THE DEVELOPMENT OF NARRATIVE SKILLS IN TURKISH-SPEAKING CHILDREN: A COMPLEXITY APPROACH

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ABSTRACT

THE DEVELOPMENT OF NARRATIVE SKILLS
IN TURKISH-SPEAKING CHILDREN: A COMPLEXITY APPROACH

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Narrative is a complex form of discourse. Creating it requires "a joint process of event comprehension and language production" (Trabasso & Rodkin, 1994, p.87), and understanding and explaining behaviors and emotions of others through perspective taking. In the present study, it is claimed that these requirements map into three levels of complexity: 1) Plot complexity reflecting the temporal and thematic organization of the narrative in a coherent manner, 2) Evaluative complexity indicating the narrator's perspective toward the events, and 3) Syntactic complexity expressing the coherent causal, temporal and logical order of the reported events in a cohesive way. The aim of the present study was to examine the developments at each level and their interrelationships. Moreover, the relationship between each level of complexity, and theory of mind (ToM), executive function and the comprehension of complex syntactic structures to each level was analyzed. One hundred and five Turkish-speaking children distributed across 4 age groups (4, 5,7 and 8, and 10 and 11 years) and 15 adults participated in 1. Elicitation of narratives task , 2. Emotional Stroop Task, 3. First- (for 4-year-old children) and second-order (for older children and adults) ToM tasks, 4. Real-apparent emotion task (for 4-year-old children), and 5. Comprehension of complement clauses task. Children's performance on tasks assessing ToM, executive function and comprehension of complex syntax was found to increase with age. Regarding plot complexity, an increase with age was also observed. The fifth and seventh years of life were found to be transitional periods for the generation of coherent narratives. Moroever, the ability to comprehend complex syntax predicted plot complexity suggesting the

influence of general linguistic competence on narrative skills. Children in all age groups were found to employ evaluative devices to some extent. However, the frequency of particular evaluative devices changed with age and even adults were found to use them to a low extent. Executive function was found to predict the extent of the use of syntactically complex clauses. A more detailed analysis of these clauses demonstrated that with age children can incorporate syntactically more complex structures expressing cognitively more complex relations into their narratives. The only significant relation between the three levels of complexity was shown between evaluative and syntactic complexity which had clear indicators in narratives. These findings were discussed considering the cognitive, linguistic and sociocultural nature of narration, and the effect of context on narrative performance.

Keywords: narrative skills, complexity, ToM, executive function, cognitive development

ÖZ

TÜRKÇE KONUŞAN ÇOCUKLARDA ANLATI YETİLERİNİN GELİŞİMİ: KARMAŞIK BİR YAKLAŞIM

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Anlatı karmaşık bir söylem türüdür. Bir anlatının oluşturulması için olayların, başkalarının davranış ve duygularının anlaşılması ve açıklanabilmesi ile dil kullanımının birleştirilmesi gerekmektedir (Trabasso & Rodkin, 1994, p.87). Bu çalışmada bu yetilerin üç karmaşıklık düzeyi ile örtüştüğü ileri sürülmektedir: 1) anlatının içindeki zamansal ve konusal bütünlüğü ahenkli bir şekilde yansıtan olay dizgisi düzeyinde karmaşıklık, 2) anlatıcının olaylara karşı kendi bakış açısını içeren değerlendirici anlatı öğelerinin kullanımı düzeyinde karmaşıklık, ve 3) anlatılan olaylar arasındaki nedensel, zamansal ve mantıksal düzenin birbirine bağlanarak ifade edilmesini sağlayan sentaks düzeyinde karmaşıklık. Bu çalışmanın amacı her düzeydeki karmaşıklığın gelişimini ve birbirleriyle ilişkilerini araştırmaktır. Ayrıca, her düzeydeki karmaşıklığın zihin kuramı, yönetici fonksiyonlar ve karmaşık sentaksın anlaşılması yetisi ile ilişkisinin incelenmesi de amaçlamaktadır. Bu çalışmaya dört farklı yaş grubundan (4, 5, 7-8 ve 10-11 yaş) toplam 105 Türkçe konuşan çocuk ve 15 yetişkin katılmıştır. Katılımcılar 1) Anlatı Kurma İşlemi, 2) Duygusal Stroop İşlemi, 3) 1. (4 yaş) ve 2.derece (diğer yaş grupları) Zihin Kuramı İşlemleri, 4) Gerçek-görünen Duygu İşlemi (4 yaş) ve 5) Tümleç Yantümcelerinin Anlaşılması İşlemi'ne katılmışlardır. Çocukların zihin kuramı, yönetici fonksiyonlar ve karmaşık sentaksın anlaşılması işlemlerindeki başarı düzeylerinin yaşla arttığı bulunmuştur. Olay dizgisi düzeyinde karmaşıklığın da yaşla arttığı gözlenmiştir. Bu artışta beş ve yedi yaş dönemlerinin önemli olduğu gösterilmiştir. Ayrıca, karmaşık sentaksın anlaşılmasının olay dizgisi düzeyinde karmaşıklığı yordadığı bulunmuştur. Bu, genel dil kullanma yetilerinin anlatı kurma yetileri üzerindeki etkisini göstermektedir.

Çocukların her yaş grubunda değerlendirici anlatı öğelerini belli bir düzeyde kullanabildikleri bulunmuştur. Fakat, tercih edilen değerlendirici anlatı öğelerinin yaşla birlikte değiştiği ve yetişkinlerin bile değerlendirici anlatı öğelerini nadiren kullandıkları gözlenmiştir. Yönetici fonksiyonların sentaks düzeyindeki karmaşıklığı yordadığı bulunmuştur. Kullanılan tümleçlerin yapısı incelendiğinde yaşla birlikte bilişsel açıdan daha karmaşık olan ilişkileri tifade eden karmaşık sentaks yapılarının kullanımının geliştiği gösterilmiştir. Sadece değerlendirici anlatı öğelerinin kullanımı düzeyi ile sentaks düzeyi karmaşıklığı arasında bir ilişki bulunmuştur. Bu bulgular anlatıların bilişsel, dilsel ve sosyokültürel yapısı ve bağlamın anlatılar üzerindeki etkisi göz önünde bulundurularak tartışılmıştır.

Anahtar sözcükler: anlatı yetileri, karmaşıklık, zihin kuramı, yönetici fonksiyonlar, bilişsel gelişim

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CHAPTER 1

INTRODUCTION

Creating a narrative requires "a joint process of event comprehension and language production" (Trabasso & Rodkin, 1994; p.87), and understanding and explaining of the behaviors and emotions of others via perspective taking. Considering cognitive science as a discipline occupied with the examination of the acquisition, internal representation, storage, retrieval and symbolic use of information, the study of narratives is pertinent to it. Cognitive science with its interdisciplinary stance including scientific subdomains focusing on the study of different requirements of a narrative will provide a comprehensive account of its generation. In other words, cognitive science will contribute to the understanding of "how people weave tapestries of [a narrative] by relying on abilities they possess as simultaneously language-using, thinking, and social beings" (Herman, 2003, p. 11). In this regard, applying a complexity approach from the perspective of cognitive science to study narrative skills thoroughly, the first aim of the present study was to examine narrative development in terms of three levels of narrative complexity. The first one is plot complexity which is defined as the extent of the inclusion of the plot components in a temporal and thematic organization in the narrative. Evaluative complexity refers to the extent of the use of evaluative devices as a means to express the mental states of the story characters, to describe the reasons and the consequences of the events and actions, and to integrate the narrator's view point into the plot line. The last level of complexity is syntactic complexity reflecting the extent of the use of syntactically complex clauses in the service of the depiction of the coherent causal, temporal and logical order of the reported events in a cohesive way. Previous research on narrative development has been focused mostly on only one of these levels. Thus, the present study is unique in combining them and considering their relations with each other via the complexity approach.

Another reflection of the complexity approach in the present study was the focus on the abilities underlying the competence in narrative production. Accordingly, the second aim was to explore how theory of mind (ToM), executive function and the comprehension of complex syntax are related to the developments in each level of complexity. The effect of different abilities on narrative development has been previously studied. However, these studies have chosen most often a single cognitive, social or linguistic ability and looked at how it is related to a single aspect of narrative. Since the present study examined the effect of several abilities

simultaneously, it contributed to the improvement of the understanding of the foundations of narrative competence. Moreover, most of the studies about narrative development covered limited developmental periods until the age of 9 years and did not include adult narrators as a reference group. The present study with a wider age range covering 4 to 11 years, and including an adult comparison group, allowed a more detailed analysis of the effect of age. It also provided suggestions about narrative development beyond the age of 11 years towards adulthood.

Languages differ in terms of their typology and rhetorical styles. The grammatical forms that are obligatory in a language are easily accessible to their speakers and early acquired. Consequently, they make the conceptual content that they express salient for their speakers and direct them to it as a result of which speakers organize their thinking according to these particular conceptual distinctions and categories, and reflect them in their narratives (Berman & Slobin, 1994a). Thus, the findings about narrative development in one language cannot be easily generalizable to another language. Although different aspects of narrative development have been previously studied in Turkish, the current one is more comprehensive in terms of scope covered and age range studied. Thus, the present study with its focus on Turkish provides a detailed account of narrative skills specific to Turkish-speakers. The similarities between the findings about the narrative development in different languages imply a universal pattern and its underlying mechanisms which are independent from "the demands and constraints of acquiring a particular native tongue" (Berman & Slobin, 1994b, p.43). The present study offers a general account of narrative development in this respect as well.

Besides, due to the fact that narrative is a sociocultural activity, studying it in different cultures is essential to have a grasp of its culture-specific and culture-general aspects. Turkish culture with its collectivist orientation might constitute a distinctive environment for narrative formation. Therefore, the present study has implications for the effect of culture on narrative development.

All things considered, the present study with its complexity approach covering different levels of complexity, looking at the effect of different social, cognitive and linguistic abilities on narrative competence simutaneously, offering implications for the role of culture and language on the development of narrative skills contributes to the specific literature in narrative development, and generally in cognitive science.

The aims and the siginificance of the present study have been introduced in the present chapter. The second chapter covers the literature review focusing on the development of each level of narrative complexity and its relation to ToM, executive function and syntactic competence. It ends with the hypotheses of the present study. The third chapter provides detailed information about the methodology. The sample and the tasks are described. The operational definition of each level of complexity is presented with examples. The results of the statistical analyses are reported in the fourth chapter. The last chapter discusses the findings and provides explanations for them on the basis of previous research and theories. Ideas for future studies are

addressed. After discussing the possible influence of sociocultural and contextual factors on the findings; the limitations are stated followed by a general conclusion.

CHAPTER 2

LITERATURE REVIEW

This chapter aims to introduce the levels of plot, syntactic and evaluative complexity in the light of previous research on them. The possible relationships between these levels, and theory of mind (ToM), executive function and syntactic competence in terms of the comprehension and reproduction of syntactically complex clauses are discussed. The chapter ends with the statement of the aims and the hypotheses of the present study.

2.1. Narrative as a complex form of discourse:

Narrative is a type of discourse referring to goal-directed events that are sequenced in a causal and temporal order (Aksu-Koç & Tekdemir, 2004). According to Labov and Waletzky (1967), narrative has two main functions. Its referential function is to express the events in sequenced clauses that reflect the temporal order of the events. The other function, the evaluative function, refers to the expression of the narrator's interpretation of and attitude towards the referential components. Labov describes this function as follows: "evaluation of a narrative event is information on the consequences of the event for the human needs and desires" (Labov, 1997; p. 403). Bruner (1986) also identified two levels of organization of narrative. One is the "landscape of action" referring to the plot of the story that include events and actions. The other one is the "landscape of consciousness" consisting of thoughts, beliefs and emotions of the story characters. These two levels correspond to the functional distinction of Labov and Waletzky (1967) in such a way that the landscape of action matches with the referential function, while the landscape of consciousness matches with the evaluative function. Considering the functions of narrative and its organization, it can be claimed that narrative is a complex form of discourse. Creating it requires "a joint process of event comprehension and language production" (Trabasso & Rodkin, 1994, p.87), and understanding and explaining behaviors and emotions of others via perspective taking. In the present study, these requirements were claimed to correspond to three levels of complexity.

2.1.1. Plot complexity:

Plot is defined as a sequence of events connected to each other to comprise a meaningful whole (Bruner, 1990). The plot line includes three main components: 1. *the onset* referring to a starting event, 2. the *unfolding* referring to the extension of the events in the story, and 3. the *resolution* referring to the reaching of an outcome (Berman & Slobin, 1994b). They reflect the temporal and thematic organization of the narrative which can be achieved through the comprehension of the events by the narrator (Berman & Slobin, 1994b). Thus, an analysis of plot complexity is seen to be relevant for the referential function of narrative.

Berman and Slobin (1994b) examined the development of the main plot components in the narratives of 3-, 4-, 5-, and 9-year-old children and adults speaking English, German, Spanish, Hebrew and Turkish. The inclusion of the onset developed between 3 and 4 years of age and achieved a high rate at the age of 5. There was a gradual increase in the inclusion of the unfolding until the age of 9 and of the resolution until adulthood. Moreover, with age children included more event components in their narratives. Developmental changes in the number of reported event components were also observed in narratives of English-speaking Latino and African American children (Muñoz, Gillami Peña, & Gulley-Faehnle, 2003; Price, Roberts, & Jackson, 2006).

2.1.2. Evaluative complexity:

During narrating, sometimes the narrator departs from the plot and incorporates his/her evaluation into the narrative (Bamberg, 1997; Bamberg & Damrad-Frye, 1991). S/he reports the mental states of the characters, describes the reasons or outcomes of the events and the behaviors of the story characters, or integrates his/her own viewpoint into the narrative. These expressions fulfill the evaluative function of the narrative as parts of the landscape of consciousness (Bamberg & Damrad-Frye, 1991). Moreover, they also reflect the point of the narrative (Labov & Waletzky, 1697), i.e. "why the events narrated are worth relating and paying attention to" (Thompson & Hunston, 2001, p.12) and the organization of the narrative discourse.

One of the early classifications of evaluative devices stems from Labov, Cohen, Robins and Lewis (1968). As evaluative devices, they identified intensifiers such as modifiers; comparators such as comparatives and negatives; correlatives such as aspectual forms that express simultaneous events; and expletives such as subordinate clauses to state the reasons of the events. All of these units express the narrator's point of view embedded within the action structure given in the clauses referring to events. In a more recent study, Bamberg and Damrad-Frye (1991) suggested five categories of evaluatives: 1) frames of mind including references to feelings and mental states of the characters, 2) causal connectors explaining the motivations of the characters and the reasons of the events, 3) character speech including direct and indirect quotation of the speech of the characters, 4) hedges expressing the likelihood of the events according to the narrator, and 5) negative qualifiers stating the discrepancy between the expectations and real events, or

referring to the failures. These evaluative expressions are related to the understanding of events and the interpretation of the behaviors, emotional and mental states of the narrative characters.

The development of the use of evaluative devices was examined in several studies. Analyzing the use of evaluative devices in the fictional third-person narratives of English-speaking 5- and 9-year-old children and adults, Bamberg and Damrad-Frye (1991) found that the use of evaluative devices increased with age and the frequency of their use changed across the age groups. Similar developmental patterns were reported by Berman and Slobin in Hebrew-speaking children (1994b). Furthermore, the study of Bamberg and Damrad-Frye (1991) showed the distribution of the evaluative devices throughout the narratives. They clustered at a point immediately before the story conflict and at its resolution in the adult narratives whereas they were distributed across particular events independently of the narrative structure in the narratives of the children. Küntay and Nakamura (2002) reported cross-linguistic differences in the use of the evaluative devices by 4-, 5-, 7- and 9-year-old Turkish-speaking and Japanese-speaking monolingual children and adults. They added four new categories to the classification of Bamberg and Damrad-Frye, namely 1) enrichment expressions including adverbial phrases expressing inferences about unexpected or repeated events such as *yine* (Turkish) and *totemo* (Japan) 'again' and *birdenbire* (Turkish) and *kyuu ni* (Japan) 'suddenly'; intensifiers such as *çok* (Turkish) and *totemo* (Japan)'very'; 2) onomatopoeia and mimesis including sound-related effects like *pattadak* (Turkish) 'with a thud' and *guruguru* (Japan) 'round and round'; 3) evaluative remarks including expressions reflecting the narrator's ethical or aesthetic judgments; and 4) verb-style shifts referring to shifts between a formal style used to tell the story in the perspective of the narrator and an informal style used to express the perspective of the story characters. They found no developmental change in the total use of evaluative devices in these two language groups. The comparison of their findings with those in Bamberg and Damrad-Frye's study (1991), however, indicated cross-linguistic differences in the frequency of use. For instance, the use of character speech was less frequent in English narratives than in Japanese narratives whereas causative expressions and hedges were more frequent in English-narratives than in Turkish and Japanese narratives. These differences suggest that evaluation is culture-specific as emphasized by Cortazzi and Jin (2001).

An evaluation can also be expressed phonologically through changes in prosodic features such as pitch, length, volume, voice quality, and stress (Cortazzi & Jin, 2001; Reilly, 1992). Moreover, facial expressions and gestures are paralinguistic evaluative devices (Peterson & McCabe, 1983; Reilly, 1992). Reilly (1992) studied the combined use of linguistic and paralinguistic devices in the fictitious narratives of 3- to 4, 7- to 8-, and 10- to 11-year-old children. The youngest group was found to prefer affective prosody, stress, vowel lengthening and intonation for evaluation. The use of these devices decreased in the narratives of 7- to 8-year-old children, and combined with the lexical devices in the oldest age group who had the richest narratives in terms of evaluation. These findings were extended to narratives of 3- to 4- and 7- to 8-year-old deaf children whose first language was American Sign

Language (Reilly & Seibert, 2002) and revealed a developmental relationship between the use of different components of language to express evaluation in two different modalities: signed and spoken languages.

2.1.3. Syntactic complexity:

The organization of a narrative is reflected through its syntactic complexity, because the syntactic structures are means to express the coherent causal, temporal and logical order of the reported events.

Syntactic complexity is a fundamental property of human language (Fernández & Cairns, 2011; Givon, 2009). According to Simon (1962), complexity requires a hierarchic organization and as the number of hierarchic levels increases within a system, the complexity of the system increases. In human language, this requirement is met through the hierarchic organization of components governed by syntactic principles (Givon, 2009). Recursivity is one type of syntactic complexity (Jurafsky & Martin, 2009). It is defined as embedding a clause inside another clause (Chomsky, 1957, 1965). Considering the hierarchical organization of human languages, recursivity can be exemplified by a constituent at a lower hierarchic level being dominated by another constituent of the same type at a higher level. According to Hauser, Chomsky and Fitch (2002), recursion is the significant feature of human language that distinguishes it from the communication systems of pre-human organisms and human pre-language. It allows unlimited linguistic creativity, because there is no upper limit to the number of embedded clauses in a single sentence (Fitch, 2005; Givon, 2009; Jurafsky & Martin, 2009). There are two main ways to create recursive hierarchies: coordination and subordination. In coordination, "[at least] two constituents belonging to the same category are conjoined to form another constituent of that category" (Kroeger, 2005, p. 218). On the other hand, in subordination one of the constituents functions as dependent on the other one (Kroeger, 2005) and they are on different hierarchical levels. Research has shown that children acquire complex clauses with subordination during the period of 2 to 4 years of age (Diesel & Tomasello, 2001; Givon, 2001). Similarly, they acquire additive conjunctions such as 'and' early around the age of 3 followed by temporal, causal and adversative conjunctions (Bloom, Lahey, Hood, Lifter, & Fiess, 1988; Peterson & McCabe, 1988).

In the literature, several studies showed developmental increase in the use of syntactically complex clauses in narratives of children speaking different languages. For example, Justice et al. (2006) demonstrated a continuous increase in syntactic complexity between 5 and 12 years of age in English-speaking children. Similarly, Reilly, Losh, Bellugi and Wulfeck (2004) reported that 10- and 12-year-old English-speaking children used more complex clauses than 4- to 6- and 7- to 9-year-old children. Moreover, Kit-Sum To, Stokes, Cheung, and T'sou (2010) showed developmental changes in syntactic complexity between 4 and 6 years of age in Cantonese-speaking children. In addition, Mäkinen, Loukusa, Nieminen, Leinonen, and Kunnari (2014) found an increase between 4 and 7 years of age in syntactic complexity in the narratives of Finnish-speaking children.

In the narrative literature, the use of subordination is considered as a measure of syntactic complexity (Bishop & Donlan, 2005; Cutting & Dunn, 1999; Justice et al., 2006). Another frequently used measure of syntactic complexity is the mean length of C-units (MLCU) in words (Mäkinen et al., 2014). Communication units, abbreviated as C-Units, are described as a main clause with its associated subordinate clauses. MLCU is computed by dividing the total number of words in tokens by the number of C-units. To analyze the syntactic structure of narratives, sentence-level complexity is considered together with the sentence-level productivity. The measures of productivity are the number of C-units, the total number of words in tokens (TNW), and the number of different words in type (NDW) reflecting lexical diversity (Mäkinen et al., 2014). Research has shown that with age narratives become longer and syntactically more complex throughout the preschool and early school ages (e.g. Bishop, 2004; Justice et al., 2006; Mäkinen et al., 2014; Muñoz et al., 2003; Reilly et al., 2004; Schneider, Dubé, & Hayward, 2005; Westerveld, Gillon and Miller, 2004), but the rate of development decreases around the age of 10 (Justice et al., 2006).

2.1.4. Relations between the levels of complexity:

Children's narratives were so far analyzed separately according to plot complexity, evaluative complexity and syntactic complexity. The relationship between each of these levels and some relevant cognitive abilities such as theory of mind (ToM) was also taken into account and examined (as discussed in Section 2.2. below). Nevertheless, in recent years, a multidimensional analysis has been emphasized in studies focusing on the developmental patterns in different levels of complexity in combination with each other (e.g. Mäkinen et al., 2014).

