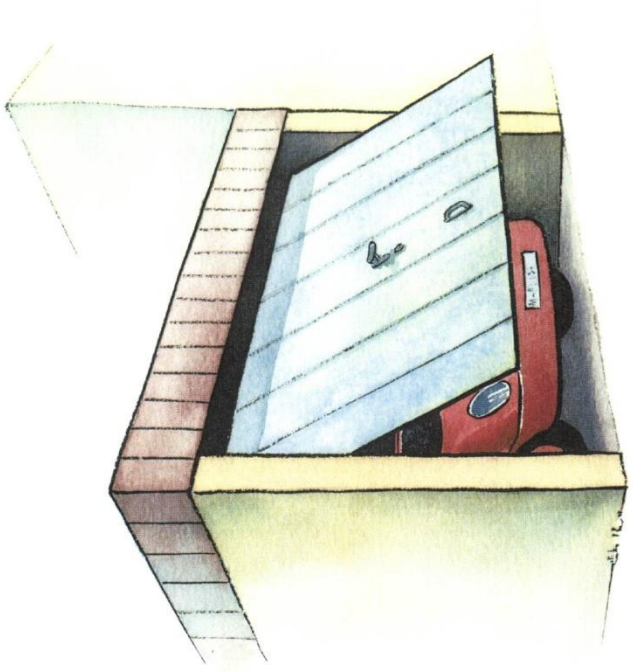
Mutlu_____ Üzgün_____ Normal_____

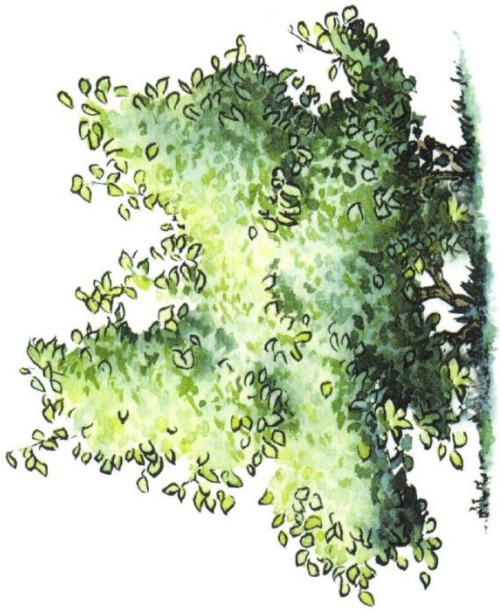
Story Pictures:

NOD

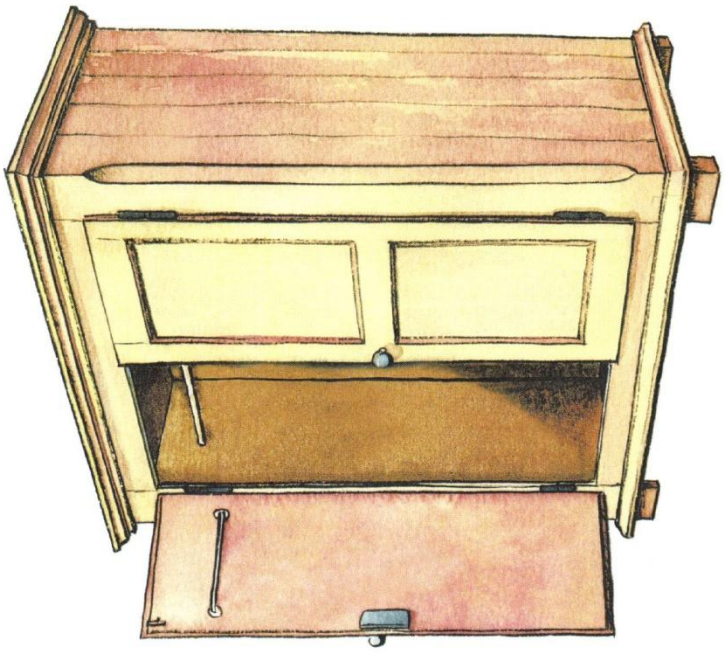


NOB

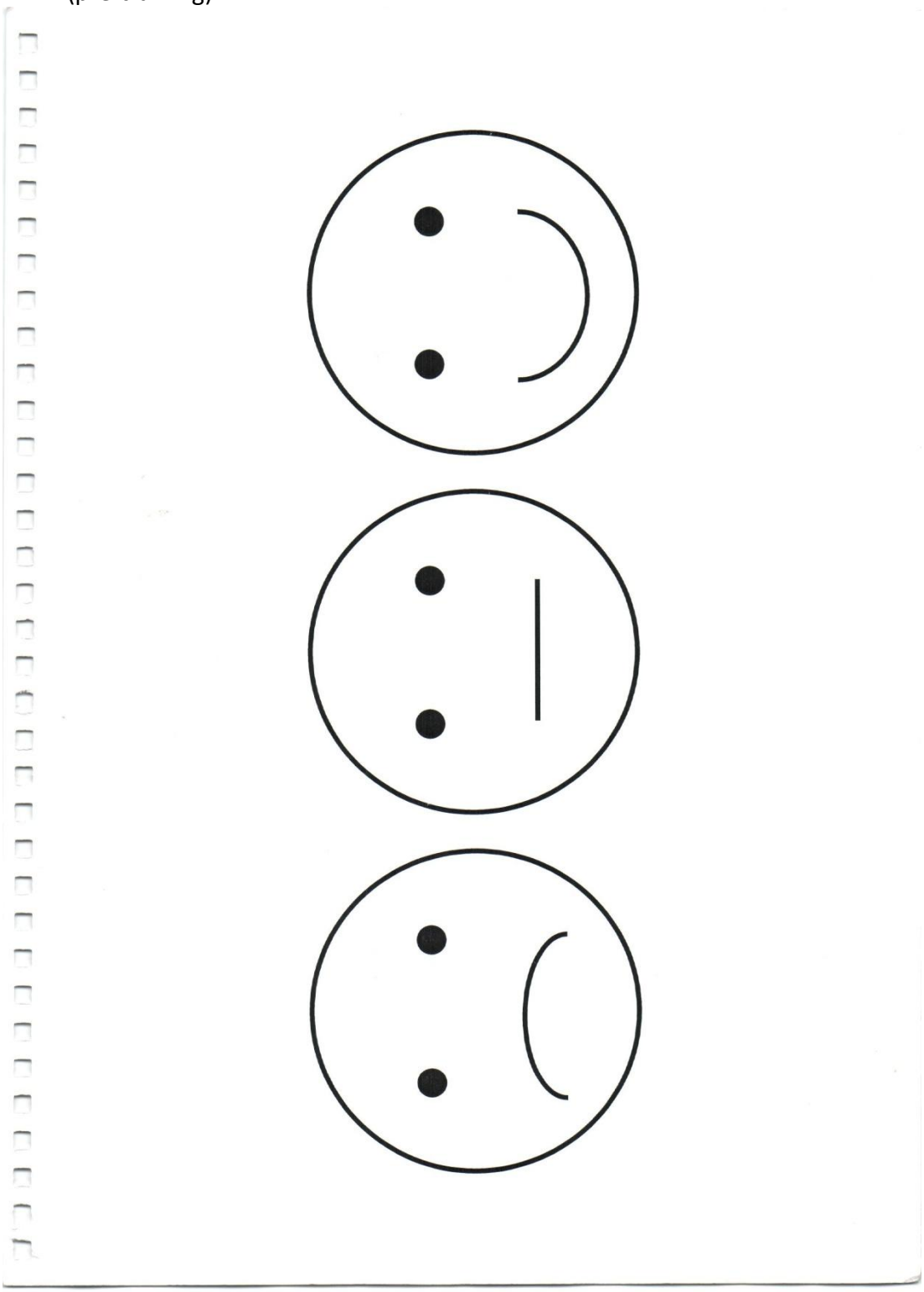




EFB



AREN (pre-training)



KI (dog and box)

CFB (pencil case, bird)

CHARACTERS

Appendix B: Word Span Task Stimuli

SETS OF 2

Köşk - Muz

Pil - Üst

Buz - Dört

SETS OF 3

Göl - Saç - Tuz

Sev - Kürk - Bel

Kir - Ut - Pas

SETS OF 4

Kaş - Sos - Göç - Yat

Cam - But - Sal - Köy

Zar - Kuş - Tüm - Can

SETS OF 5

Suç - Kek - Böl - Top - Zam

Bal - Kurt - As - Tat - Çöp

Ot - Son - Türk - Seç - Kol

SETS OF 6

Hak - Sus - Tek - Mum - Dip - Kar

Kes - Bin - Ter - Aşk - Yut - Sel

Tren - Kel - Söz - An - Koy - Tez

SETS OF 7

Ak - Top - Su - Alt - Bey - Bol - Mart

Tel - Poz - At - Bil - Yok - Fes - Tür

Kış - Ver - Han - Bot - Yıl - Post - Kül

SETS OF 8

Tam - Bak - Uç - Göz - Hal - Boş - Ek - Yurt

Üç - Kas - Al - Mülk - Bir - Tut - Dil - Kum

Bul - Pek - On - Fal - Var - El - Ses - Genç

Appendix C: Referent-matching Task Stimuli

Sentences:

1. Koyunu okşayan inek?
2. Fareyi öpen ördek?
3. Tavuğu gıdıklayan tavşan?
4. Köpeği yalayan maymun?
5. Koyunu okşayan at?
6. Ayıyı kovalayan fil?
7. Köpeği yalayan kedi?
8. Fili ısıran aslan?
9. Gülen kaplumbağa?
10. Ağlayan kaplumbağa?
11. Uyuyan kuş?
12. Ağlayan balık?
13. Uçan kuş?
14. Gülen balık?
15. Kadının kestiği pasta?
16. Adamın okuduğu kitap?
17. Kızın tuttuğu çiçek ?
18. Çocuğun yediği dondurma?
19. Kızın tuttuğu çiçek?
20. Çocuğun tuttuğu elma?
21. Adamın okuduğu gazete?
22. Dondurma yiyen cocuk?
23. Gazete okuyan adam?
24. Ekmek kesen kadın?
25. Kitap okuyan adam?
26. İneğin tekmelediği koyun?

27. Kedinin ittiği köpek?
28. Atın tekmelediği koyun?
29. Aslanın kovaladığı fil?
30. Ördeğin gıdıkladığı fare?
31. Filin ısırdığı ayı?
32. Tavşanın öptüğü tavuk?
33. Maymunun ittiği köpek?

Appendix D: Sentence Repetition Task Stimuli

Explanations about missing markers:

GR : Grammatical (control) sentence.

RC : 3SG.POS marker *–(s)ı(n)* missing after -DIK in relative clause

RCgen : GEN marker *-(n)ın* missing in first element of relative clause.

CCdik : ACC marker *-(y)ı* missing after -DIK in complement clause.

GP : 3SG.POS *–(s)ı(n)* marker missing after second element of relative clause.

CCme : 3SG.POS *–(s)ı(n)* marker missing before ACC marker *-(y)ı* in complement clause.

The words with missing suffixes are shown with **bold** characters.

1. CCdik1- Deve atın ineği **öptüğü** görünce şaşırmış.
2. RC1 - Kedinin hızlıca **ittik** bir kuzu suya düşmüş.
3. GR1 - Maymun ormanda koşarken bir yüzük bulmuş.
4. CCme1 - Maymun kuzunun kediyi **gıdıklamayı** seyrederken şarkı söylemiş.
5. RCgen1- **Kuzu** tatlıca öptüğü bir kedi mutlu olmuş.
6. GP1 - Ördeğin güzel **öğretmen** ona aferin demiş.
7. RC2 - Tavşanın heyecanla **kovaladık** bir tavuk ağlamış.
8. CCdik2 - Aslan ayının fili **ittiği** görünce ona kızmış.
9. GR2 - Ördek maç seyrederken uyuyakalmış.
10. GP2 - İneğin sevimli **hala** ona şeker vermiş.
11. RCgen2- **Tavuk** şakacıktan ısırdığı bir ördek ağlamış.
12. CCme2 - Fil ayının aslanı **yalamayı** seyrederken çiçekleri ezmiş.
13. GR3 - Koyun çok eski bir arkadaşını görünce sevinçle çığlık atmış.
14. RC3 - Gorilin yanlışlıkla **tekmeledik** bir ayı korkmuş.
15. GP3 - Kedinin tatlı **kardeş** bir sürü portakal toplamış.
16. CCme3 - At ineğin deveyi **tekmelemeyi** seyrederken üzülmüş.

17. RCgen3- **Ayı** yanlışlıkla yaladığı bir aslant yüzünü yıkamış.
18. GR4 - Kuzu dans etmek isteyince keçi piyano çalmış.
19. CCdik3 - Kuzu maymunun kediyi **ısırdığı** görünce annesine söylemış.
20. RC4 - Atın aniden **gıdıkladık** bir inek gülmekten bayılmış.
21. CCme4 - Ördek tavuğun tavşanı **öpmeyi** seyrederken uyumuş.
22. GR5 - Fil faydalı yiyecekler yemek yerine hamburger yermiş.
23. GP4 - Aslanın yakın **arkadaş** yarışmada bir kalem kazanmış.
24. RCgen4- **İnek** güzelce sevdiği bir deve kahkaha atmış.
25. CCdik4 - Kedi maymunun kuzuyu **kovaladığı** görünce çığlık atmış.