Regarding the relationship between the levels of plot complexity and syntactic complexity, Hakala (2013; as cited in Mäkinen et al., 2014) found that among 5-year-old Finnish-speaking children's narratives those that were rich in content included more TNW and NDW. Likewise, Soodla and Kikas (2011) reported a positive correlation between the number of plot elements and TNW in the narratives of 6- to 7-year-old Estonian children. Mäkinen et al. (2014) extended these findings further to narratives of 4- to 8-year-old Finnish children. Furthermore, Fernández (2011) reported that narratives with more plot components included more clauses.

Beck, Kumschick, Eid and Klann-Delius (2012) demonstrated that the use of evaluative devices was positively related to the extent of the use of plot components in the narratives of 7- to 9-year-old German-speaking children.

In addition, Fernández (2011) reported relationships between the level of syntactic complexity and the use of evaluative devices in the narratives of preschool and first-grade Spanish-speaking children with an age range between 4 and 8 years. She distinguished between textualized evaluation referring to the internal states of the story characters, and performed evaluation "refer(ring) to the 'acting out' of the story through the use of literary devices that enrich the story for the audience" (p. 27). The textualized evaluation devices included expressions of perception, physical, consciousness, emotion, behavioral expression of affect, cognition, intentionality, and qualifiers whereas the performed evaluation devices were intensifiers, delimiters,

reported speech, onomatopoeia, repetition and interactional markers. Syntactic complexity measured by the number of C-units and the total number of clauses and utterances was found to be more strongly correlated with the textualized evaluation than the performed evaluation. Furthermore, the extent of the inclusion of story elements correlated mildly with syntactic complexity.

Despite the fact that these studies provide some insight into the relationships between different levels of complexity, they are limited in some aspects. First of all, the relationships between plot, syntax and evaluation in narratives were only secondary or minor topics in most of these studies. For instance, the main aim of Fernández's (2011) study was to examine the relationship between pragmatic language skills, general language skill and ToM. She considered the measures related to plot and evaluative complexities as measures of pragmatic language skills and used the measure of syntactic complexity as a measure of general language ability. Similarly, Beck et al. (2012) included the extent of the use of evaluative devices and plot components as measures of language competence in their study examining the relationship between language competence and emotional competence. Moreover, none of these studies cover different developmental periods or wide age ranges although research has shown that patterns might change with age (e.g. Longobardi, Spataro, & Renna, 2014; Meins, Fernyhough, Johnson, & Lidstone, 2006). In the present study, these problems were eliminated in order to provide a better account of children's narrative skills.

2.2. Cognitive and linguistic processes underlying narrative development

Most researchers studying narrative development consider narrative production and comprehension as the integration of linguistic, cognitive and social abilities (Liles, 1993). In this section, I will introduce some of these abilities and describe their possible relationships with narrative development.

2.2.1. Theory of Mind (ToM):

Theory of mind is the cognitive ability to understand and explain the mental states of others and predict their behaviors (Gopnik & Wellman, 1994). It has different components such as the ability to distinguish between representation and reality, and to understand that a person might have a belief that differs from reality and might act according to that belief rather than reality (Perner & Wimmer, 1985). These abilities develop between 3 and 5 years of life (e.g. Astington & Jenkins, 1999; Flavell, 1992; Gopnik & Astington, 1988; Lewis & Osborne, 1990; Miller, 2001, 2004; Siegal & Beattie, 1991; Wimmer & Perner, 1983). Due to the fact that this time period coincides with the time period in which children's focus shifts from the plot elements to the thoughts, beliefs and intentions of the story characters in their narratives, Astington (1990) proposed a relationship between ToM and narrative development; especially the development in the use of evaluative devices. Supporting this proposal, Pelletier and Astington (2004) found that among 4- and 5-year-old English-speaking children those who were more successful on ToM tasks could coordinate the landscape of action and the landscape of consciousness in their

narratives better compared to other children who were less successful. Furthermore, the impairment of ToM in autistic children was demonstrated to be related to their difficulties in referring to thoughts, beliefs or emotions of the story characters (Baron-Cohen, Leslie, & Frith, 1985; Capps, Losh, & Thurber, 2000; Craig & Baron-Cohen, 2000; Siller, Swanson, Serlin, & Teachworth, 2014; Tager-Flurberg & Sullivan, 1995).

In addition to these findings addressing ToM as the predictor of evaluative complexity, there are empirical studies indicating that narrative abilities also contribute to the development of ToM. Symons, Peterson, Slaughter, Roche and Doyle (2005) showed that 4- and 5-year-old English-speaking children who referred to the emotions and thoughts of the story characters in their narratives were more successful on false-belief tasks compared to their peers who did not include these elements in their narratives. Peterson and Slaughter (2006) reported the same relationship for deaf children. Furthermore, intervention studies in which children were encouraged to talk about the mental states of the story characters in storytelling activities showed a facilitative effect of such talk in the context of narrative on ToM development (Guajardo & Watson, 2002; Peskin & Astington, 2004).

There are contradictory findings about the relationship between evaluative complexity and ToM in studies addressing second-order ToM development in older children. Second-order false belief is "a belief not about something in the world (as in the first-order case) but about someone else's belief about something in the world" (Miller, 2009, p. 750). Recursive reasoning in the form of "A thinks that B thinks that…" is a component of it. Developmental studies indicated that second-order ToM reasoning develops around age 5 or 6 (e.g. Astington, Pelletier, & Homer, 2002; Filippova & Astington, 2008; Hasselhorn, Mahler, & Grube, 2005; Maas, 2008; Parker, MacDonald, Miller, 2007; Perner & Wimmer, 1985; Sullvan, Zaitchik, & Tager-Flusberg, 1994). Fernández (2011) showed that second-order ToM abilities of 4- to 8-year-old preschool and first grade Spanish-speaking children are good predictors of their use of evaluative devices in narratives. On the contrary, Meins, Fernyhough, Johnson, and Lidstone (2006) found that the second-order ToM performance of 7- and 9-year-old children was not related to their use of mental state terms in narratives. Longobardi, Spataro and Renna (2014) also reported the lack of this relationship in children between 8 and 12 years of age. These findings were consistent with those of earlier studies by Charman and Shmueli-Goetz (1998) with 6- to 8-year-old children and by Tager-Fluesberg and Sullivan (1995) with 7- to 10-year-old children. They imply a dynamic developmental relationship between ToM and evaluative complexity (Fernández, 2011).

2.2.2. Executive Function

Although executive function has been studied extensively in psychology and cognitive science, there is no consensus about its definition (Zelazo, Muller, Frye, & Marcovitch, 2003). According to Zelazo, Carter, Reznick and Frye (1997), it can be defined in terms of its function which is purposeful goal-directed behavior (Grafman, 2006; Lezak, Howieson, & Loring, 2004). In this respect, various cognitive

processes such as "regulation of attention; inhibition of inappropriate responses; coordination of information in working memory; and capacities to organize, sequence, and plan adaptive behavior" (Welsh, Friedman, & Spieker, 2006, p.167), shifting between tasks, updating informational content (Mozeiko, Le, Coelho, Krueger, & grafman, 2011), resistance to interference, error detection and correction (Eslinger, 1996; Zelazo et al., 1997) are combined to construct executive function. Most of these processes are mediated by the prefrontal cortex and frontal cortical activation (Dennis, 1991; Diamond & Taylor, 1996; Luria, 1973; Passler, Isaac, & Hynd, 1985; Perner & Lang, 1999; Stuss, 1992). Different tasks were designed to examine them. However, they are not totally independent from each other (Garon, Bryson, & Smith, 2008; Miyake, Friedman, Emerson, Witzki, & Howerter, 2000; Van der Ven, Kroesbergen, Boom, & Leseman, 2013). "Each executive process operates on other processes" and this creates the problem of task impurity (Friend & Bates, 2014, p.2).This multi-component structure of executive function results also in difficulties in studying it developmentally.

Studies conducted with infants using Piaget's A-not-B task (e.g. Diamond, 1990) and the object retrieval task (Diamond et al., 1994) focus mostly on the inhibitory mechanism combined with working memory (Welsh et al., 2006). The focus on this component continues in studies with toddlers and preschoolers (Carlson, 2005). Gerstadt, Hong and Diamond (1994) assessed the development of inhibitory control in 3.5- to 7-year-old children using a Day-night Stroop task (1994). They found that children's performance increased continuously and at the age of 6 it reached ceiling. In addition, the response speed decreased around 4.5 years of age. These developmental changes were attributed to the development of the abilities to inhibit a prepotent response and to remember the rules of the task. More recently, Lagattuta, Sayfan and Monsour (2011) constructed another Stroop task that can be administered to older children and adults without resulting in ceiling. They demonstrated gradual increase in performance and gradual decrease in response speed between 4 to 11 years of age continuing until adulthood. This task seems to capture the development in inhibitory control from preschool ages to adulthood. Between the ages of 6 and 10 dynamic developments were observed in executive function (Welsh, 2002). Working memory capacity increases and abilities to self-monitor, control memory, introspect and solve problems emerge. Problem-solving tasks such as the Tower of Hanoi and theTower of London were used to study the development of these new abilities. Continuous development between 6 and 12 years of age was observed, but adult-level performance could not be achieved in this age range (Levin, Eisenberg, & Benton, 1991; Luciano, 2003; Welsh et al., 1991).

The development of executive function has been claimed to be related to narrative production. One reason for this claim is the parallelism between these two domains. First of all, like executive function, narrative production and comprehension are associated with frontal lobe activation. Troiani et al. (2008) observed bilateral frontal activation in young adults narrating a story elicited with the book "Frog, where are you?" (Mayer, 1969). In addition, both narrative abilities and executive function develop rapidly during the preschool period (Friend & Bates,

2014). Another reason is the claim that some cognitive components of executive function are required for narrative production. Mozeiko et al. (2011, p. 827) identified them as a) *shifting* "to recall and integrate content for the story narrative", b) *updating* to "[recall] prior episodes or episodic components in order to appropriately elaborate the story", and c) *inhibition* "of extraneous comments while telling a story". Studies with brain injured adults partially supported this claim. For instance, Mozeiko et al. (2011) found that performance of adults with traumatic brain injury (TBI) on an executive function task measuring shifting or cognitive flexibility correlated with the total number of complete episodes including a starting event or goal, an attempt to reach the goal and the consequence of the attempt on a narrative task in which the narrative was elicited with a picture story. In addition, it also correlated with the number of C-units in each episode. Coelho, Liles and Duffy (1995) extended these findings by showing that performance of adults with TBI on a shifting task correlated with the number of complete episodes on a story generation task in which the participants were asked to create a story about what happens in a painting. Similarly, Coelho (2002) found a positive correlation between performance on a shifting task and the number of complete episodes in story retelling and story-generation tasks. Friend and Bates (2014) examined the relationship between narrative and executive function developmentally. In this longitudinal study, 4- and 5-year-old children participated in a narrative elicitation task and two executive function tasks, one assessing the alerting, orienting and conflict resolution functions of attention and the other one testing response inhibition, two times within a 6 months interval. The narratives were coded according to the narrative complexity scale by Cobo-Lewis, Eilers, Pearson, and Umbel (2002) focusing on the number of story elements, the organization and sequence of the events and the syntactic and lexical units used in the narratives. The analysis of the performance on the tasks in each time period separately did not reveal any relationship between narrative production and executive function. However, longitudinal analyses demonstrated that focusing attention at 4.5 years of age predicted narrative production at 5 years of age. Moreover, the narrative production at 4.5 years of age predicted the speed of response inhibition at 5 years of age. These findings imply interdependency between narrative ability and executive function over time.

The development of executive function, especially inhibitory control, is also claimed to be related to ToM development. Carlson and Moses (2001) summarized the reasons for this claim. First of all, both inhibitory control and ToM develop during the preschool years. Secondly, activation in frontal lobes was observed during performing both inhibitory control (Dennis, 1991; Luria, 1973; Passler, Isaac, & Hynd, 1985) and ToM tasks (Baron-Cohen et al., 1994; Goel, Grafman, Sadato, & Hallett, 1995; Sabbagh & Taylor, 2000). Furthermore, individuals with autism have difficulties in both executive functioning and ToM tasks (Hughes & Russell, 1993; Ozonoff, Pennington, & Rogers, 1991). Finally, the proponents of the executive accounts of ToM development argued that the development of ToM does not require only conceptual development, but also the development of inhibitory control skills (Carlson, Moses, & Hix, 1998). On the one hand, inhibitory control might be

necessary for the emergence of ToM (Russell, 1996) Children need to distance themselves from "the prepotent world of reality" so that they can represent it and work on it to form concepts required for ToM in "the world of mind" (Wellman, Crossi & Watson, 2001, p. 677). Inhibitory control skills help them during this process to suppress the reality. Consequently, thinking about the mind is achieved (Carlson & Moses, 2001). On the other hand, inhibitory control might contribute to the expression of the conceptual knowledge (Carlson & Moses, 2001; Russell, 1996). On many ToM tasks, prepotent responses should be inhibited so that the conceptual knowledge can manifest itself in action. This is ensured by inhibitory control. The relationship between inhibitory control and ToM was supported in several studies. Frye, Zelazo, and Palfai (1995) demonstrated that ToM performance of 3- to 5-year-old children was correlated with performance on the Wisconsin Card Sorting Task. Carlson and Moses (2001) found that after controlling for confounding variables such as age, gender, verbal ability, motor sequencing, mental state control, pretend actions and number of siblings the correlations between various ToM tasks remained robust. Carlson et al. (1998) extended this finding to deception and attributed 3-year-old children's inability to deceive others on deception tasks assessing ToM to the lack of inhibitory control as a result of which they cannot resist the prepotent response which is pointing to the desirable object or its location. Moreover, Carlson, Moses and Breton (2001) demonstrated that inhibitory control is more strongly related to ToM compared to other components of executive function. Furthermore, among tasks assessing inhibitory control, the conflict tasks that require the inhibition of the prepotent response and the creation of a new response through implementing a rule held in working memory were found to predict ToM performance better than the delay tasks which include only the inhibition of the response (Carlson & Moses, 2001; Carlson et al., 2001). This indicates the significance of the combination of inhibitory control and working memory for ToM development. The replication of Carlson and Moses' (2001) study by Sabbagh, Xu, Carlson, Moses and Lee (2006) with Chinese preschoolers mirrored the earlier findings and indicated that "individual differences in executive functioning predict individual differences in theory of mind" (p. 80). This cross-cultural consistency supports further the link between executive function and ToM.

The findings regarding the relationship between executive function and ToM in preschool children were extended to middle childhood by Bock, Gallaway and Hund (2015). They demonstrated that cognitive flexibility predicted social understanding in 7- to 12-year-old children after controlling the effects of age, vocabulary, working memory and inhibition. This finding implied that the link between executive function and ToM continues beyond their emergence in early childhood (Bock et al., 2015). However, they found no relationship between second-order false-belief and executive function. This finding was consistent with that of Sodian and Hülsken (2005) and Charman, Carroll and Sturge (2001).

Considering the findings about the relationship between executive function and ToM during early and middle childhood, it can be claimed that the nature of this relationship changes with time. In early childhood, inhibitory control and working

memory contributed to ToM development, mostly to the understanding of false-belief, while in middle childhood cognitive flexibility, another component of executive function, is related to more complex ToM skills such as social understanding.

2.2.3. Syntactic competence

As mentioned in Section 2.1.3, syntactic structures reflect the organization of the narrative at the sentence level. Because of its importance, some studies look at the use of the syntactic forms in narrative, but no study directly explores the relationship between narrative development and syntactic development outside the narrative context. Syntactic development is also related to other domains associated with narrative development. ToM is one of these domains. The temporal coincidence between the development of ToM and the emergence of subordinate clauses in children's speech hints at (but does not prove) a possible causal relation between the two domains.

According to functionally-oriented grammarians, grammar is determined by the discourse context. Givon (2009) defined the discourse context as "the speaker's communicative intent; that is, the speaker's mental representation of the interlocutor's relevant shifting mental states during communication" (p.26). In other words, grammar is adapted to represent the mental representation of other minds. During conversation, the speaker shapes his/her utterances depending on his/her communicative intent, his/her knowledge and belief states and his/her assumptions about the hearer's epistemic and deontic mental states. At every new turn, the speaker's mental model of the hearer's constantly changing mental states is updated so that communication between the interlocutors can go on. These shifts depend on ToM. Moreover, Fitch (2005) claimed that only humans are able to embed the representation of other minds into the representation of their own minds and this is the precursor for the ability to form syntactically complex, embedded structures.

Alternatively, de Villiers and de Villiers (2003) argued that the structural complexity of languages contributes to ToM development. They suggested that the comprehension and the production of complement clauses as subordinated structures of main clauses are the most relevant aspects of language for ToM. In general, mental state verbs such as 'think', 'want', 'know', 'remember', and 'need' are used in complex sentences as the main verb taking a complement clause as its object. In these structures, although the main clause expresses a true statement, the complement clause embedded in it might express a false statement. For example, while the statement 'Hale thinks that Can is at home' is true, the statement 'Can is at home' might be false. According to de Villiers and de Villiers (2003, p.351) "only language of this degree of structural complexity, namely a distinction between the complements and adjuncts of complex clauses, is representationally rich enough to capture false beliefs". Between the ages of 3 and 4 years of age, children started to use mental state verbs with their complements and this time period coincides with the development of ToM. In a longitudinal study with 3- and 4-year-old English-speaking children, de Villiers and Pyers (1997) examined the relationship between

false-belief understanding and the use of complements over a year and found that the ability to process complement structures was a good predictor of later ToM development. This relationship was further supported in other studies (Astington Jenkins, 1999; de Villiers, de Villiers, Schick, & Hoffmeister, 2001; de Villiers & Pyers, 2002).

The relation between ToM and complex language also has a social dimension. In Nelson's view (1996), language is a system that is used to represent one's own representations for oneself, reflect these representations to others, hold others' representations and represent others' representations as different from own representations. The development of this representational system through social interaction with others contributes to the development of ToM.

Tomasello (1999) claimed that language as a means to transmit cultural knowledge influences the structure and content of mental representations on the basis of which individuals try to make sense of the outer world, and others' behaviors and beliefs. Furthermore, during conversations multiple perspectives are shared and this contributes to representing different perspectives and keeping them in mind. These play a role in the development of ToM.

The relationship between ToM and syntactic development is mostly studied regarding first-order false belief. Second-order false belief is generally neglected (Miller, 2009). In several studies, vocabulary development and general linguistic competence were found to be related to its development (Astington et al., 2002; Filippova & Astington, 2008; Hasselhorn et al., 2005; Lockl & Schneider, 2007; Pellicano, 2007). In addition, the relationship between syntactic development and second-order ToM development was studied by Hollebrandse, Hobbs, de Villiers and Roeper (2008). They found some parallels between 6-year-old children's performance on a second-order false-belief task and their ability to comprehend and reproduce syntactically complex clauses including second-order embedding. This finding implies a possible relationship between them. This possibility necessitates further examination.

Syntactic competence might also be associated with executive function. Forming syntactically complex clauses requires planning, holding the grammatical units in working memory, inhibiting irrelevant information, and binding the units together. All of these processes can be attributed to executive function. Supporting this claim, Coelho (2002) demonstrated the relationship between executive function and syntactic complexity measured by the number of subordinate clauses per C-unit in the narratives of adults.

2.3. The Present Study

The present study brought together different levels of complexity in narratives, namely plot complexity, evaluative complexity and syntactic complexity, with cognitive, linguistic and social processes which might be related to each level in line with a complexity approach. Its first aim was to examine the development of Turkish-speaking children's narrative skills related to the levels of plot, evaluative and syntactic complexity. Four- and 5-year-old preschoolers, 7- and 8-year-old and

10-and 11-year-old children and adults participated in the present study so that the relationship between the levels of complexity could be analyzed within a wide age range covering different developmental periods. Moreover, taking into account the proposed relationships between narrative development, ToM, executive function and syntactic development, how the development in each type of complexity is related to each of these domains was studied as a second aim of the present study.

It was hypothesized that there would be an increase in the measures of plot complexity, evaluative complexity and syntactic complexity with age reflecting the developmental changes. Based on the previous findings in the literature mentioned in 2.1.4., positive relationships between plot complexity and syntactic complexity, between syntactic complexity and evaluative complexity, and between plot complexity and evaluative complexity were expected. In addition, ToM abilities, executive function and the ability to comprehend and reproduce syntactically complex sentences were expected to increase with age. Executive function was hypothesized to predict plot complexity and syntactic complexity. ToM was expected to predict the development of evaluative complexity and syntactic complexity. Finally, the ability to comprehend complement clauses was expected to predict syntactic complexity.

CHAPTER 3

METHOD

The present chapter introduces the method of the study. Relevant details of the sample are presented. The tasks are described along with information about the results of the inter-rater analysis. After the presentation of the procedure, the operational definitions of the levels of complexity are stated.

3.1. Participants

The data have been collected from 105 children in 4 age groups and 15 adults. Table 1 presents the distribution of the participants according to age groups and gender.

Table 1
Distribution of participants according to age groups and gender including descriptive information for age

	No of participants		Age (in months)			
Age group	Male	Female	M	SD	Min.	Max.
4	11	7	52	4.25	45	59.5
5	11	11	64.5	3.67	60	70
7 & 8	12	21	93.18	5.24	84	105
10 & 11	16	16	134.97	5.16	124	143
Adults	2	13	254.40	9.93	243	278

All of the participants were native Turkish speakers. Four- and 5-year -old participants were recruited from four kindergartens in Beylikdüzü, Istanbul. Seven-, 8-, 10- and 11-year-old participants were recruited from three primary and secondary public schools in Istanbul. Two of these schools are in Beylikdüzü and the other one is in Fındıkzade. These two districts mostly have population of middle socioeconomic status. To collect data in these schools, permission from the Ministry of National Education of Istanbul was obtained. Informed consent was obtained for all child participants from their parents (see Appendix A for the consent form). All of

the child participants were reported to be normally developing by their teachers. In return for their participation, 4- and 5-year-old participants received a sticker whereas older child participants received a pencil. Adults were recruited from Istanbul Bilgi University. They were undergraduate students in the Psychology department. They signed the informed consent form (see Appendix B). In return to their participation, they received two credits in the Experimental Psychology or the Cognitive Psychology courses. The parents of the child participants and the adult participants were asked to fill the demographic information questionnaire presented in Appendix C and Appendix D, respectively. It was filled by all adult participants and 46% of the parents.

3.2. Tasks

In this section, the tasks are introduced one by one. After the content of the tasks, the details of their administration and the criteria for their scoring are discussed, and the results of the inter-rater reliability analysis are presented. On 25 % of data, inter-rater reliability was computed. A graduate student in Bahçeşehir University was trained for transcribing and coding data of randomly selected 30 participants. Table 2 presents the distribution of the participants selected for the inter-rater reliability analysis by age.

Table 2
Distribution of the participants selected for the inter-rater reliability analysis by age

Age group	No of participants
4	5
5	6
7 & 8	8
10 & 11	6
Adults	5

The consensus estimates method was used. In cases of disagreement, the coding of the experimenter was accepted. Information regarding inter-rater reliability for the three complexity levels are presented after their operational definition given in Section 3.4.1.

3.2.1. Elicitation of narratives:

To elicit the narratives, Mayer's 24-page wordless picture book 'Frog, where are you?' (1969) was used. This book has been widely used in narrative studies to elicit narratives in various languages including English, German, Hebrew, Spanish (Berman & Slobin, 1994b), Mandarin (e.g. Sah, 2013), Thai (e.g. Zlatev & Yangklang, 2004), Russian (e.g. Slobin, 2000), Tzeltal (Brown, 2004), Australian Aboriginal languages (Bavin, 2004), Icelandic and Swedish (Ragnarsdóttir & Strömqvist, 2004). Previously, it was also used to elicit narratives in Turkish (e.g. Aksu-Koç, 1994; Küntay & Nakamura, 2004; Özçalışkan & Slobin, 1999; Özyürek & Özçalışkan, 2000). The story depicted in the book is about a boy, his dog and his lost frog. To be able to tell the story, the narrators have to infer the relationships between the characters, refer to their emotions and mental states, and describe the causes of events and actions (Küntay & Nakamura, 2004). The use of this book allowed a comparison of the present results with those of previous studies.

First, the experimenter introduced the book to the participants by stating that the book is a wordless picture book depicting a story about a boy, a dog and a frog. The experimenter showed the participants the pictures of these characters on the cover of the book. She asked them to look at all of the pages of the book in the presented order, and then to tell the story in their own words. She emphasized that the story should include the experiences, the emotions and the thoughts of the story characters. The participants looked at the pictures on the pages during story telling. If the participants had difficulties to tell the story, they were encouraged to look at the pictures for a second time before narrating. During the story telling, the experimenter listened to the participants silently and nodded a few times to show her interest. She answered only the questions of the participants about the identity of the story characters (e.g. the deer, the gopher). Except that, she did not answer any questions related to the content of the story, interfere with the narration of the story, or give any cue to the participants. After the participants finished their stories, the experimenter gave positive feedback, thanked and introduced the next task.

3.2.2. Theory of Mind (ToM) Tasks

3.2.2.1. First-order ToM Task:

The change of location task developed by Wimmer and Perner (1983) was used to assess ToM abilities of 4-year-old participants. Similar to the original version of the task, a scenario was acted out with toys (see Appendix E). The experimenter introduced one doll named Mehmet to the participants. Mehmet had a ball. He put it into a blue box and left to eat lunch. The experimenter asked a control question (*Top nerede?*'Where is the ball?'). Then, his friend Zeynep came. She moved the ball into a blue basket in Mehmet's absence and left. The experimenter asked three control questions (*Mehmet topu nereye koymuştu?* 'Where did Mehmet put the ball?'), (*Top şimdi nerede?*'Where is the ball now?') and (*Mehmet Zeynep'in topu torbaya koyduğunu gördü mü?* 'Did Mehmet see where Zeynep moved the ball?'). Then, Mehmet came back and wanted to play with his ball. The participants were asked to answer the false belief question (*Mehmet topunu nerede arayacak?* 'Where will

Mehmet look for the ball?') followed by two memory control questions (*Top gerçekte nerede?*'Where is the ball in reality?' and *Mehmet en başta topunu nereye koymuştu?* 'Where did Mehmet put the ball at the beginning?')). The experimenter did not give any positive or negative feedback.

If the participants answered correctly all of the false-belief and memory control questions, they got 1 point as the score of this task and passed the task. If they gave incorrect answers to even one of the questions, they got 0 point and failed the task.

The inter-rater reliability between the experimenter's and the rater's coding based on consensus estimates method was found to be 100%.

3.2.2.2 Real-apparent emotion task:

To assess 4-year-old participants' ability to differentiate between the emotion a person feels and the emotion a person displays, the real-apparent emotion task included in Wellman and Liu's (2004) ToM scale was used. To test the participants' ability to identify facial expressions, the experimenter presented three cartoon faces with sad, happy and neutral expressions (see Appendix F). She asked the participants to point to the sad face, the happy face and the neutral face in a random order. If the participants made any mistakes, they were corrected. Then, the experimenter introduced the task. She told the participants that she would tell a story about a girl in which the girl would feel happy or sad. She added that at the end of the story she would ask how the girl really felt and what the facial expression of the girl would be. After she mentioned that her real emotion and the emotion on her face would be either same or different, she introduced the main character of the story, a doll named Zeynep, and started to tell the story. In this story, Zeynep's aunt has promised to bring a doll to her from a journey. But she actually brings a book although Zeynep likes dolls more than books. Zeynep should hide her real emotion, because if her aunt realizes it, she will not buy her anything in the future. The experimenter asked the participants two memory control questions, (*Zeynep'in teyzesi ona ne almış?* 'What did Zeynep's aunt buy her?' and *Teyzesi Zeynep'in gerçek hislerini öğrenirse ne yapar?* 'What will Zeynep's aunt do if she realizes her real feelings?'). If the participants answered incorrectly either one of these questions, the experimenter repeated first the story, then the questions. If the participants could not answer correctly both questions again, the experimenter repeated the story and the questions for the last time. When the participants answered correctly both memory control questions, the experimenter continued with the real and apparent emotion questions, (*Zeynep gerçekte ne hissetimiştir teyzesi kitabı ona verdiğinde?* 'How did Zeynep really feel when her aunt gave her the book?' and *Zeynep'in yüzündeki ifade nasıldır teyzesi ona kitabı verdiğinde*? 'How was the expression on Zeynep's face when her aunt gave her the book?'). The participants had to answer them by pointing to one of the cartoon faces.

If the participants responded to the real emotion question by pointing to the sad cartoon face and to the apparent emotion question by pointing to the happy or

neutral cartoon face, they passed the task and got 1 point. Any other response combinations were evaluated as incorrect with 0 point.

The inter-rater reliability between the experimenter's and the rater's coding based on consensus estimates method was found to be 95.45%.

3.2.2.3. Second-order ToM task:

To assess ToM abilities of 5-, 7-, 8-, 10- and 11-year-old participants and adult participants, the second-order false-belief task developed by Flobbe (2006) based on Sullivan et al. (1994) and Hogrefe and Wimmer (1986) and adapted to Turkish by Arslan (2011) was administered. On this task, the experimenter told two stories to the participants. During the story telling, she presented drawings depicting the stories to foster the comprehension of the stories and asked questions regarding the details.

In the first story (see Appendix G) Adapted from Perner and Wimmer's (1985) set of second-order ToM stories, the chocolate bar story, a boy named Can takes a chocolate bar from his mother, puts it in a drawer and leaves the room. In his absence, his sister named Ece moves the chocolate bar to the toy-box. Through the window Can sees that his sister relocates the bar, however, Ece is not aware of that. At this point, the experimenter asked the reality control question (*Çikolata şimdi nerede?* 'Where is the chocolate bar now?'), the 1st order ignorance question (*Can Ece'nin çikolatayı oyuncak sandığına koyduğunu biliyor mu?* 'Does Can know that Ece moves the chocolate to the toy-box?'), and the linguistic control question (*Ece Can'ın onu gördüğünü biliyor mu?* 'Does Ece know that Can sees her relocating the chocolate?'). Later, Can comes back and states that he wants to eat his chocolate. The experimenter presented the 2nd order false-belief question (*Ece Can'ın çikolatayı nerede arayacağını düşünür?* 'Where does Ece think that Can will look for the chocolate?'). She also asked the participants to justify their answer. No positive or negative feedback was given.

In the second story adapted from Sullivan et al.'s (1994) set of stories, the birthday present story (see Appendix H), Mehmet's mother bought a puppy as a birthday present to Mehmet. She hid the puppy in the basement. On his birthday, Mehmet asks his mother what she bought for him. Because of the fact that his mother wants to surprise him, she tells him that she bought a ball. At this point, the experimenter asked the reality control question (*Annesi Mehmet'e doğum günü için gerçekte ne aldı?*'What does the mother buy as a birthday present for her son?'). Then, Mehmet goes to the basement and sees the puppy. Her mother does not know this. The experimenter asked the 1st order ignorance question (*Mehmet annesinin yavru kopek aldığını biliyor mu?* 'Does Mehmet know that his mother bought him a puppy?') and the linguistic control question (*Annesi Mehmet'in yavru köpeği gördüğünü biliyor mu?*'Does Mehmet's mother know that Mehmet saw the puppy in the basement?'). The grandmother calls to learn the time of the birthday party. She asks Mehmet's mother what Mehmet thought that her mother bought for him. As the 2nd order false-belief question, the experimenter asked the participants to state what the mother's answer to this question would be (*Mehmet'in annesi anneanneye ne*

cevap verir?'How will Mehmet's mother answer to the grandmother?'). They were also asked to provide a justification for their answer. No positive or negative feedback was given.

Participants' responses were evaluated separately for each story. If they answered correctly all of the questions regarding one story (justifications were not included), they got 1 point and passed that story. If they answered incorrectly even one question, they got 0 point.

In the chocolate bar story, the inter-rater reliability between the experimenter's and the rater's coding based on consensus estimates method was found to be 97.5%. In the birthday present story, the inter-rater reliability was 96.67%.

3.2.3. Emotional Stroop Task:

The Emotional Stroop Task used in the present study was developed by Lagattuta, Sayfan and Monsour (2011) to assess executive function. Twelve 7.5x7.5 cm cards displaying a yellow cartoon happy face and 12 7.5x7.5 cm cards showing a yellow cartoon sad face were used (see Appendix I). Before the administration of the task, the experimenter showed first the happy face, then the sad face to the participants and asked them to state whether the face was happy or sad. If the participants could not give the right answer, they were corrected. Then, the experimenter introduced the participants the rule of the task by explaining that they would play an opposite game in which when she showed the happy face, the participants had to respond saying *"üzgün*'sad'*"* and when she showed the sad face, the participants had to respond saying *"mutlu* 'happy'*"*. After the participants repeated the rule with the experimenter, they did four training trials in which two happy and two sad faces were presented in the order of happy, sad, sad, happy. If the participants performed correctly on the training trials, they continued with testing trials. If they made any mistakes, training was carried on until they gave correct responses in all training trials. For the testing trials, there were 10 conditions in which 10 happy and 10 sad faces were randomly organized in a different order (see Appendix J). The experimenter selected one of the conditions for each participant and arranged the cards accordingly. She presented each card one by one. Immediately after the participants' response, the experimenter put the card faced down and presented the next one faced up. No positive or negative feedback was given. However, if the participants made 4 errors in a row, the experimenter reminded them of the rule.

The total number of correct responses was calculated to evaluate the participants' performance on this task. Only the first response of the participants in each trial was taken into account. If the participants corrected their mistakes, the corrections were disregarded. Moreover, the time period between the presentation of the card in the first testing trial and the response of the participants in the last testing trial was considered as the total response time.

The inter-rater reliability between the experimenter's and the rater's coding of the correct responses based on the consensus estimates method was found to be 96.50%.

3.2.4. Comprehension of Complement Clauses Task:

Altan (2008) developed a task to assess children's ability to comprehend complement clauses inspired by a task developed by Crain and Nakayama (1987; as cited in Thornton, 1996) and revised by Thornton (1996). On this task, the experimenter presented clauses including object nominalizations formed with the suffixes –mA, -mAK, -DIK and –(y)AcAK (e.g.*"Fareye kutuda ne olduğunu sandığını sorar mısın?"* 'Can you ask the mouse what he thinks there is in the box?') as complement clauses. The participants were expected to direct the questions embedded in these clauses to a puppet introduced at the beginning of the task (e.g. "Kutuda ne olduğunu sanıyorsun?" What do you think there is in the box?"). The yes-no interrogative clauses formed with complement clauses (*"Fareye dün okula gidip gitmediğini sor"* 'Ask the mouse whether he went to school yesterday or not') were also included. To be able to make the transition from the indirect forms of the questions embedded in clauses presented by the experimenter to the direct ones that would be presented to the puppet, the participants need to understand the syntactic and semantic properties of complement clauses (Altan, 2008). There were 3 training trials and 10 testing trials. Seven of the testing trials included clauses with single embedding (e.g. "Fareden bize peynir vermesini iste" 'Ask the mouse to give some cheese to us') whereas three of them included clauses with double embedding.

Altan's task was adapted for the present study. At the beginning of the task, the experimenter introduced a turtle puppet who was very shy to talk with her, but liked to talk to other people who wanted to play with him. She stated that the participants had to ask some questions to the turtle instead of her. In the four training trials, the experimenter presented four clauses including object nominalizations as complement clauses. Two of them were single-embedded and the other two were double-embedded. If the participants could not construct the correct form to direct the question to the turtle, the experimenter corrected and repeated the correct form with the participants. The testing trials included six single-embedded and six double-embedded clauses. The order of these clauses was determined randomly and same for all participants. The yes-no interrogative clauses used by Altan were excluded. The list of the clauses in the presented order is given in Appendix K. During the testing, the experimenter presented each clause to the participants one by one. After the presentation of a clause, she waited for the participants to direct the question to the turtle. Then, without giving any feedback the experimenter carried on with the next clause.

Adapting Altan's scoring criterion, participants' correct responses on the clauses with single nominalization were scored as 1. Their correct responses on the clauses with double nominalization were scored as 2 (e.g. *Bana dün ne yaptığını anlatır mısın?* 'Can you tell me what you have done yesterday?' in response to *Kaplumbağaya dün ne yaptığını sana anlatmasını söyler misin?* 'Could you ask the turtle to tell you what he has done yesterday?'). Incorrect and unrelated responses

were scored as 0 (e.g. *Dün oyun oynadın mı?* 'Did you play yesterday?' in response to *Kaplumbağaya dün ne yaptığını sana anlatmasını söyler misin?* 'Could you ask the turtle to tell you what he has done yesterday?'). If the participants could understand the complement clauses with double embeddings, but could reproduce only some part of the question (e.g. *Dün ne yaptın?* 'What did you do yesterday?' in response to *Kaplumbağaya dün ne yaptığını sana anlatmasını söyler misin?* 'Could you ask the turtle to tell you what he has done yesterday?'), their responses were scored as 1. Finally, if they divided the double-embedded clauses into two separate clauses (e.g. *Dün ne yaptın? Bana anlatır mısın?* 'What did you do yesterday? Can you tell me?'), their responses were scored as 1.5. The maximum possible score on this task was 18 (6 for single-embedded clauses and 12 for double-embedded clauses).

The overall inter-rater reliability between the experimenter's and the second rater's coding based on consensus estimates method was found to be 93.61%. The inter-rater reliability for single-embedded clauses was 96.11% and the inter-rater reliability for double-embedded clauses was 91.11%.

3.3. Procedure

Data from the child participants were collected in a silent classroom in their schools. Data from the adult participants were collected in a silent classroom in Istanbul Bilgi University. All tasks were administered individually to all participants by the same native Turkish-speaking experimenter. She sat facing the participant around a table. To 4-year-old participants, the tasks were presented in two sessions. There was a 4 to 7 days long interval between the sessions. To control for the effect of the task order on performance, fixed-order was used in both sessions. In the first session, the order of the tasks was: (1) Elicitation of the Narrative Task and (2) the Emotional Stroop Task. In the second session, the order of the tasks was: (1) First-order ToM task, (2) Real-apparent Emotion Task, (3) Comprehension of Complement Clauses Task. Each session lasted approximately 10 minutes. To participants in other age groups, the tasks were administered in a single session in the fixed order of: (1) Elicitation of Narrative Task, (2) Emotional Stroop Task, (3) Second-order ToM Task, (4) Comprehension of Complement Clauses Task. This session lasted 15-20 minutes. The adult participants filled the consent form before, and the demographic questionnaire after the tasks. All of the tasks were video-recorded for transcription and coding.

3.4. Transcription and coding:

Video-recordings of the narratives were transcribed by the experimenter using EUDICO Linguistic Annotator (ELAN). It was developed at the Max Planck Institute for Psycholinguistics, Nijmegen, Netherlands to analyze language, sign language and gestures (Lausberg & Sloetjes, 2009; Wittenburg, Brugman, Russel, Klassmann, & Sloetjes, 2006).

3.4.1. Operational definitions of the levels of complexity - Coding criteria

3.4.1.1. Plot complexity: Plot complexity was coded according to the criteria constructed by Ayas-Koksal (2011) based on the plot components suggested by Berman and Slobin (1994b) for the book 'Frog, where are you?' (1969). There were 4 main components: a) the onset including the introduction of the characters, the setting and the disappearance of the frog as the main event; b) the unfolding including the experiences of the boy and the dog with different animals; c) the resolution including the boy's finding of the frog; and (d) the search theme including the references to the searching of the frog. Appendix L presents these components and their subcomponents with definitions and some examples.

The presence of each sub-component scored 1 point. The total points given for the presence of the sub-components of the plot onset constituted the plot onset score, ranging between 0-8. The total points given for the presence of the sub-components of the plot unfolding constituted the plot unfolding score, ranging between 0-6. The resolution score ranged between 0 and 1 depending on whether the participant mentioned the finding of the lost frog. The total points given for the presence of the sub-components of the search theme constituted the search theme score, ranging between 0-4 (Ayas-Koksal, 2011). The plot complexity score was computed by adding up all the subcomponent scores.

The overall inter-rater reliability between the experimenter's and the rater's coding based on consensus estimates method was found to be 86.88%. Table 3 presents the inter-rater reliability for each four components.

Table 3
Inter-rater reliability between the experimenter's and the rater's coding based on consensus estimates method for each component of plot complexity

Component	% of agreement
Onset	83.33
Unfolding	94.44
Resolution	83.33
search theme	80.00
Overall	86.87

3.4.1.2. Evaluative complexity: All clauses, except the noun clauses formed with the subordinating suffixes –mE and –mEk, were coded as either referential or evaluative. If a clause expresses a scene, an event or information directly observable in the pictures of the book, then it is coded as referential. If it includes an evaluation

of the narrator regarding the events or the story characters, or stating the point of view of the narrator him/herself, then it is coded as evaluative.

In the literature, there was no consensus on the coding categories for evaluation (Shiro, 2003). For the present study, the categories used by Küntay and Nakamura (2004) were adapted and modified. There are different categorizations of mental state terms. Appendix M presents the classification of Bretherton and Beeghly (1982) and Fuste-Herrmann, Silliman, Bahr, Fasnacht and Federico (2006). For the purposes of the present study, the classification of Bretherton and Beeghly (1982) was adapted. But, due to the fact that the category of moral judgment and obligation was not applicable in the current study, it was excluded. Moreover, the categories of perceptual and physiological mental state terms were excluded, because information regarding them is mostly presented in the pictures and the participants can refer to them without any evaluation. The evaluative categories used in the present study are given below with examples from the narratives.

a) Mental state terms: They referred to the internal states of the story characters indicating that the narrator was aware of the emotions, thoughts, subjective states, needs and desires of the story characters. There were four subcategories.

- terms for emotional states: e.g. *kızmak* 'get angry', *mutlu* 'happy', *üzülmek* 'become sad', *şaşırmak* 'surprise', *korkmak* 'be scared of', *rahatsız* 'uncomfortable', *sevmek* 'like'

[1] Burda sahibi bulamadığı için kızgın
'here his owner is angry, because he couldn't find (it)'
[2] Çok mutlu oluyorlar.
'they become very happy'

Due to the fact that the verb 'şaşırmak' has both emotional and cognitive connotations, first it was thought to constitute a separate subcategory titled as 'cognitive - emotional'. But because of its low frequency it is included in the 'emotional' subcategory as in the literature (e.g. Küntay & Nakamura, 2004)

- terms for affect expression: e.g. *gülmek* 'laugh', *gülümsemek* 'smile', *sarılmak* 'hug', *teşekkür etmek* 'thank'

[3] ve ailesine teşekkür ediyor.
'and he thanks to his family'
[4] Sonra çocuk kalktığında biraz gülümsemiş.
'Then when the boy stands up, he smiles'

- terms for motivation and ability: e.g. *istemek* 'want', *çalışmak* 'try', *-AbIlmek* 'be able, can'

[5] Gitmek istedi
'he wanted to go'
[6] Ağaca tırmanmaya çalışıyor
'he tries to climb the tree'

- terms for cognitive states: e.g. *düşünmek* 'think', *karar vermek* 'decide', *bilmek* 'know', *sanmak* 'suppose, think2

[7] Kurbağanın burada olacağını düşünüyorlar
'they thought that the frog would be here'

b) Hedges: These devices were used for the expression of uncertainty of the narrator for the content of his/her statement. Expressions like *galiba* 'probably', *belki* 'maybe', *verb-bilir* 'might be', *anladığım kadarıyla* 'as I understood' and *zannediyorum* 'I assume' constitute this category (Küntay & Nakamura, 2004).

[8] Bataklıktı galiba.
'Probably it was a swamp'
[9] Gene köpeği aramaya çalışıyor sanırım.
'I assume that he is again trying to search for his dog'

c) Negative qualifiers: These devices mention the discrepancy between the expectations of the narrator and what happened in the story expressed by the negative markers (Küntay & Nakamura, 2004). Any direct negation was coded in this category.

[10] Bataklığın üstüne düşüyorlar. Köpek düşmüyor ama.
'they fall to the swamp. But the dog does not fall'
[11] Sonra uyandığında kurbağa yokmuş.
'Then, when he woke up, the frog was not there'

d) Character speech: Direct statements of the utterances of the story characters and statements of indirect speech constitute this category (Küntay & Nakamura, 2004). It indicates the intentional state of the characters.

[12] Sessiz olmasını söyledi Can köpeğine
'Can told his dog to be silent'
[13] Çocuk böyle "Kurbağacık nerdesin? Kurbağacık nerdesin?" diye bağırmıştı.
'the child shouted "Frog, where are you? Where are you?"'

e) Enrichment expressions: Adverbial phrases for unexpected or inferred nature of an action (*yine* 'again', *birdenbire* 'suddenly'), intensifiers (*çok* 'very', *hep* 'always', *her* 'every'), and repetitions used to take the listener's attention constitute this category (Küntay & Nakamura, 2004).

[14] Uyandıklarında çok şaşırıyorlar.
'When they woke up they become very surprised'

[15] Sonra hemen gitmiş
'Then he went immediately'
[16] Sonra sessizce bakıyorlar kütüğün arkasına.
'then they looked silently behind the wood block'
[17] Sonra köpek koşa koşa gitmiş
'then the dog went running'

f) Evaluative remarks: Devices in this category indicate the subjective point of view of the narrator (Küntay & Nakamura, 2004).

[18] Tabii ki de köpek sahibiyle beraber yatakta yatıyordu.
'Of course, the dog was lying together with his owner in bed'

g) Causal expressions: Devices in this category express inferred causes of events and motivations behind the actions of the story characters (*çünkü*'because', *için* 'for').

[19] Tony de bu arada Tolga'nın kafasına çıkmış. Çünkü suyu sevmiyormuş.
'Meanwhile Tony stepped to the Tolga's head, because he did not like water'

h) Contrastive expressions: They include expressions of unexpected or contrastive occurrences of events (*ama*, *fakat* 'but').

[20] Ağaca tırmanmaya çalışıyor. Ama burdan arılar çıkıyor.
'He tries to climb the tree. But the bees come out from here.'

Similar categories were also reported by Fernández (2011) and Shiro (2003).

An evaluative complexity score was created by taking the percentage of clauses with an evaluative category over the total number of clauses (the sum of the number of referential and evaluative clauses).One clause might include more than one evaluative category. Thus, the total number of the occurrence of an evaluative term was also computed. For every evaluative category, the percentage of the number of occurrence of an evaluative element from that category over the total number of evaluative elements was calculated. For example, to analyze the extent of the use of mental state terms, the percentage of the number of mental state terms over the total number of evaluative elements was computed.

The overall inter-rater reliability between the experimenter's and the rater's coding based on consensus estimates method was found to be 73.84%. Table 4 presents the inter-rater reliability for every evaluative device category.

Table 4
Inter-rater reliability between the experimenter's and the rater's coding based on the consensus estimates for each evaluative device category

evaluative device	inter-rater reliability (%)
terms for emotions	92.30
terms for affect expression	77.78
terms for motivation & ability	87.88
Terms for cognitive states	65.63
causal expressions	66.86
Hedges	20[1]
negative qualifiers	88.27
character speech	92.59
enrichment expression	68.82
evaluative remarks	57.14
contrastive expressions	95.00

3.4.1.3. Syntactic complexity: The total number of the communication units, C-units, described as a main clause with its subordinate clauses, the total number of words (TNW), the mean length of C-units (MLCU), the total duration of the narrative and the mean duration of a C-unit were included as narrative productivity parameters. The measure of syntactic complexity was the percentage of the number of C-units with at least one subordinate clause to the total number of C-units. In Turkish, subordinate clauses come in three kinds, as noun phrases, adverbial phrases and relative clauses (Göksel & Kerslake, 2005). Göksel and Kerslake (2011) summarized their marking as in Appendix N. The subordinate clauses in narratives were identified and classified accordingly.

[1] 20% inter-rater reliability was very low. Narratives of only 5 participants whose data were re-coded by the second rater included hedges. In each narrative, there was only one hedge. So, the first and second raters agreed only on one of them. The remaining ones were the cases of *değil mi?*'isn't it?'. This is a rhetoric question asked by the participants to the experimenter to check the truth of their statements. The first rater considered it as an expression of uncertainty whereas the second rater did not take it into consideration.

Note that more than one subordinate clause might be embedded in one C-unit.

[21] Onun ile oynamaya çalışıyordu
'He was trying to play with him'
[22] Sonra gitmeye karar veriyorlar peşinden onu tutmak için
'then they decided to go after thim to catch him'
[23] Can ve köpeği uyurken kurbağayı koydukları kavanozdan kurbağa kaçmak için hazırlık yapıyordu
'While Can and his dog were sleeping, the frog gets prepared to escape from the jar in which they put him'

For example, [21] includes only one noun phrase (*oynamaya* 'to play') whereas one noun phrase (*gitmeye* 'to go') and one adverbial phrase (*tutmak için* 'to catch') are embedded in [22], and [23] includes two adverbial phrases (*uyurken* 'while sleeping' and *kaçmak için* 'to escape') and one relative clause (*kurbağayı koydukları kavanoz* 'the jar in which they put the frog'). Considering the differences in the complexity level between these three types of clauses, the number of C-units with one embedded, two embedded and more than two embedded subordinate clauses; and the total number of subordinate clauses in the narratives were also included as measures to analyze the syntactic complexity in a more comprehensive way.

For the C-units with at least one subordinate clause, the inter-rater reliability based on consensus estimates method was found to be 77.84%. The inter-rater reliability for noun subordinate clauses was 57.95 %. The inter-rater reliability for adverbial subordinate clauses was 86.46 % and for relative clauses it was 52.04%.

The second rater did not have any formal training in linguistics. During training for inter-rater reliability analysis, the experimenter gave detailed information about the types of subordinate clauses in Turkish and provided examples. She had no difficulties in identifying subordinate clauses, but in categorizing them. In cases of disagreement, the experimenter coded the clauses again and her coding was accepted.

CHAPTER 4

RESULTS

First, the results regarding ToM, executive function and the comprehension of complex syntax are presented. After the details of the general structure of the narratives, results regarding each level of complexity are introduced. The results of the regression analyses testing the relationship between the levels of complexity, and ToM, executive function and the comprehension of complex syntax are followed by the results of the discriminant analysis.

Data from adult participants were excluded from the statistical analyses, but included in the figures or tables for only descriptive purposes so that the child participants' performance can be compared to the performance of the adult participants. To analyze the participants' performance on each task, the effect of age and the effect of gender were examined together. But if the effect of gender was found to be insignificant, then it was excluded from the analyses and only the effect of age was further examined.

4.1. ToM Tasks:

Table 5 presents the percentage of participants who passed each ToM task.

Table 5

Percentage of participants who passed the First-order, the Real-apparent Emotion and the Second-order ToM tasks in each age group

Age	1st order ToM	Real-apparent Emotion	2nd order ToM	
			Chocolate story	Birthday Present Story
4	23.53	17.65		
5			30	15
7 & 8			60.61	39.39
10 & 11			90.32	51.61
adult			93.33	93.33

For the analysis of participants' overall ToM performance across age groups, an overall ToM score was computed by adding the first-order ToM score (1 for passing the ToM task, 0 for failing it) and the real-apparent emotion score (1 for passing the task, 0 for failing it) for the 4-year-old participants, and the scores from the two stories in the second-order ToM task (1 for passing the part including the chocolate bar story, 0 for failing it and 1 for passing the part including the birthday present story and 0 for failing it) for the older participants. Figure 1 displays the overall ToM score (maximum =2) for each age group.

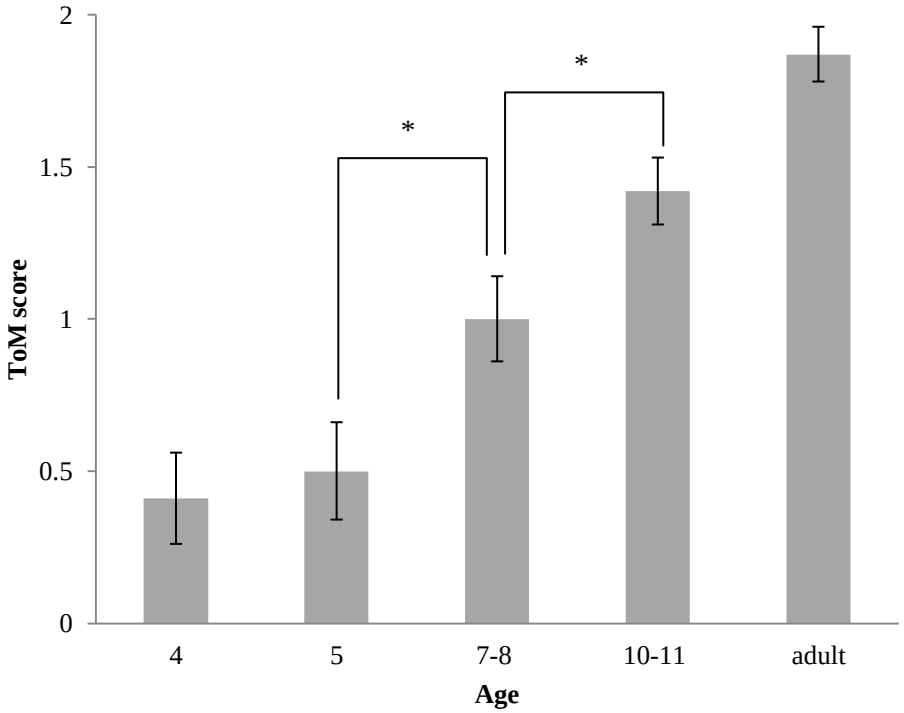

Figure 1. Total ToM scores by age (over maximum score 2). Error bars represent standard errors, the asterisk is used to show significant results.

A one-way ANOVA with age as the independent variable and the overall ToM score as the dependent variable showed the significant effect of age, $F(3, 99) = 10.88$, $p < .001$, $\omega = .47$. Planned repeated contrasts revealed that the ToM score of 4-year-old participants [M=0.41; SD=0.62] was not different than that of 5-year-old participants [M = 0.50; SD = 0.74], $t(99) = .39$, $p > .05$[2]. As shown in Figure 1, 5-year-old participants' ToM score was significantly lower than 7- and 8-year-old

[2] To be able to cover ToM abilities over the whole age range (4 to 11 years) ToM tasks at two different levels (first-order for -4-year-old participants and second-order for older participants) were used. Thus, the lack of the difference between ToM scores of 4-year-old and 5-year-old participants did not mean that there was no development between these age groups (as discussed below in Section 5.7).

participants' score [*M* = 1.00; *SD* = 0.79], *t*(99) = 2.58, *p* < .01 (1-tailed), *r* = .25, which was significantly lower than 10- and 11-year-old participants' scores [*M* = 1.42; *SD* = 0.62], *t*(99) = 2.38, *p* < .01 (1-tailed), *r* = .23.

4.2. Emotional Stroop Task:

To analyze participants' performance on the Emotional Stroop Task, the ratio of the correct responses to the number of all responses was computed as the Emotional Stroop Task score.

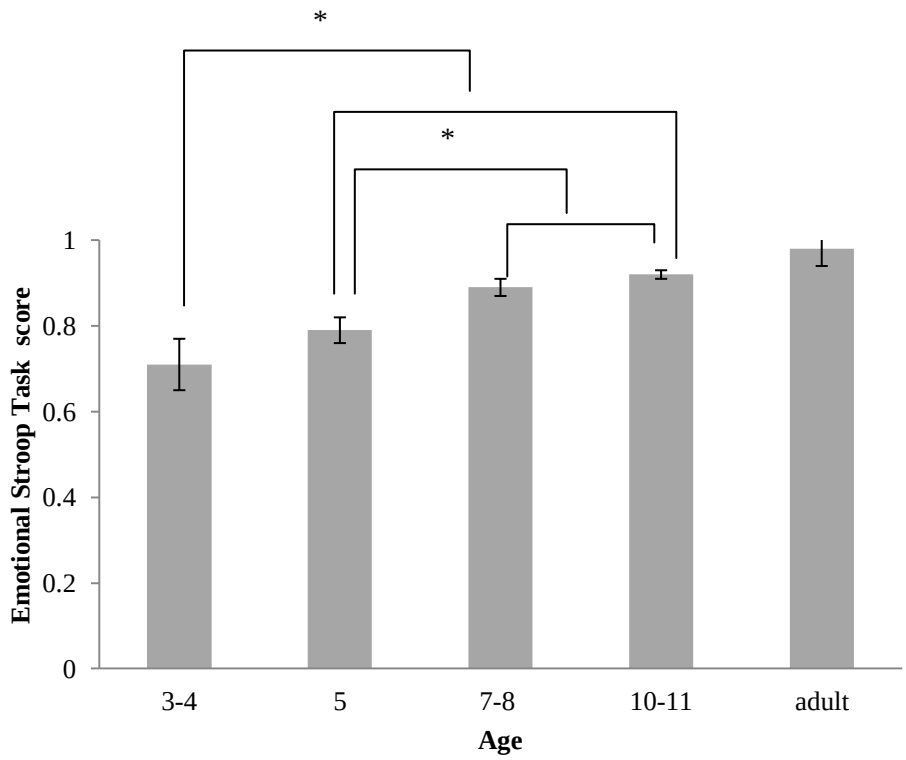

Figure 2. Distribution of the Emotional Stroop Task score by age. Error bars represent standard errors, the asterisk is used to show significant results.

A one-way ANOVA with age as the independent variable and the Emotional Stroop Task score as the dependent variable revealed that age had a significant main effect, *Welch's* $F^3(3, 43.18) = 8.83$, $p < .001$, $\omega = .46^4$. As Figure 2 shows, planned Helmert contrasts indicated that 4-year-old participants' score [*M* = 0.71; *SD* = 0.25] was

[3] If the homogeneity of variance assumption was violated, Welch's *F*-ratio was considered and reported.

[4] ω is a measure for the effect size. It is based on the sum of squares and also uses the variance explained by the model and the error variance (Field, 2013)

significantly lower than the older participants' score, $t(18.48) = 2.58$, $p < .01$ (1-tailed), $r = .51$. Five-year-old participants' score [$M = 0.79$; $SD = 0.13$] was significantly lower than that of older participants, $t(29.13) = 3.72$, $p < .001$(1-tailed), $r = .57$. The score of 7- and 8-year-old participants [$M = 0.89$; $SD = 0.12$] was not different from that of 10- and 11-year-old participants [$M = 0.92$; $SD = 0.07$], $t(51.82) = 1.22$, $p > .05$.

A further analysis was conducted with the total response time on the Emotional Stroop Task as the dependent variable and age as the independent variable. A one-way ANOVA showed that age had a significant main effect on the total response time, *Welch's* $F(3, 40.49) = 45.82$, $p < .001$, $\omega = .80$. Planned Helmert contrasts demonstrated that the response time of 4-year-old participants [$M = 73.33$; $SD = 15.44$] was significantly longer than that of older participants, $t(19.41) = -7.62$, $p < .001$ (1-tailed), $r = .87$.

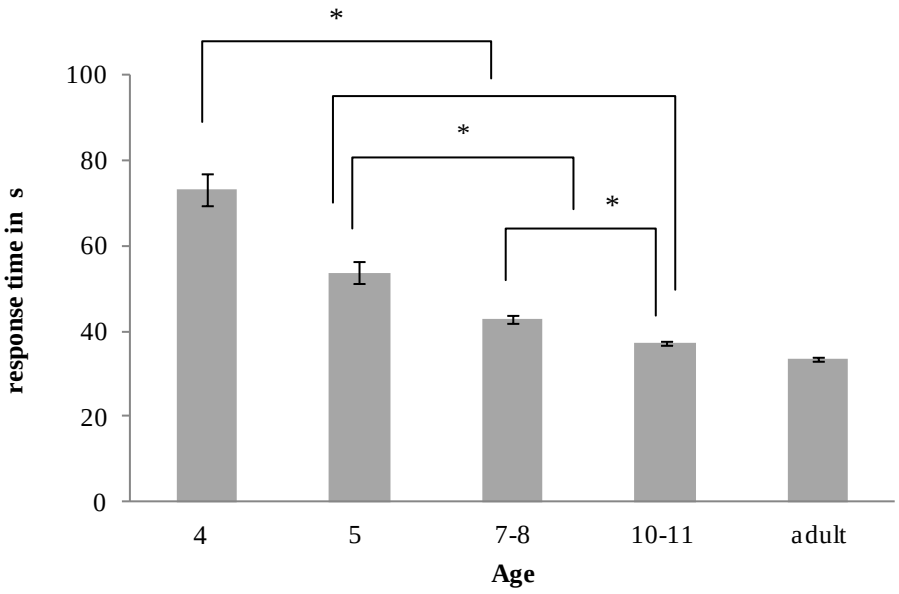

Figure 3. Distribution of the total response time on the Emotional Stroop Task by age. Error bars represent standard errors, the asterisk is used to show significant results.

In addition, 5-year-old participants [$M = 53.73$; $SD = 12.47$] had significantly longer response time than older participants, $t(22.92) = -5.02$, $p < .001$ (1-tailed), $r = .72$, and 7-and 8-year-old participants [$M = 42.79$; $SD = 5.74$] had significantly longer response time than 10- and 11-year-old participants [$M = 37.38$; $SD = 2.99$], $t(48.50) = -4.79$, $p < .001$ (1-tailed), $r = .57$. Figure 3 shows the total response time of each age group.

4.3. Comprehension of Complement Clauses Task

For the analysis of participants' performance on the comprehension of complement clauses task, the ratio of the total scores of the participants to the maximum possible total score was computed as the comprehension of complements score. A one-way ANOVA with age as the independent variable and the comprehension of complements score as the dependent variable revealed that age had a significant effect, *Welch's* $F(3, 41.09) = 10.82$, $p < .001$, $\omega = .51$. As shown in Figure 4, planned repeated contrasts demonstrated that 4-year-old participants' score [$M = 0.55$; $SD = 0.20$] was not different than that of 5-year-old participants, $t(30.09) = -1.37$, $p > .05$. The score of 5-year-old participants [$M = 0.66$; $SD = 0.18$] was significantly lower than that of 7- and 8-year-old participants [$M = 0.75$; $SD = 0.12$], $t(33.70) = 2.18$, $p < .05$ (1-tailed), $r = .35$. Seven- and 8-year-old participants' score was significantly lower than that of 10- and 11-year-old participants [$M = 0.80$; $SD = 0.08$], $t(56.10) = -2.09$, $p < .05$ (1-tailed), $r = .27$.

To differentiate between the participants' performance on complement clauses with single and double embeddings, a 4 (age) X 2 (type of complement clause) mixed design ANOVA with age as the between-subjects factor and type of complement clause as the within-subjects factor was applied. Figure 5 shows the scores for the two types of complement clauses. Results showed that the type of complement clause had a significant main effect, $F(1, 96) = 340.06$, $p < .001$, $r = .88$, partial $\eta^2 = .78$, observed power = 1.00. Participants' score on the complement clauses with single embedding [$M = 0.91$; $SD = 0.17$] was higher than their performance on the complement clauses with double embedding [$M = 0.61$, $SD = 0.18$]. The effect of age was also significant, $F(3, 96) = 14.56$, $p < .001$, $r = .36$, partial $\eta^2 = .31$, observed power = 1.00. Pairwise comparisons indicated that 4-year-old [$M = 0.60$; $SE = 0.03$] and 5-year-old [$M = 0.70$; $SE = 0.03$] participants' scores were not different from each other, but significantly lower than those of 7- and 8-year-old [$M = 0.80$; $SD = 0.02$] and 10- and 11-year-old participants [$M = 0.85$; $SD = 0.02$]. The interaction between age and complement clause type was not significant, $F(3, 96) = 0.60$, $p > .05$.

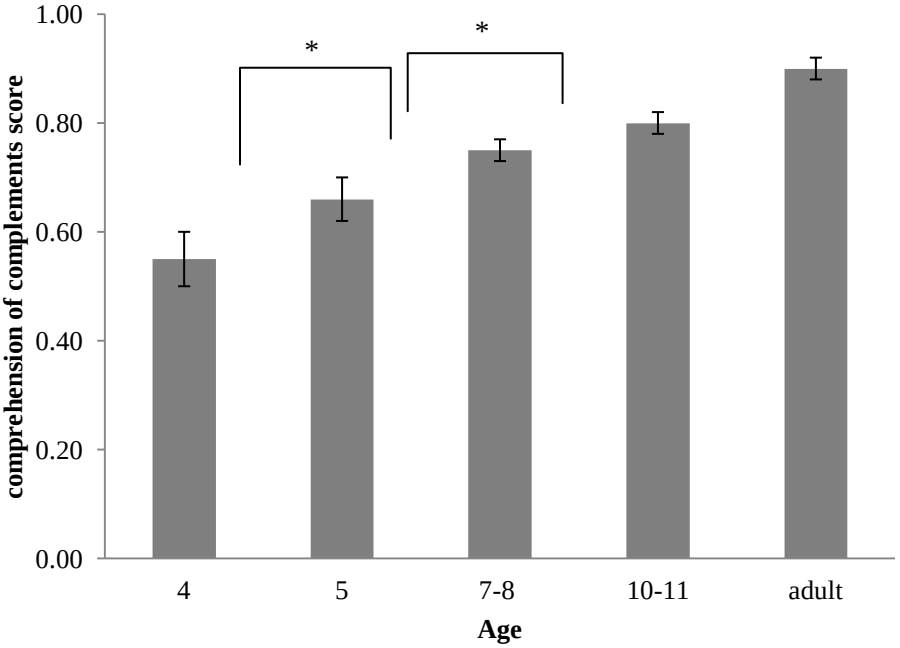

Figure 4. Mean comprehension of complements score by age. Error bars represent standard errors, the asterisk is used to show significant results.

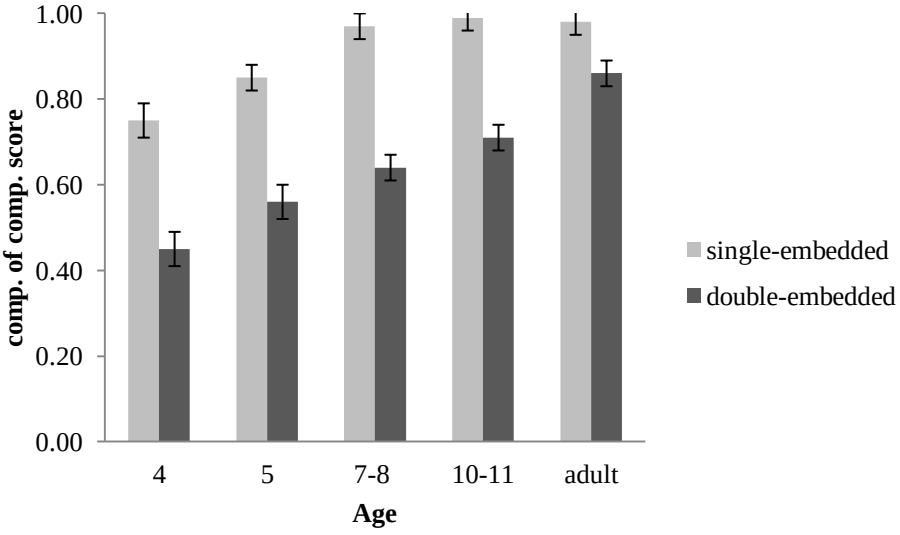

Figure 5. Mean comprehension of complements scores for single-embedded clauses and double-embedded clauses on the Comprehension of Complement Clauses Task by age. Error bars represent standard errors.

4.4. Narrative performance

Narrative performance was evaluated in terms of narrative productivity and narrative fluency. To analyze narrative productivity, the parameters of the total number of C-units (a C-unit is a main clause with all subordinate clauses embedded in it), the total number of words and the mean length of C-unit (MLCU) in words were calculated. They are displayed in Table 6.

Table 6
Means and Standard Deviations of the number of C-units, the number of words and the mean length of C-unit (MLCU) by age as measures of narrative productivity

	No of C-units		No of words		MLCU	
Age	M	SD	M	SD	M	SD
4	35.24	12.55	148.06	63.16	4.13	.85
5	39.73	11.59	157.59	40.22	4.04	.54
7-8	48.06	17.99	202.67	86.91	4.18	.55
10-11	41.72	11.60	195.47	63.58	4.67	.68
Adult	50.93	21.94	310.07	119.76	6.25	.98

A MANOVA with age as the independent variable and the number of C-units, the total number of words and the mean length of C-unit as the dependent variables indicated that age had a significant effect, $V^5 = 0.28$, $F(9, 300) = 3.37$, $p < .01$, partial $\eta^2 = .09$, observed power = .99; $\Theta = 0.17$, $F(3, 100) = 5.79$, $p < .01$, partial $\eta^2 = .15$, observed power = .94. Separate follow-up univariate ANOVAs showed the significant effect of age on the number of C-units, $F(3, 100) = 3.52$, $p < .05$, $\omega = .09$, partial $\eta^2 = .10$, observed power = .77. Planned repeated contrasts revealed that the number of C-units of 4-year-old participants [$M = 35.24$; $SD = 12.55$] did not differ from that of 5-year-old participants [$M = 39.73$; $SD = 11.59$]. Five-year-old participants had significantly less C-units than 7- and 8-year-old participants [$M = 48.06$; $SD = 17.99$] whereas the latter had significantly more C-units than 10- and 11-year-old participants [$M = 41.72$; $SD = 11.60$].

[5] SPSS calculates four multivariate tests for MANOVA. They differ in terms of test power and robustness. Thus, when I reported the results of MANOVA, I reported two of these tests, namely Pillai's trace (V) and Roy's largest root (Θ).

On the total number of words, there was a significant effect of age, $F(3, 100) = 3.77$, $p < .05$, $\omega = .10$, partial $\eta^2 = .10$, observed power = .80. Repeated contrasts showed that the total number of words in the narratives of 5-year-old participants [$M = 157.59$; $SD = 40.22$] was lower than that of 7- and 8-year-olds [$M = 202.67$; $SD = 86.91$]. Other comparisons between age groups were not significant.

The effect of age was also significant on the mean length of C-units, $F(3, 100) = 5.55$, $p < .01$, $\omega = .05$, partial $\eta^2 = .14$, observed power = .93. The mean length of C-units in the narratives of 7- and 8-year-old participants [$M = 4.18$; $SD = 0.55$] was lower than that of 10- and 11-year-old participants [$M = 4.67$; $SD = 0.68$]. Other age comparisons were not significant.

The total duration of the narratives, the total duration of the C-units and the mean duration of a C-unit were included as parameters of narrative fluency. Figure 6 displays the total duration of narratives in each age group, differentiated for duration of clauses (light portion of bar) and duration of external content (dark portion of bar). Figure 7 shows the mean duration of a C-unit by age.

A MANOVA with age as the independent variable and duration of the narrative, total duration of C-units, and mean duration of C-units as the dependent variables indicated that age had a significant effect, $V = 0.62$, $F(9, 300) = 8.72$, $p < .001$, partial $\eta^2 = .21$, observed power = 1.00; $\Theta = 0.99$, $F(3, 100) = 32.85$, $p < .001$, partial $\eta^2 = .50$, observed power = 1.00 . Separate follow-up univariate ANOVAs showed a significant effect of age on the duration of the narrative, $F(3, 100) = 3.16$, $p < .05$, $\omega = .13$, partial $\eta^2 = .09$, observed power = .72. Planned repeated contrasts revealed that the narratives of 7- and 8-year-old participants [$M = 178.14$; $SD = 75.73$] were significantly longer than those of 10- and 11-year-old participants [$M = 130.47$; $SD = 43.31$]. Other contrasts were not significant.

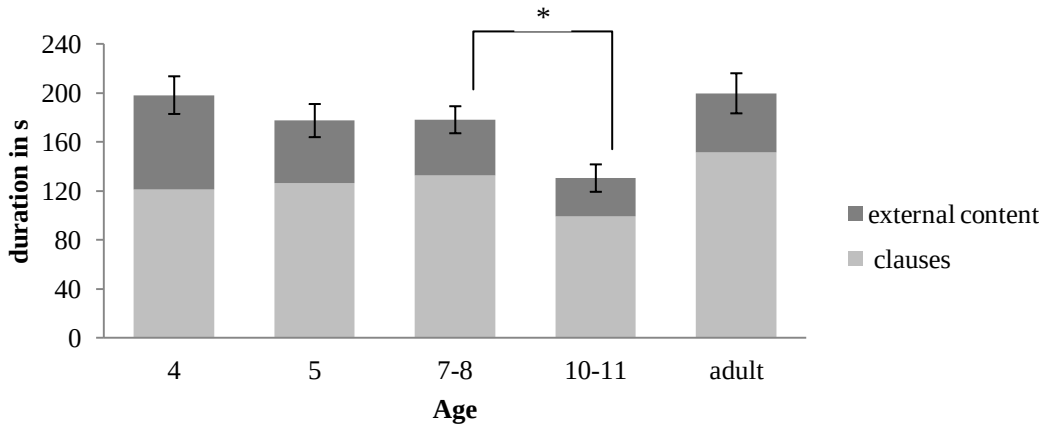

Figure 6. Duration of the narratives, differentiated for duration of C-units and content external to the narrative (e.g. interruptions, conversation with the experimenter, silence etc.) by age. Error bars represent standard errors for the total duration, the asterisk is used to show significant results.

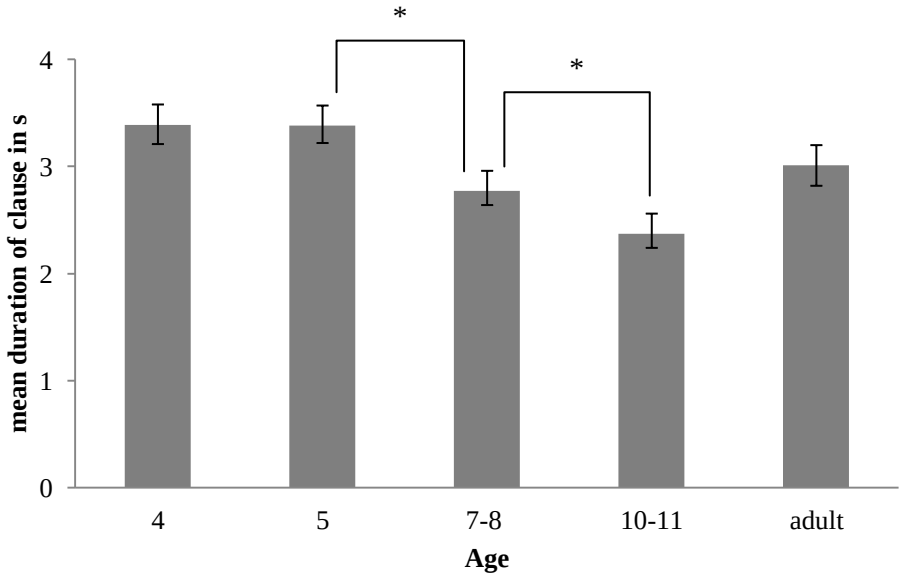

Figure 7. Mean duration of a C-unit in the narratives by age. Error bars represent standard errors, the asterisk is used to show significant results.

On the total duration of the clauses, age had a significant effect, $F(3, 100) = 6.28$, $p < .01$, $\omega = .09$, partial $\eta^2 = .16$, observed power = .96. The total clause duration in narratives of 7- and 8-year-old participants [$M = 132.47$; $SD = 56.23$] was longer than that of 10- and 11-year-old participants [$M = 99.27$; $SD = 35.58$]. Other comparisons between age groups were not significant. Age had also a significant effect on the mean duration of a C-unit, $F(3, 100) = 11.73$, $p < .001$, $\omega = .15$, partial $\eta^2 = .26$, observed power = 1.00. As shown in Figure 7, planned repeated contrasts indicated that the C-units of 5-year-old participants [$M = 3.38$; $SD = 1.15$] were significantly longer than that of 7- and 8-year-old participants [$M = 2.77$; $SD = 0.53$] which were significantly longer than that of 10- and 11-year-old participants [$M = 2.37$; $SD = 0.34$]. The mean duration of a C-unit in narratives of 4-year-old [$M = 3.40$; $SD = 0.89$] participants and that of 5-year-old participants did not differ from each other.

4.5. Levels of Complexity

To analyze plot complexity of the narratives, the ratio of the participants' total plot complexity score to the maximum possible total score was computed. For the analysis of the evaluative complexity, the percentage of clauses with at least one evaluative device over the total number of clauses was calculated. The percentage of complex clauses which included at least one subordinate clause embedded in it over

the total number of C-units in the narrative was computed for the analysis of syntactic complexity.

A 4 (age groups) X 2 (gender) MANOVA with age and gender as the between-subject independent variables and plot complexity, evaluative complexity and syntactic complexity scores as the dependent variables was conducted. There was a significant effect of age on the levels of complexity, $V = 0.51$, F (9, 288) = 6.61, $p < .001$ partial $\eta^2 = .17$, observed power = 1.00; $\Theta = 0.84$, $F(3, 96) = 26.71$, $p < .001$ partial $\eta^2 = .46$, observed power = 1.00 . The effect of gender was also significant, $V = .12$, $F(3, 94) = 4.15$, $p < .01$, partial $\eta^2 = .12$, observed power = .84; $\Theta = 0.13$, $F(3, 94) = 4.15$, $p < .001$, partial $\eta^2 = .12$, observed power = .84. There was a significant interaction effect between age and gender, $V = .18$, $F(9, 288) = 2.09$, $p < .05$, partial $\eta^2 = .06$, observed power = .87; $\Theta = 0.1$, $F(3, 96) = 3.40$, $p < .05$ partial $\eta^2 = .10$, observed power = .75.

Separate two-way ANOVAs on the dependent variables followed the MANOVA.

4.5.1. Plot complexity

Following the MANOVA reported in section 4.5, a separate 4 (age groups) X 2 (gender) two-way ANOVA with age and gender as the between-subject independent variables and the plot complexity score as the dependent variable was conducted. The effect of age was significant, $F(3, 96) = 22.07$, $p < .001$, $r = .11$, partial $\eta^2 = .41$, observed power = 1.00. As shown in Figure 8, planned repeated contrasts demonstrated that 4-year-old participants' plot complexity score [$M = .46$; $SE = .03$] was lower than that of 5-year-old participants [$M = 0.61$; $SE = 0.03$]. Similarly, 5-year-old participants' plot complexity score was lower than that of 7- and 8-year-old participants [$M = 0.75$; $SE = 0.02$]. Plot complexity scores of 7- and 8-year-old and 10- and 11-year-old [$M = 0.75$; $SE = 0.02$] participants did not differ from each other.

The effect of gender was significant on plot complexity, $F(1, 96) = 11.21$, $p < .01$, $r = .02$, partial $\eta^2 = .11$, observed power = .91. Female participants [$M = 0.69$; $SD = 0.02$] had higher plot complexity scores than male participants [$M = 0.59$; $SD = 0.02$]. The interaction effect between age and gender was not significant, $F(3, 96) = 1.77$, $p > .05$.

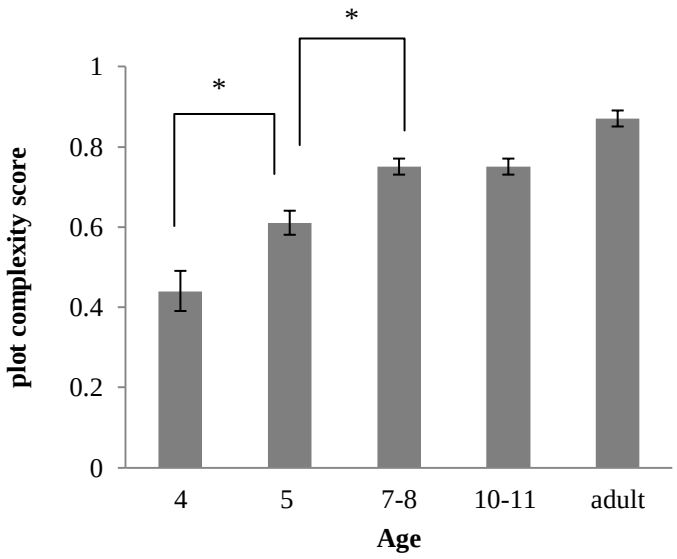

Figure 8. Mean plot complexity scores by age. Error bars represent standard errors, the asterisk is used to show significant results.

To analyze plot complexity in more detail, the effect of age and gender on the four plot components were examined. A 4 (age) X 2 (gender) X 4 (plot component) mixed design ANOVA with age and gender as the between-subjects factors and plot component as the within-subjects factor was run. Results indicated a significant effect of plot component, $F(1.98, 190.36) = 18.42$, $p < .001$, partial $\eta^2 = .16$, observed power = 1.00.

Within-subjects contrasts showed that the participants' score in plot unfolding [$M = 0.78$; $SD = 0.23$] was higher than their score in plot onset [$M = 0.67$; $SD = 0.19$] and resolution [$M = 0.63$; $SD = 0.49$], $F(1, 96) = 26.21$, $p < .001$, $r = .46$, partial $\eta^2 = .21$, observed power = 1.00 and $F(1, 96) = 9.12$, $p < .01$, $r = .31$, partial $\eta^2 = .09$, observed power = .85 respectively. The scores in the resolution was higher than the score in the search theme [$M = 0.51$; $SE = 0.32$], $F(1, 96) = 8.82$, $p < .01$, $r = .29$, partial $\eta^2 = .08$, observed power = .84. The effect of age and the effect of gender were significant, $F(3, 96) = 14.94$, $p < .001$, partial $\eta^2 = .32$, observed power = 1.00 and $F(1, 96) = 8.14$, $p < .01$, partial $\eta^2 = .08$, observed power = .81 respectively. The interaction effect between age and gender was significant, $F(3, 96) = 3.65$, $p < .05$, partial $\eta^2 = .10$, observed power = .78. The effects of the interaction between age and plot component and the interaction between gender and plot component were not

significant, $F(5.95, 190.36) = 1.56$, $p > .05$ and $F(1.98, 190.36) = 0.75$, $p > .05$, respectively.

The three-way interaction between plot component, age and gender had a significant effect, $F(5.95, 190.36) = 3.37$, $p < .01$, partial $\eta^2 = .10$, observed power = .93. To analyze this effect in more detail, separate 4 (age) X 2 (gender) two-way ANOVAs were computed for each plot component.

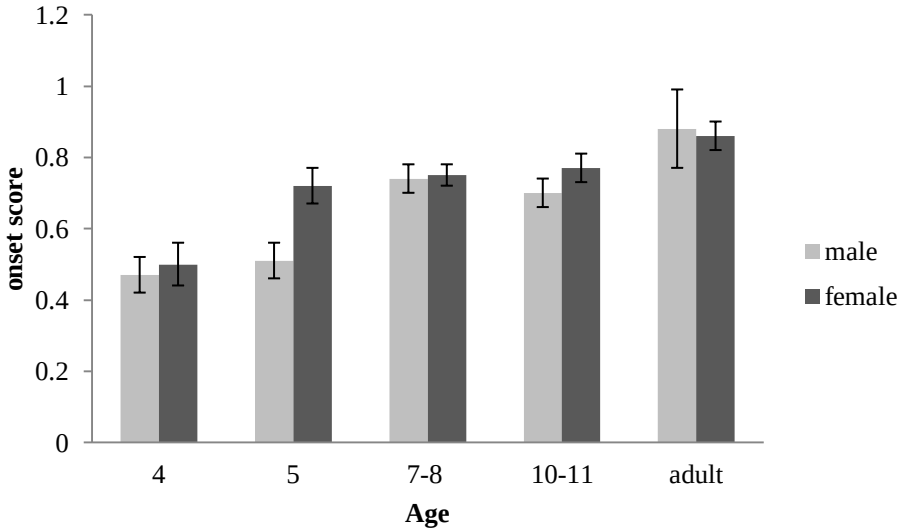

Figure 9. Mean plot onset scores by age and gender. Error bars represent standard errors.

On the plot onset score shown in Figure 9, the effect of age was significant, $F(3, 96) = 12.80$, $p < .001$, partial $\eta^2 = .29$, observed power = 1.00. Repeated contrasts showed that 4-year-old participants [$M = 0.48$; $SD = 0.21$] had lower plot onset scores than 5-year-old participants [$M = 0.61$; $SD = 0.19$]. The plot onset score of 5-year-old participants was lower than that of 7-and 8-year-old participants [$M = 0.75$; $SD = 0.13$] which was not different from the onset score of 10-and 11-year-old participants [$M = 0.73$; $SD = 0.13$]. The effect of gender was significant, $F(1, 96) = 5.89$, $p < .05$ partial $\eta^2 = .06$, observed power = .47. The plot onset score of female participants [$M = 0.72$; $SD = 0.16$] was higher than that of male participants [$M = .62$; $SD = 0.20$]. The interaction effect between age and gender was not significant, $F(3, 96) = 1.85$, $p > .05$.

On the plot unfolding score, there was a significant effect of age, $F(3, 96) = 9.58$, $p < .001$, partial $\eta^2 = .23$, observed power = 1.00. Repeated contrasts showed that the unfolding score of 4-year-old participants [$M = 0.53$; $SD = 0.23$] was lower than that of 5-year-old participants [$M = 0.75$; $SD = 0.19$]. The unfolding score of 5-year-old participants was lower than that of 7- and 8-year-old participants [$M = 0.86$;

SD = 0.17]. The unfolding score of 7- and 8-year-old participants did not differ from 10- and 11-year-old participants' score [*M* = 0.84; *SD* = 0.21].

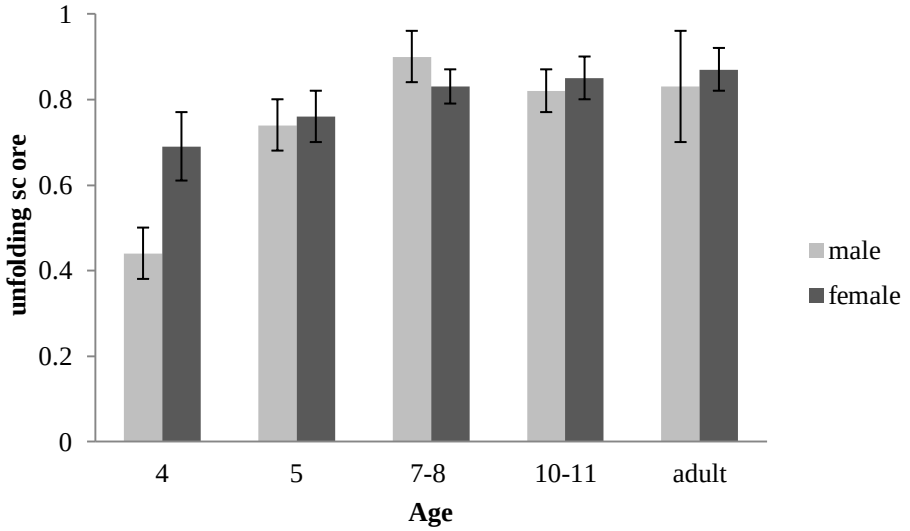

Figure 10. Mean plot unfolding scores by age and gender. Error bars represent standard errors.

The effect of gender and the interaction effect between age and gender were not significant, $F(1, 96) = 2.08$, $p > .05$ and $F(3, 96) = 2.45$, $p > .05$. Figure 10 shows the mean unfolding scores by age.

On the resolution score, the effect of age was significant, $F(3, 96) = 3.51$, $p < .05$, partial $\eta^2 = .10$, observed power = .77. Repeated contrasts revealed only that 4-year-old participants' resolution score [*M* = 0.29; *SD* = 0.47] was significantly lower than the score of 5-year-old participants [*M* = 0.64; *SD* = 0.49]. The scores of other age groups did not differ from each other. The effect of gender was not significant, $F(1, 96) = 1.31$, $p > .05$. The interaction between age and gender was significant, $F(3, 96) = 4.62$, $p < .01$, partial $\eta^2 = .13$observed power = .88. To analyze this interaction in more detail, separate independent samples *t*-tests with gender as the independent variable were conducted for each age group. As shown in Figure 11, results demonstrated that among 5-year-old participants females [*M* = 0.91; *SD* = 0.30] had significantly higher score than males [*M* = 0.36; *SD* = 0.50], $t(16.34) = -3.08$, $p < .01$, $r = .61$. Gender differences in other age groups were not found to be significant $t(15) = -1.37$, $p > .0125$ for 4-year-olds; $t(30.88) = -1.86$, $p > .0125$ for 7- and 8-year-olds; and $t(30) = 1.10$, $p > .0125$ for 10- and 11-year-olds.

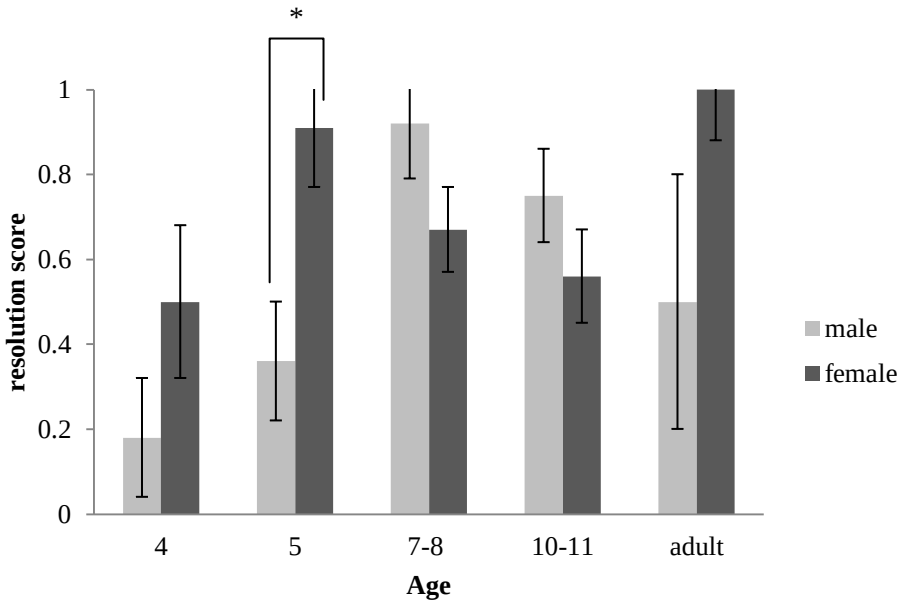

Figure 11. Mean plot resolution scores by age and gender. Error bars represent standard errors, the asterisk is used to show significant results

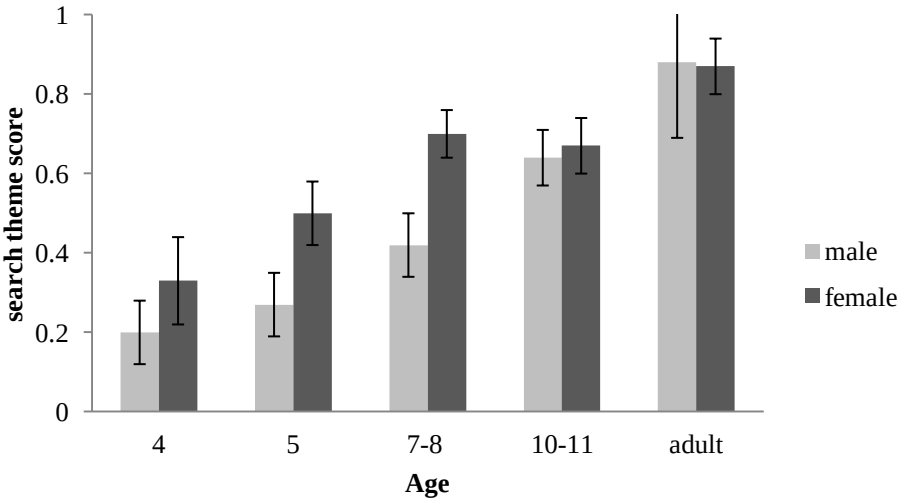

Figure 12. Mean search theme scores by age and gender. Error bars represent standard errors.

On the search theme score displayed in Figure 12, the effect of age and the effect of gender were significant, $F(3, 96) = 9.37$, $p < .001$, partial $\eta^2 = .23$, observed power = 1.0 and $F(1, 96) = 9.17$, $p < .01$, partial $\eta^2 = .09$, observed power = .85 respectively. Repeated contrasts showed that the search theme score of 5-year-old participants [$M = 0.39$; $SD = 0.29$] was significantly lower than that of 7- and 8-year-old participants [$M = 0.60$; $SD = 0.29$]. Other age comparisons were not significant. In addition, simple contrast indicated that female participants [$M = 0.61$; $SD = 0.30$] had significantly higher scores than male participants [$M = 0.41$; $SD = 0.30$]. The interaction effect between age and gender was not significant, $F(3, 96) = 1.32$, $p > .05$.

4.5.2. Evaluative Complexity

Following the MANOVA reported in section 4.5, a separate 4 (age groups) X 2 (gender) two-way ANOVA with age and gender as the between-subject independent variables and the evaluative complexity score as the dependent variable was conducted. As Figure 13 shows, there was no effect of age, $F(3, 96) = 1.06$, $p > .05$. The effect of gender was not significant either, $F(1, 96) = 2.09$, $p > .05$. The interaction effect between age and gender was significant, $F(3, 96) = 3.08$, $p < .05$, $\omega = 10$, partial $\eta^2 = .09$, observed power = .70, as shown in Figure 14.

Applying Bonferroni correction, follow-up separate independent samples *t*-tests for each age group revealed no gender differences in all age groups, $t(15) = -1.95$, $p > .0125$ for 4-year-olds; $t(20) = -1.29$, $p > .0125$ for 5-year-olds; $t(31) = -0.02$, $p > .0125$ for 7- and 8-year-olds; $t(30) = -0.80$, $p > .0125$ for 10- and 11-year-olds.

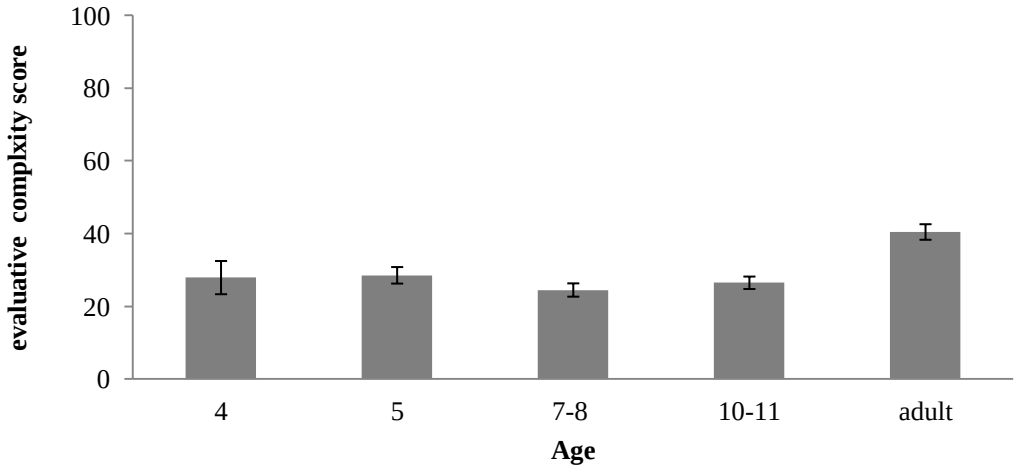

Figure 13. Mean evaluative complexity scores by age. Error bars represent standard errors.

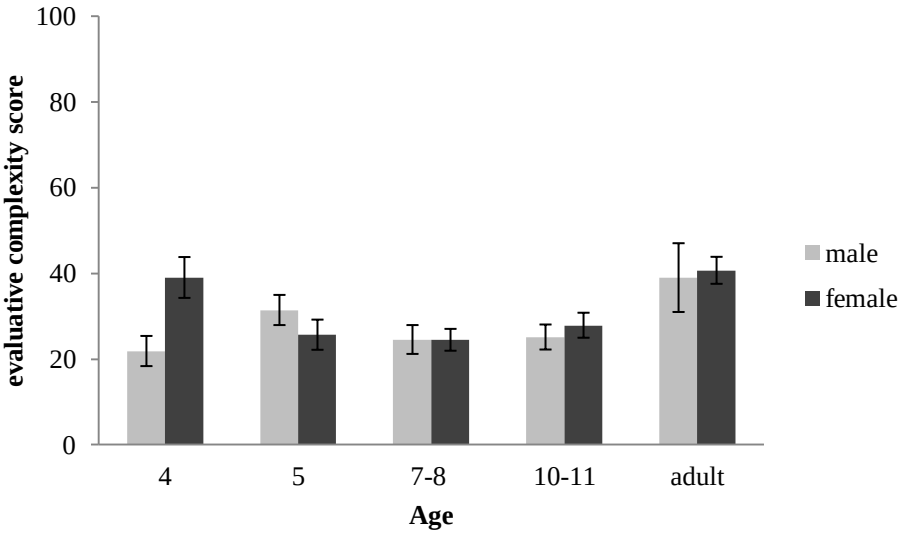

Figure 14. Mean evaluative complexity scores by age and gender. Error bars represent standard errors.

Due to the fact that one clause can include more than one evaluative device, first the total number of evaluative devices was computed to analyze the level of evaluative complexity in more detail.

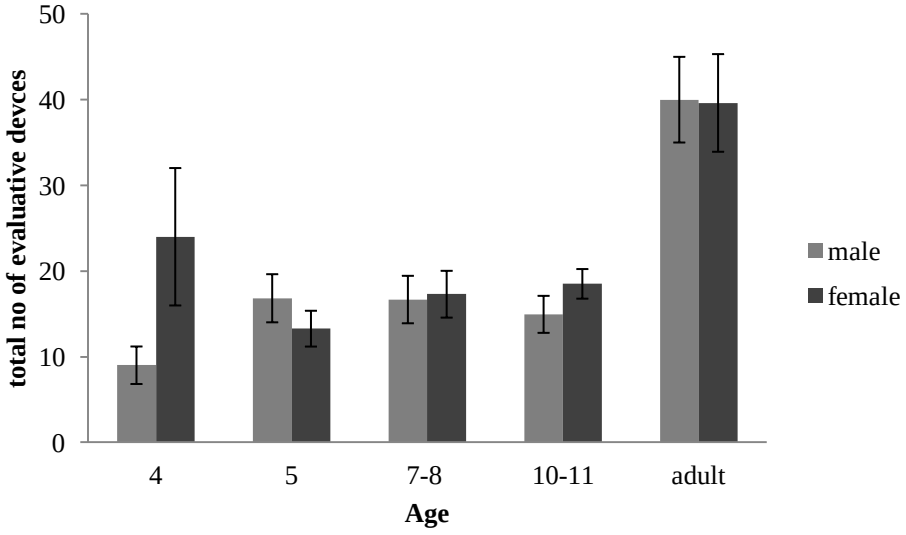

Figure 15. Mean of the total number of evaluative devices by age and gender. Error bars represent standard errors.

Figure 15 displays the total number of evaluative devices by age and gender. A 4 (age) X 2 (gender) two-way ANOVA with age and gender as the independent variables and the total number of evaluative devices as the dependent variable indicated that the effect of age and the effect of gender were not significant, $F(3, 96) = 0.18$, $p > .05$ and $F(1, 96) = 3.45$, $p > .05$, respectively. The interaction effect between age and gender was marginally significant, $F(3, 96) = 2.75$, $p = .05$, $r = .12$, partial $\eta^2 = .08$, observed power = .65. Applying Bonferroni correction, separate independent-samples *t*-tests for each age group with gender as the independent variable and the total number of evaluative devices as the dependent variable showed no effect of gender in all age groups, $t(5.75) = -1{,}80$, $p > .0125$ for 4-year-old participants; $t(20) = 1.01$, $p > .0125$ for 5-year-old participants; $t(31) = -0.15$, $p > .0125$ for 7- and 8-year-old participants and $t(30) = -1.29$, $p > .0125$ for 10- and 11-year-old participants.

The distribution of clauses with different numbers of evaluative devices was also examined. A 4 (age) X 2 (gender) MANOVA with age and gender as the independent variables and the percentage of clauses with one evaluative device over the total number of clauses with at least one evaluative device, the percentage of clauses with two evaluative devices over the total number of clauses with at least one evaluative device and the percentage of clauses with more than two evaluative devices over the total number of clauses with at least one evaluative device as the dependent variables showed that age had a significant effect, $V = 0.14$, $F(9, 288) = 1.56$, $p > .05$; $\Theta = 0.11$, $F(3, 96) = 3.36$, $p < .05$ partial $\eta^2 = .10$, observed power = .75 .The effect of gender was significant, $V = 0.09$, $F(3, 94) = 3.11$, $p < .05$, partial $\eta^2 = .09$, observed power = .71; $\Theta = 0.10$, $F(3, 96) = 3.11$, $p < .05$, partial $\eta^2 = .10$, observed power = .71. The interaction effect between age and gender was significant, $V = 0.13$, $F(9, 288) = 1.40$, $p > .05$; $\Theta = 0.12$, $F(3, 96) = 3.71$, $p < .05$, partial $\eta^2 = .10$, observed power = .80.

Separate univariate ANOVAs on the outcome variables indicated a marginally significant age effect on the percentage of clauses with one evaluative device, $F(3, 96) = 2.61$, $p = .056$, $\omega = .05$, partial $\eta^2 = .08$, observed power = .62. As shown in Figure 16, repeated contrasts revealed that 4-year-old participants [$M = 94.47$; $SD = 30.24$] formed more clauses with one evaluative device than 5-year-old participants [$M = 80.73$; $SD = 15.48$]. Other comparisons were not significant. The effect of gender and the interaction effect between age and gender were not significant, $F(1, 96) = 0.95$, $p > .05$ and $F(3, 96) = 0.24$, $p > .05$. On the percentage of clauses with two evaluative devices, the effect of age and the effect of gender were not significant, $F(3, 96) = 0.42$, $p > .05$ and $F(1, 96) = 2.23$, $p > .05$, respectively. The interaction effect between age and gender was not significant either, $F(3, 96) = 1.31$, $p > .05$. On the percentage of clauses with more than two evaluative devices, the effect of age and the effect of gender were not significant, $F(3, 96) = 1.38$, $p > .05$ and $F(1, 96) = 0.44$, $p > .05$, respectively. The interaction effect between age and gender was not significant either, $F(3, 96) = 0.73$, $p > .05$.

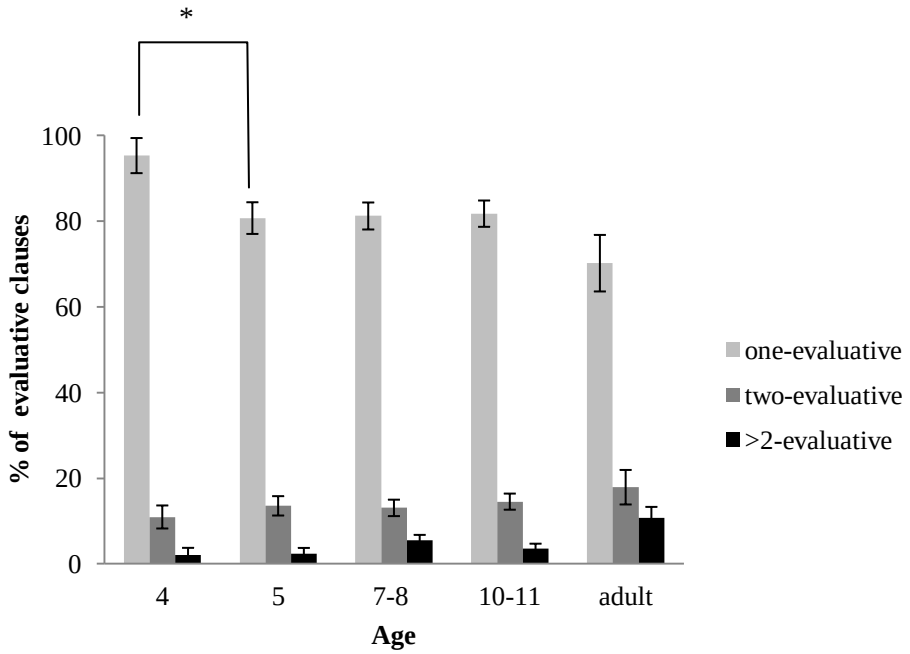

Figure 16. Distribution of the percentage of the number of clauses with one, two, and more than two evaluative devices to the total number of clauses with at least one evaluative device according to age. Error bars represent standard errors, the asterisk is used to show significant results.

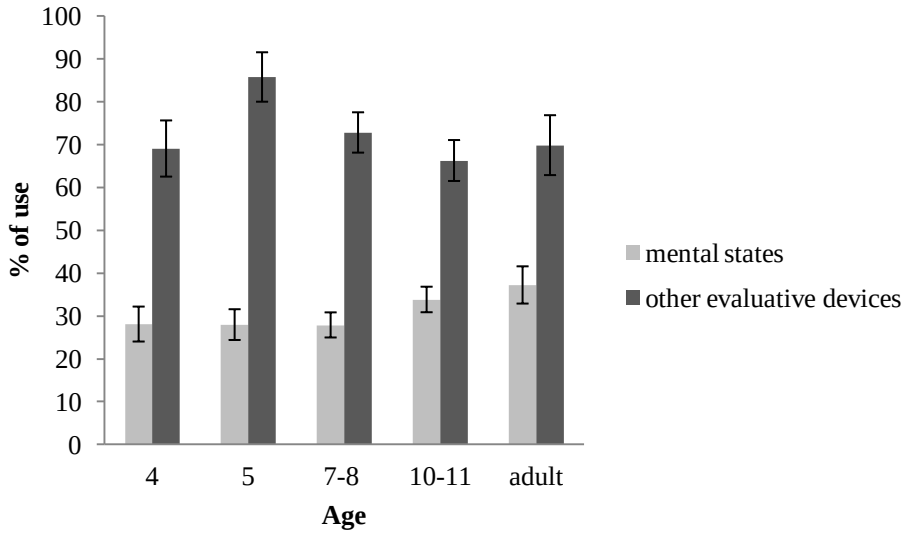

Figure 17. Mean percentage of the number of mental state terms and other evaluative devices over the total number of evaluative devices by age. Error bars represent standard errors.

Next, the categories of evaluative devices were looked at in more detail. The percentages of the number of mental state terms and the percentages of the number of other evaluative devices over the total number of evaluative devices are shown in Figure 17. A MANOVA with age as the independent variable and the percentage of mental state terms and the percentage of other evaluative devices as the dependent variables was conducted. Results demonstrated a non-significant age effect, $V = .09$, $F(6, 200) = 1{,}48$, $p > .05$; $\Theta = 0.08$, $F(3, 100) = 2.54$, $p > .05$. Separate one-way ANOVAs for each dependent variable confirmed the non-significant effect of age, $F(3, 100) = 0.82$, $p > .05$ for mental states and $F(3, 100) = 2.41$, $p > .05$ for other evaluative devices.

To analyze the use of different evaluative devices referring to mental states of the narrative characters, a 4 (age) X 4 (category of mental state term) mixed-design ANOVA with age as the between-subjects independent factor and the category of mental state term as the within-subjects factor was conducted.

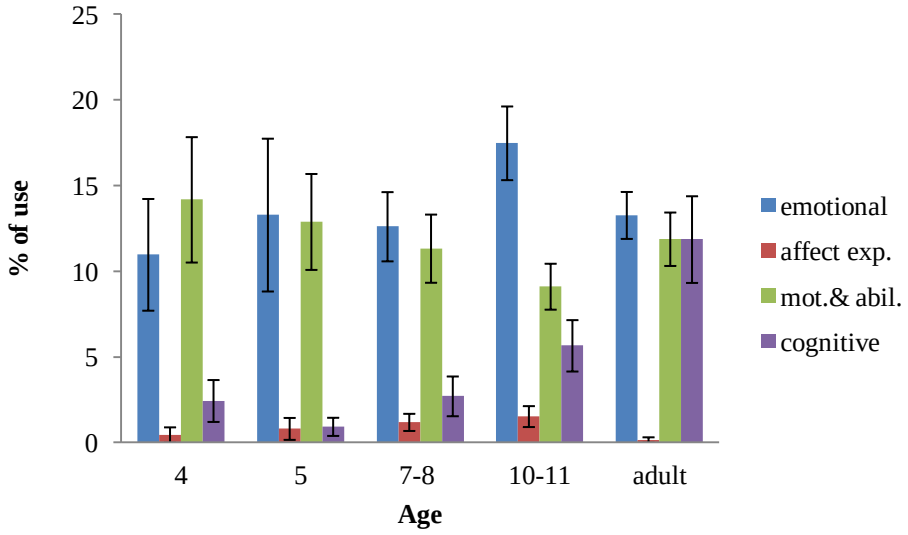

Figure 18. Mean percentage of the number of each emotional state term over the total number of evaluative devices. Error bars represent standard errors.

Figure 18 displays the mean percentages by age. Results showed that the effect of age was not significant, $F(3, 100) = 0.82$, $p > .05$. The effect of the category of mental state term was significant, $F(1.93, 192.58) = 36.61$, $p < .001$, partial $\eta^2 = .27$, observed power = 1.00. Pairwise comparisons indicated that the percentage of emotional terms [$M = 13.99$; $SD = 14.47$] and the percentage of motivation and ability [$M = 11.44$; $SD = 11.47$] were not different from each other, and higher than the percentage of affect expression [$M = 1.09$; $SD = 2.95$] and the percentage of cognition [$M = 3.19$; $SD = 6.62$] which also did not differ from each

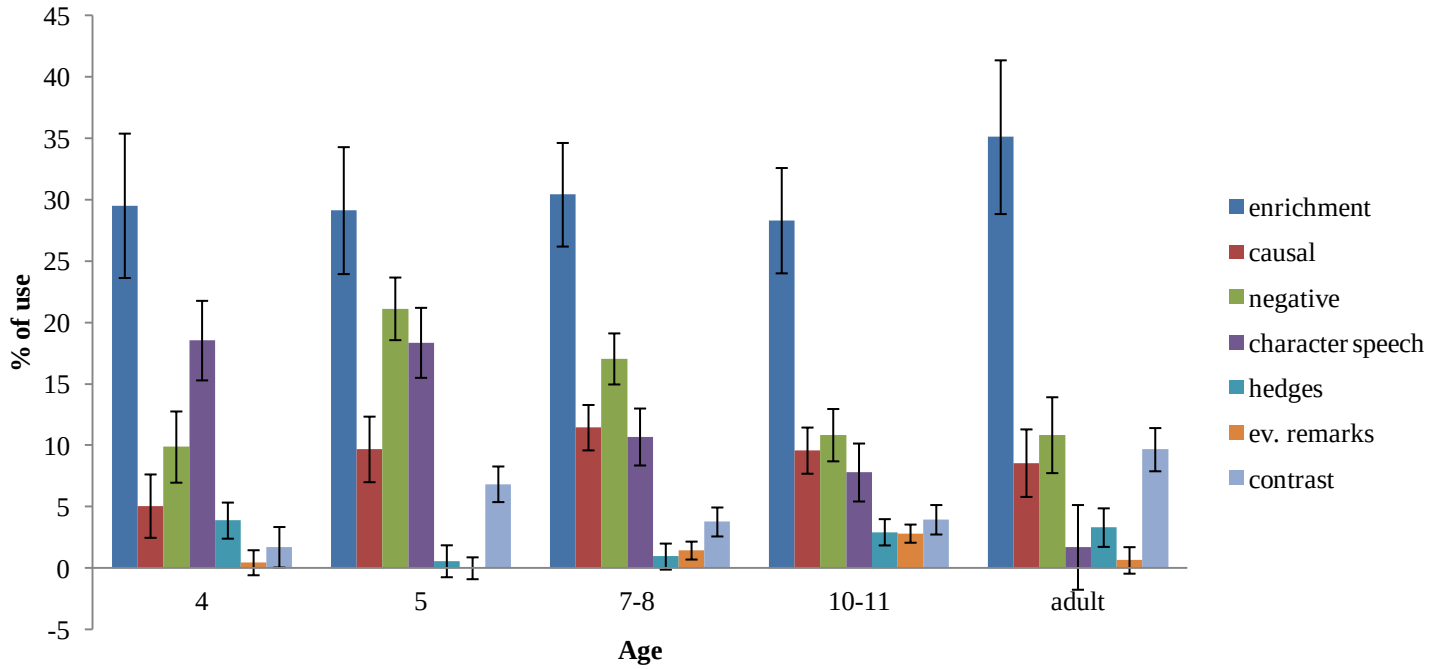

Figure 19. Mean percentage of the number of each type of evaluative device over the total number of evaluative devices. Error bars represent standard errors.

other. The interaction effect between age and type of emotional state term was not significant, $F(5.77, 192.58) = 1.18$, $p > .05$.

To analyze the use of evaluative devices other than mental state categories, a 4 (age) X 7 (category of evaluative device) mixed design ANOVA with age as the between-subjects factor and the category of evaluative device as the within-subjects factor was conducted. Figure 19 displays the mean percentages by age. The effect of age was not significant, $F(3, 100) = 2.41$, $p > .05$. The effect of the type of evaluative device was significant, $F(2.73, 273.30) = 51.59$, $p < .001$, partial $\eta^2 = .34$, observed power = 1.00. Pairwise comparisons indicated that enrichments ($M = 29.35$, $SD = 2.50$) were used more than any other evaluative device. Moreover, the use of causal expression [$M = 8.94$; $SD = 1.12$], negative qualifiers [M = 13.97; SD = 1.29] and character speech [$M = 13.85$; $SD = 1.45$] did not differ from each other, but was significantly higher than the use of hedges [$M = 2.08$; $SD = 0.64$], evaluative remarks [$M = 1.78$; $SD = 0.45$] and contrastive expression [$M = 4.07$, $SD = 0$ .67] which did not differ from each other. The interaction effect between age and type of evaluative device was not significant, $F(8.20, 273.30) = 1.31$, $p > .05$.

4.5.3. Syntactic Complexity

Results revealed no significant effect of age and no significant effect of gender on syntactic complexity score calculated as the percentage of the number of C-units with at least one subordinate clause to the total number of C-units, $F(3, 96) = 2.01$, $p > .05$ and $F(1, 96) = 2.47$, $p > .05$ respectively. The interaction effect between age and gender was not significant either, $F(3, 96) = 2.32$, $p > .05$. Figure 20 displays the syntactic complexity scores by age.

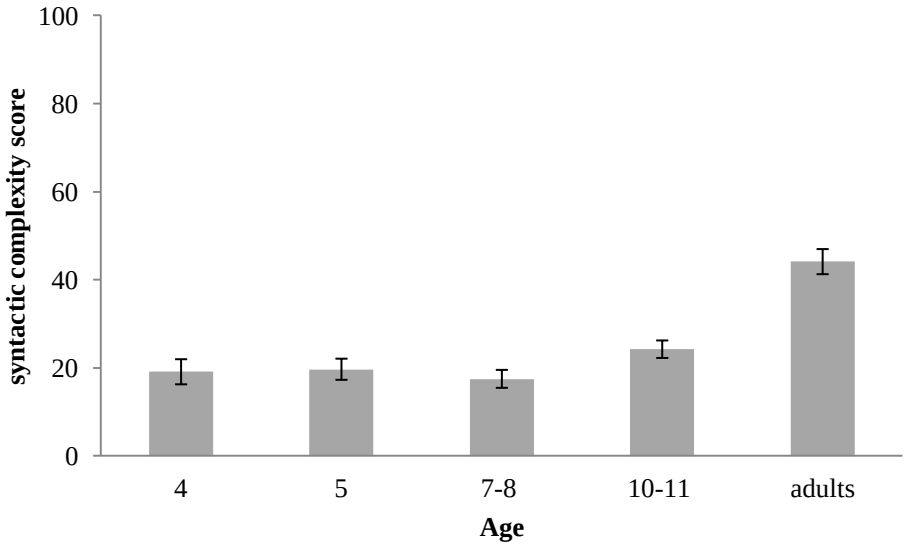

Figure 20. Mean syntactic complexity scores by age. Error bars represent standard errors.

Due to the fact that one complex clause can include more than one subordinate clause with different functions, alternative measures were calculated. First, the number of total subordinate clauses embedded in complex clauses was calculated to analyze the level of syntactic complexity in more detail. Figure 21 displays the total number of subordinate clauses in narratives in each age group.
The results of a univariate ANOVA with age as the independent variable and the total number of embedded clauses as the dependent variable showed that age had a significant effect, $F(3, 100) = 2.81$, $p < .05$, $\omega = .22$. Planned Helmert contrasts revealed that 4-year-old participants [$M = 7.12$; $SD = 7.03$] constructed fewer subordinate clauses than older participants, $t(100) = 1.81$, $p < .05$ (1-tailed), $r = .18$. Moreover, 7- and 8-year-old participants [$M = 9.24$; $SD = 5.73$] used fewer subordinate clauses than 10- and 11-year-old participants [$M = 12.06$; $SD = 6.15$], $t(100) = 1.86$, $p < .05$ (1-tailed), $r = .18$.

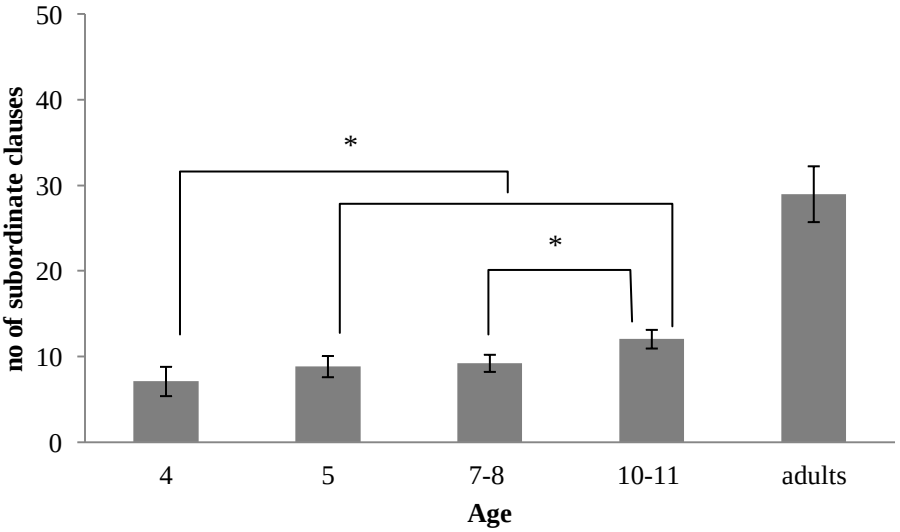

Figure 21. Mean number of subordinate clauses in each age group. Error bars represent standard errors, the asterisk is used to show significant results.

The distribution of complex clauses with different numbers of embedded subordinate clauses was also examined. A MANOVA with age as the independent variable and the percentage of syntactically complex C-units with one-embedded subordinate clause, the percentage of syntactically complex C-units with two-embedded subordinate clauses and the percentage of syntactically complex C-units with more than two embedded subordinate clauses over the total number of syntactically complex C-units as the dependent variables revealed a significant effect of age, $V = .08$, $F(6, 192) = 1.41$, $p > .05$; $\Theta = .08$, $F(3, 96) = 2.80$, $p < .05$, partial

η^2 = .08, observed power = .66. Separate univariate ANOVAs on the dependent variables demonstrated a marginally significant effect of age on the percentage of the C-units with one embedded clause, $F(3, 96) = 2.69$, $p = .05$, partial $\eta^2 = .08$, observed power = .64. The effect of age on the percentage of C-units with two-embedded clauses and the percentage of C-units with more than two-embedded clauses was not significant, $F(3, 96) = 2.00$, $p > .05$ and $F(3, 96) = 1.22$, $p > .05$, respectively. Repeated contrasts revealed that 10- and 11-year-old participants [$M = 85.89$; $SD = 10.42$] used significantly less complex C-units with one-embedded clause than 7-and 8-year-old participants [$M = 92.03$; $SD = 10.33$]. As shown in Figure 22, although not statistically significant, they used more C-units with two-embedded clauses [$M = 11.80$; $SD = 8.23$] compared to 7- and 8-year olds [$M = 6.84$; $SD = 10.01$].

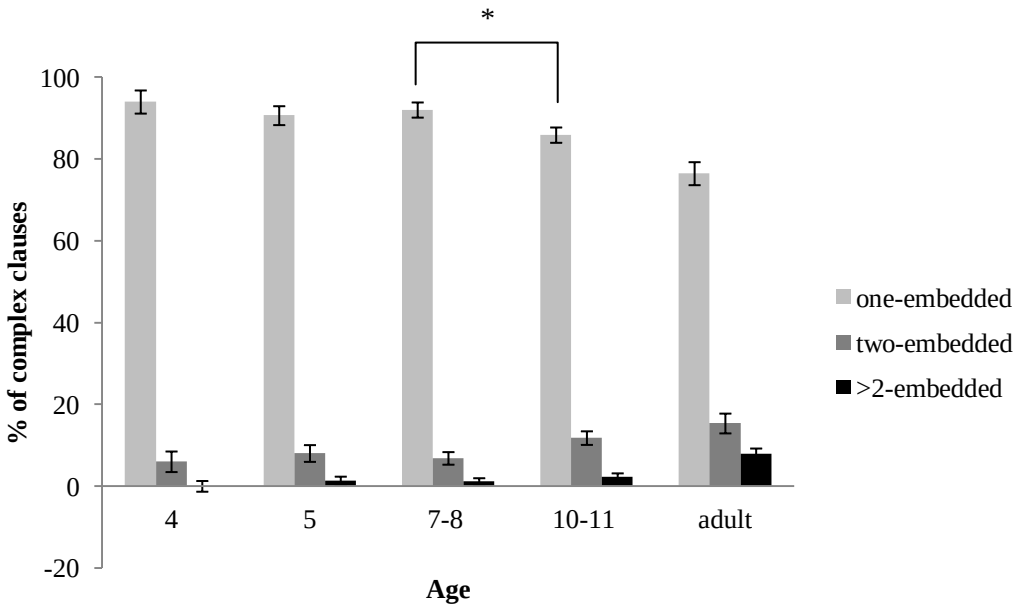

Figure 22. Distribution of the percentage of the number of complex C-units with one, two, and more than two embedded subordinate clauses to the total number of complex clauses according to age. Error bars represent standard errors, the asterisk is used to show significant results.

For a further analysis, complex clauses were also analyzed according to the type of the subordinate clauses. The percentage of noun clauses, adverbial clauses and relative clauses embedded in the complex clauses over the total number of subordinate clauses is shown in Figure 23. A 4 (age) X 3 (type of clause) mixed design ANOVA with age as the between-subjects factor and type of clause as the within-subjects factor was run. Results demonstrated that age had no significant

effect, $F(3, 96) = 1.00$, $p > .05$. The type of clause had a significant effect, $F(1.11, 106.61) = 114.49$, $p < .001$, partial $\eta^2 = .54$, observed power = 1.00 The tests of within-subjects contrasts showed that participants used more noun clauses [$M = 49.87$; $SD = 24.48$] than adverbial clauses [$M = 46.94$; $SD = 24.79$], $F(1, 96) = 3.58$, $p < .05$(1-tailed), $r = .19$, partial $\eta^2 = .04$, observed power = .47, and more adverbial clauses than relative clauses [$M = 3.38$; $SD = 6.80$], $F(1, 96) = 217.902$, $p < .001$(1-tailed), $r = .83$, partial $\eta^2 = .69$, observed power = 1.00. There was also a significant interaction effect between age and type of clause, $F(3.33, 106.61) = 5.06$, $p < .01$, partial $\eta^2 = .14$, observed power = .93.

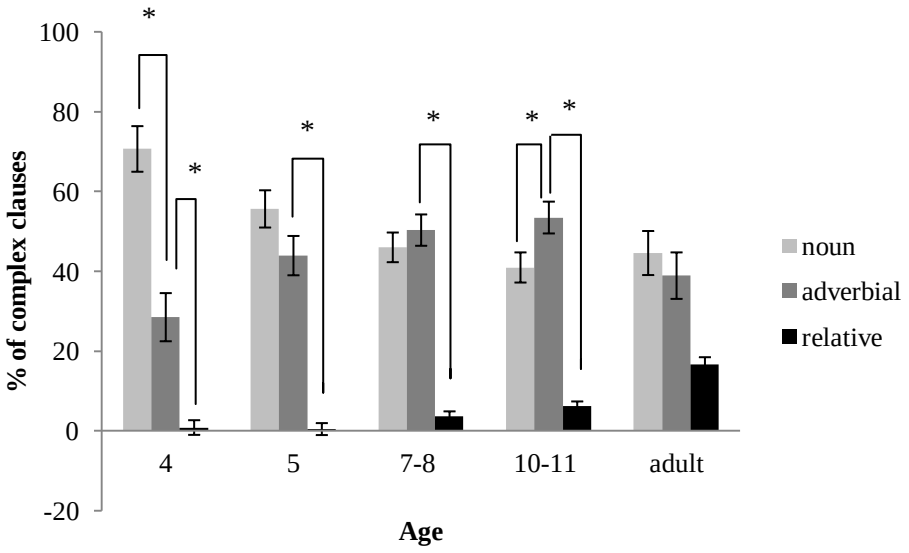

Figure 23. Distribution of subordinate clauses with different functions in the total number of subordinate clauses by age. Error bars represent standard errors, the asterisk is used to show significant results.

Follow-up repeated-measures ANOVAs were conducted for each age group. Results showed that 4-year-old participants used the three types of clauses significantly differently, $F(1.01, 13.17) = 31.64$, $p < .01$, partial $\eta^2 = .71$, observed power = 1.00. Tests of within-subjects contrasts indicated that 4-year-old participants used more noun clauses [$M = 70.68$; $SD = 23.10$] than adverbial clauses [$M = 28.49$; $SD = 23.59$], $F(1, 13) = 11.46$, $p < .01$, $r = .68$, partial $\eta^2 = .71$, observed power = 1.00, and more adverbial clauses than relative clauses [$M = 0.82$; $SD = 2.23$], $F(1, 13) = 18.19$, $p < .001$, $r = .58$, partial $\eta^2 = .88$, observed power = .98. Similarly, 5-year-old participants used the three types of clauses significantly differently, $F(1.01, 20.18) = 35221.24$, $p < .001$, partial $\eta^2 = .57$, observed power = 1.00. Tests of within-subjects contrasts indicated that 5-year-old children used more adverbial clauses [$M = 43.93$; $SD = 25.60$] than relative clauses [$M = 0.43$; $SD = 1.98$], $F(1, 20) = 60.38$, $p < .01$,

r = .87, partial η^2 = .75, observed power = 1.00. Their rate of the use of noun and adverbial clauses did not differ, $F(1, 20) = 1.10$, $p > .05$. The rate of the use of three types of clauses differed in 7- and 8-year old children, $F(1.12, 35.87) = 27.95$, $p < .001$, partial η^2 = .47, observed power =1.00 . Tests of within-subjects contrasts indicated that they used more adverbial clauses [M = 50.33; SD = 28.14] than relative clauses [M = 3.67; SD = 7.87], $F(1, 32) = 72.45$, $p < .001$, r = .83, partial η^2 = .69, observed power = 1.00. Their rate of the use of noun and adverbial clauses did not differ, $F(1, 32) = .21$, $p > .05$. Ten- and 11-year-old participants used the three types of clauses significantly differently, $F(1.32, 40.96) = 71.25$, $p < .001$, partial η^2 = .70, observed power = 1.00. They used more adverbial clauses [M = 53.48; SD = 16.50] than noun clauses [M = 40.96; SD = 14.45] and relative clauses [M = 6.14; SD = 7.88], $F(1, 31) = 5.50$, $p < .05$, r = .39, partial η^2 = .15, observed power = .62 and $F(1, 31) = 158.90$, $p < .001$, r = .84, partial η^2 = .84, observed power = 1.00 respectively.

Considering the fact that noun clauses formed with the subordinating suffix –mAk are acquired very early around the age of 2, it was thought that they might not reflect the participants' ability to form syntactically complex clauses. Therefore, to analyze syntactic complexity in the narratives in a finer manner, they were excluded from the data. The finer syntactic complexity score was calculated as the percentage of the number of C-units with at least one subordinate clause except the noun clauses constructed with -mAk to the total number of C-units. A 4 (age groups) X 2 (gender) two-way ANOVA with age and gender as the between-subject independent variables and the finer syntactic complexity score as the dependent variable was conducted. As Figure 24 shows, there was no effect of age, $F(3, 96) = 1.54$, $p > .05$. The effect of gender was not significant either, $F(1, 96) = 2.20$, $p > .05$. The interaction effect between age and gender was also not significant, $F(3, 96) = 1.30$, $p > .05$.

The total number of subordinate clauses except noun clauses constructed with –mAk was calculated. The results of a univariate ANOVA with age as the independent variable and the finer measure of the total number of embedded clauses as the dependent variable showed that age had a significant effect, $F(3, 100) = 2.95$, $p < .05$, ω = .33. As shown in Figure 25, planned Helmert contrasts did not reveal any significant difference between the age groups.

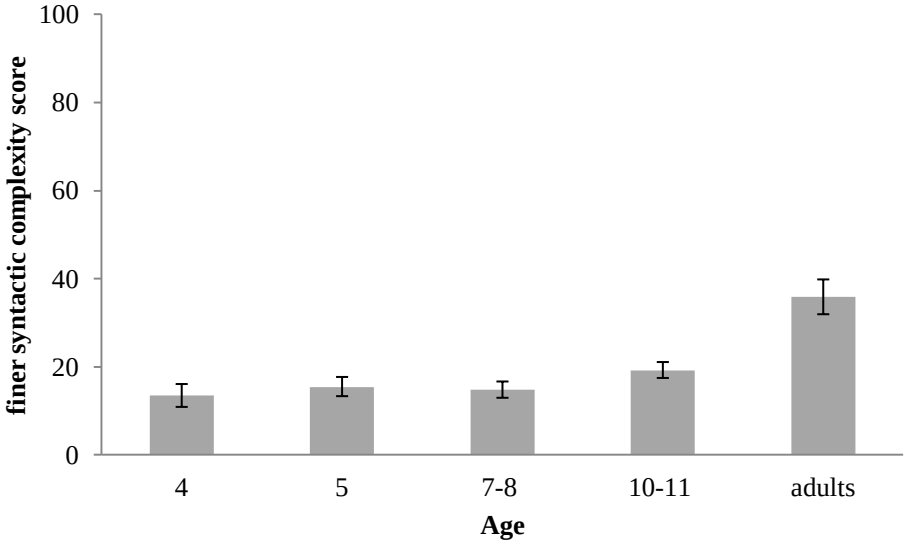

Figure 24. Mean finer syntactic complexity scores by age. Error bars represent standard errors.

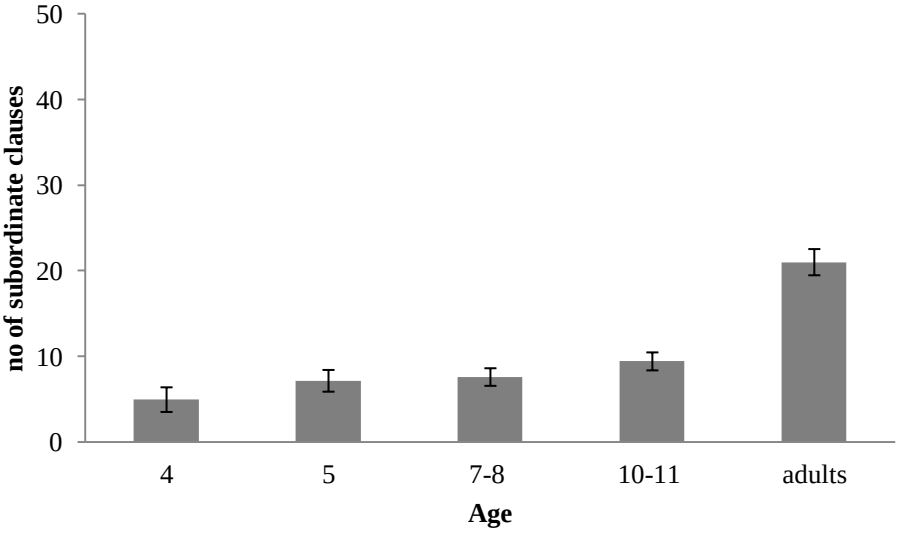

Figure 25. Mean number of subordinate clauses in each age group with a finer categorization. Error bars represent standard errors.

The distribution of complex clauses with different numbers of embedded subordinate clauses was also re-examined. A MANOVA with age as the independent variable and the percentage of syntactically complex C-units with one-embedded subordinate clause, the percentage of syntactically complex C-units with two-embedded subordinate clauses and the percentage of syntactically complex C-units

with more than two embedded subordinate clauses over the total number of syntactically complex C-units as the dependent variables showed no significant effect of age, $V = .12$, $F(9, 282) = 1.29$, $p > .05$; $\Theta = .07$, $F(3, 94) = 2.19$, $p > .05$. As shown in Figure 26, separate univariate ANOVAs on the dependent variables demonstrated no significant effect of age on the percentage of the C-units with one embedded clause, $F(3, 94) = 1.25$, $p > .05$, the percentage of C-units with two-embedded clauses, $F(3, 94) = 1.66$, $p > .05$, and the percentage of C-units with more than two-embedded clauses $F(3, 94) = 0.46$, $p > .05$.

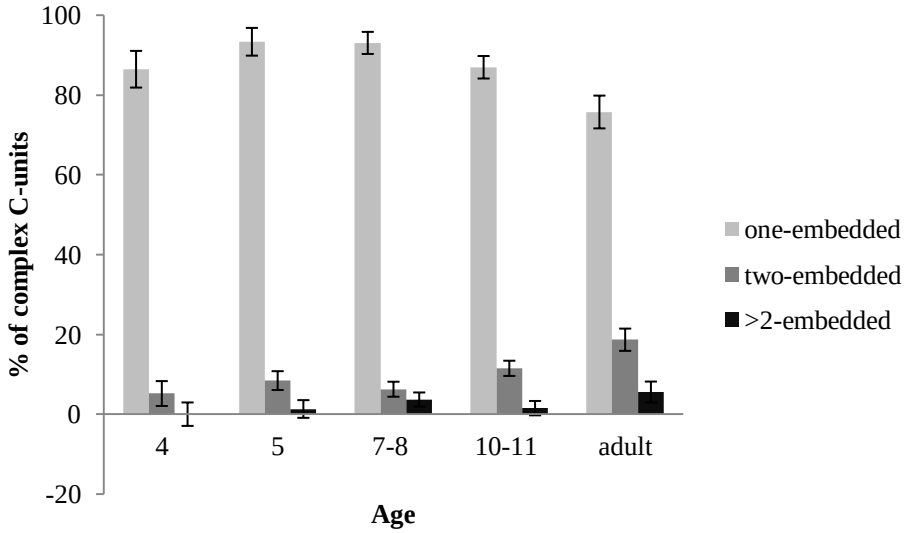

Figure 26. Distribution of the percentage of the number of complex C-units with one, two, and more than two embedded subordinate clauses to the total number of complex clauses according to age. Error bars represent standard errors.

The percentage of noun clauses, adverbial clauses and relative clauses embedded in the complex clauses over the total finer number of subordinate clauses is shown in Figure 27. A 4 (age) X 3 (type of clause) mixed design ANOVA with age as the between-subjects factor and type of clause as the within-subjects factor was run. Results demonstrated that age had no significant effect, $F(3, 92) = 0.53$, $p > .05$. The type of clause had a significant effect, $F(1.22, 112.39) = 91.66$ $p < .001$, partial $\eta^2 = .50$, observed power = 1.00. The tests of within-subjects contrasts showed that participants used more noun clauses [$M = 33.88$; $SD = 25.31$] than adverbial clauses [$M = 60.23$; $SD = 26.75$], $F(1, 92) = 11.36$, $p < .01$(1-tailed), $r = .33$, partial $\eta^2 = .11$, observed power = .92, and more adverbial clauses than relative clauses [$M = 4.51$; $SD = 9.15$], $F(1, 9\ 2) = 247.33$, $p < .001$(1-tailed), $r = .85$, partial $\eta^2 = .73$, observed power = 1.00.

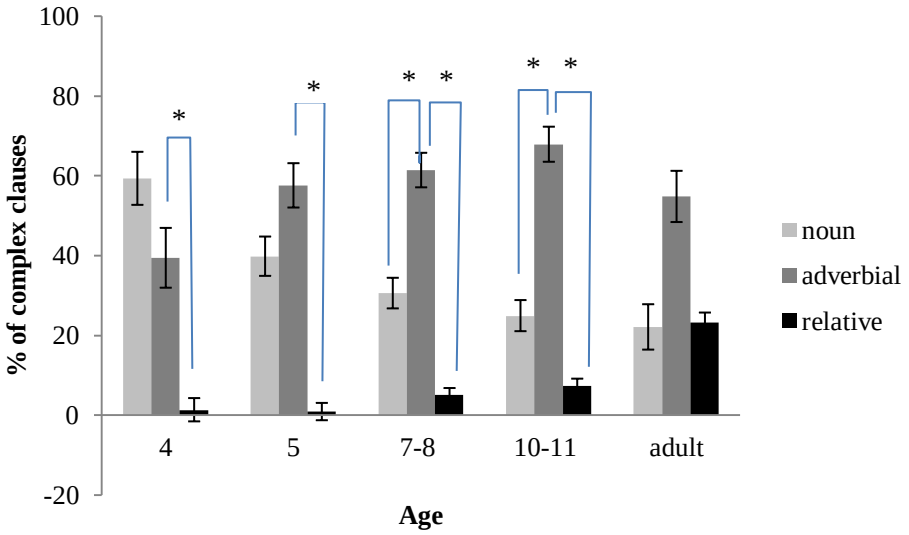

Figure 27. Distribution of subordinate clauses with different functions in the total number of subordinate clauses by age (with finer distinction). Error bars represent standard errors, the asterisk is used to show significant results.

There was also a significant interaction effect between age and type of clause, $F(3.67, 112.39) = 4.86$, $p < .01$, partial $\eta^2 = .14$, observed power = .94. The significance differences between the types of subordinate clauses in each age group were presented in Figure 27. Results of the follow-up repeated-measures ANOVAs conducted for each age group are given in Appendix O.

To analyze syntactic complexity more in detail, the adverbial clauses were divided into 4 categories: a) converbs that are formed with –(y)IncA and –(y)ken and cannot be formed for person[6], b) converbs that are formed with –DIk, -AcAk and –mA and can be marked for person, c) converbs that are formed with –(y)ArAk and acquired later than other converbs (Slobin,1995), and d) finite adverbial clauses formed with *diye* and *ki*. A 4 (age) X 4 (category of adverbial clause) mixed design ANOVA with age as the between-subjects factor and category of adverbial clauses as the within-subjects factor was run on the percentage of the number of adverbial subordinate clauses in each category over the total number of adverbial clauses. As displayed in Figure 28, it showed that the effect of age was not significant, $F(3, 89) = .00$, $p > .05$. The effect of the category of adverbial clause was significant, $F(2.34, 207.77) = 22.97$, $p < .001$, partial $\eta^2 = .21$, observed power = 1.00. Tests of within-subjects contrasts indicated that the rate of the use of the first category of converbs formed with –(y)IncA and –(y)ken did not differ from the rate of the use of the second category of converbs formed with –DIk, -AcAk and –mA , $F(1, 89) = 1.66$,

[6] Although Slobin (1995) considered –(y)Ip in this category, Göksel and Kerslake (2005) argued that it has a conjunctive function. In the present study, it was treated like a conjunction.

$p > .05$. The rate of the use of the second category of converbs formed with –DIk, -AcAk and –mA [$M = 36.77$; $SD = 31.99$] was higher than the rate of the use of the third category of converbs formed with –(y)ArAk [$M = 6.91$; $SD = 16.89$] , $F(1, 89) = 44.59$, $p < .001$, $r = .58$, partial $\eta^2 = .33$, observed power = 1.00, which was lower than the rate of the use of the finite adverbial clauses [$M = 13.98$; $SD = 25.82$], $F(1, 89) = 9.86$, $p < .01$, $r = .32$, partial $\eta^2 = .10$, observed power = .87. The interaction between age and the category of adverbial clause was not significant, $F(7.00, 207.77) = 1.48$, $p > .05$.

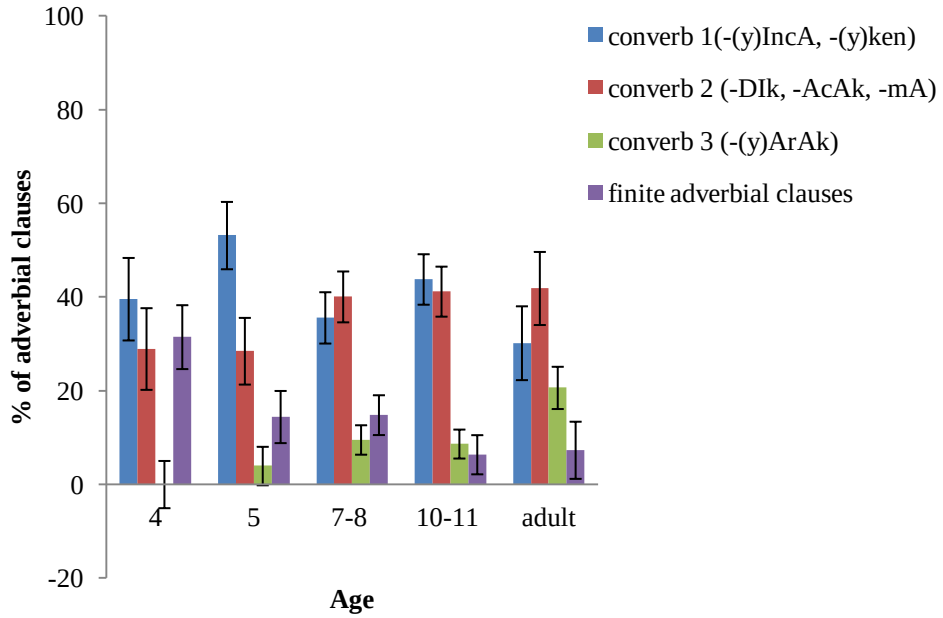

Figure 28. Distribution of different types of subordinate adverbial clauses by age. Error bars represent standard errors.

The noun clauses were also divided into four categories: 1) direct speech, 2) indirect speech, 3) complement clauses, and 4) other noun clauses including finite noun clauses formed with *ki* and noun clauses formed with –(y)Iş. A 4 (age) X 4 (category of noun clause) mixed design ANOVA with age as the between-subjects factor and type of category of noun clause as the within-subjects factor was run on the percentage of the number of noun clauses in each category over the total number of noun clauses shown in Figure 29. It showed that the effect of age was not significant, $F(3, 78) = 0.00$, $p > .05$. The effect of the category of noun clause was significant, $F(1.98, 154.76) = 42.87$, $p < .001$, partial $\eta^2 = .36$, observed power = 1.00. Tests of within-subjects contrasts indicated that the rate of the use of direct speech as subordinate noun clauses [$M = 56.60$; $SD = 40.20$] was higher than the rate of the use of indirect speech [$M = 4.42$; $SD = 15.47$], $F(1, 78) = 129.83$, $p < .001$, $r =$

.79, partial η^2 = .63, observed power = 1.00. The use of indirect speech was lower than the use of complement clauses [*M* = 27.91; *SD* = 36.08], *F*(1, 78) = 22.98, *p* < .001, *r* = .48, partial η^2 = .23, observed power = 1.00 which was higher than other subordinate noun clauses [*M* = 11.07; *SD* = 23.35], *F*(1, 78) = 6.19, *p* < .05, *r* = .58, partial η^2 = .07, observed power = .69. The interaction between the category of noun clause and age was also significant, *F* (5.95, 154.76) = 4.24, *p* < .01, partial η^2 =.14, observed power = .98. Separate repeated-measures ANOVAs for each age group were run. Significant results are displayed in Figure 29 with asterisk. The corresponding statistical details are presented in Appendix P.

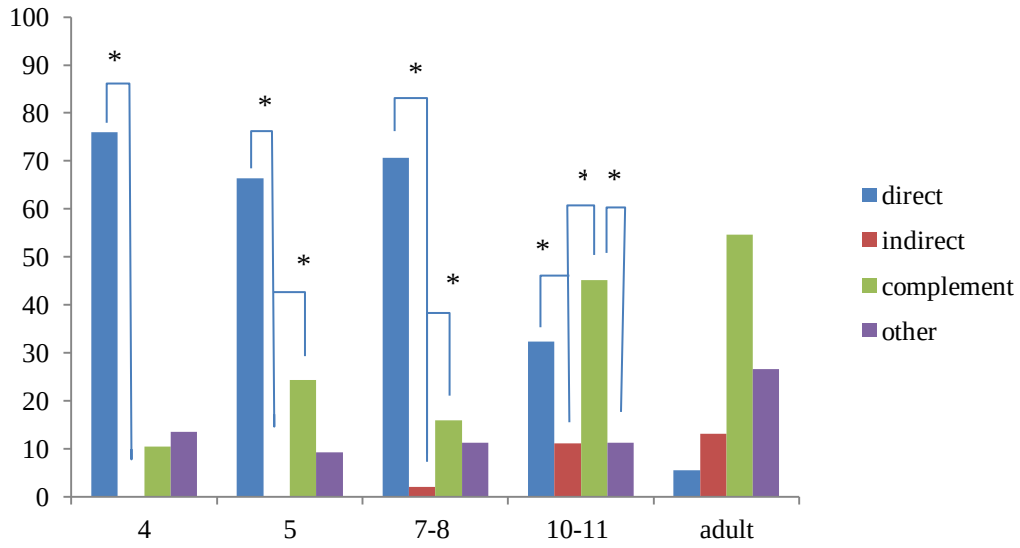

Figure 29. Distribution of different types of subordinate noun clauses by age. Error bars represent standard errors, the asterisk is used to show significant results.

4.5.4. Relationships between the Levels of Complexity

To analyze the relationship between the levels of complexity, bivariate correlations and partial correlations with age (in months) as the control variable were run between the syntactic complexity score, the evaluative complexity score and the plot complexity score. Table 7 and Table 8 present the corresponding Pearson correlation coefficients.

Table 7
Bivariate correlations between syntactic complexity, evaluative complexity, and plot complexity

	Plot complexity	Evaluative complexity	Syntactic Complexity
Plot complexity	1	.10	.19<*>
Evaluative complexity		1	.47***
Syntactic complexity			1

*p < .05, ** p < .01, ***p < .001, <*>marginally significant at p = .05.

Table 8
Partial correlations between syntactic complexity, evaluative complexity, and plot complexity with age (in months) controlled

	Plot Complexity	Evaluative complexity	Syntactic Complexity
Plot complexity	1	.17	.10
Evaluative complexity		1	.49***
Syntactic complexity			1

*p < .05, ** p < .01, ***p < .001.

Further correlations were conducted to analyze the relationship between three levels of complexity in each age group.

Table 9
Bivariate correlations between syntactic complexity, evaluative complexity, and plot complexity in each age group

		Plot complexity	Evaluative complexity	Syntactic complexity
4-year-old	Plot	1	.43	.29
	Evaluative		1	.91***
	Syntactic			1
5-year-old	Plot	1	-.26	.03
	Evaluative		1	.24
	Syntactic			1
7- & 8-year-old	Plot	1	.43*	.04
	Evaluative		1	.48**
	Syntactic			1

Table 9 (cont.)

10- & 11-year-old	Plot	1	.16	.25
	Evaluative		1	.05
	Syntactic			1

*p < .05, ** p < .01, ***p <.001.

4.6. Relationship between levels of complexity, ToM, executive function and comprehension of complement clauses.

In the following section the relation of the levels of complexity – plot, evaluative, and syntactic – and the additional tasks is explored. In various multiple regressions the question of whether these additional tasks can predict any of these

levels of complexity is explored. First, plot complexity is considered, followed by evaluative and lastly by syntactic complexity.

To test whether plot complexity was predicted by age, executive function, ToM, and comprehension of complement clauses, a multiple regression analysis was run. Age in months was included in the analysis with the forced entry method. Other predictors, ToM score, the Emotional Stroop Task score and the comprehension of complement clauses score, were included through the step-wise procedure. Table 10 presents the bivariate Pearson correlation coefficients between the criterion and predictor variables and Table 11 presents the partial correlations with age (in months) controlled.

Age was found to be a significant predictor, $R^2 = .33$, adjusted $R^2 = .33$, $F(1, 96) = 48.11$, $p < .001$. After other predictors were entered into the model, age and the comprehension of complement score were found to be significant predictors, $R^2 = .39$, adjusted $R^2 = .38$, $F(2, 95) = 30.89$, $p < .001$. Other predicors did not enter into the model. Table 12 presents the details of the models.

Among the plot components, the search theme was considered to be the component most related to executive function. To analyze this relationship, a correlation was run. A significant positive correlation was found between search theme and executive function, $r = .42$, $p < .001$. There was also a partial correlation between these variables with age controlled, $r = .30$, $p < .01$.

Table 10

Bivariate correlations between plot complexity score (outcome), age, ToM score, Emotional Stroop Task score and the comprehension of complements score

	Plot Comp.	Age	Executive Function	ToM	Comprehension of Complements
Plot Comp.	1	.58***	.44***	.37**	.51**
Age		1	.47***	.49***	.53***
Executive Function			1	.38***	.48***
ToM				1	.40***
Comprehension of Complements					1

*p < .05, ** p < .01, ***p < .001.

Table 11
Partial correlations between plot complexity score (outcome),ToM score, Emotional Stroop Task score and the comprehension of complements score with age (in months) controlled

	Plot Comp.	Executive Function	ToM	Comprehension of Complements
Plot Comp.	1	.23*	.12	.30**
Executive Function		1	.20<*>	.31**
ToM			1	.19<*>
Comprehension of Complements				1

*p < .05, ** p < .01, ***p < .001, <*>marginally significant at p = .05.

Table 12
Results of regression analysis predicting plot complexity

		B	β	t	Sig.
Step 1	Constant	.37		8.03	.000
	Age	.003	.58	6.94	.04
Step 2	Constant	.22		3.36	.001
	Age	.002	.424	4.51	.000
	Comprehension of Complements	.32	.29	3.07	.003

To test whether evaluative complexity was predicted by age, ToM, executive function and comprehension of complement clauses, a multiple regression analysis was run with the evaluative complexity score as the outcome. Age in months was included in the analysis with the forced entry method. Other predictors, ToM score, the Emotional Stroop Task score and the comprehension of complement score, were included through the step-wise procedure. Table 13 presents the bivariate Pearson correlation coefficients between the criterion and predictor variables and Table 14 shows the partial correlations between the variables with age (in months) controlled.

Table 13
Bivariate correlations between evaluative complexity score (outcome), age, ToM score, Emotional Stroop Task score and the comprehension of complements score

	Evaluative Comp. Score	Age	Emotional Stroop	ToM	Comprehension of Complements
Evaluative Comp.	1	-.06	.13	-.15	-.05
Age		1	.47***	.49***	.53***
Emotional Stroop			1	.38***	.48***
ToM				1	.40***
Comprehension of Complements					1

*p < .05, ** p < .01, ***p < .001.

Table 14
Partial correlations between evaluative complexity score (outcome), ToM score, Emotional Stroop Task score and the comprehension of complements score with age controlled

	Evaluative Comp. Score	Emotional Stroop	ToM	Comprehension of Complements
Evaluative Comp.	1	.18	-.15	-.021
Emotional Stroop		1	.20<*>	.31**
ToM			1	.19<*>
Comprehension of Complements				1

*p < .05, ** p < .01, ***p < .001, <*>marginally significant at p = .05.

None of the predictors entered into the regression model was significant. Table 15 provides the details of the model.

Table 15
Results of regression analysis predicting evaluative complexity

		B	β	t	Sig.
Step 1	Constant	28.47		7.59	.000
	Age	-.02	-.06	-.55	.59

To test whether syntactic complexity was predicted by age, executive function, ToM, and comprehension of complement clauses, a multiple regression analysis was run with the syntactic complexity score as the outcome. Age in months was included in the analysis with the forced entry method. Other predictors, ToM score, the Emotional Stroop Task score and the comprehension of complement score, were included through the step-wise procedure. Table 16 presents the Pearson correlation coefficients between the criterion and predictor variables, and Table 17 presents the partial correlations with age (in months) controlled.

Table 16
Bivariate correlations between syntactic complexity score (outcome), age, ToM score, Emotional Stroop Task score and the comprehension of complements score

	Syntactic Comp.	Age	Emotional Stroop	ToM	Comprehension of Complements
Syntactic Comp.	1	.21*	.30**	.10	.16
Age		1	.47***	.49***	.53***
Emotional Stroop			1	.38***	.48***
ToM				1	.40***
Comprehension of Complements					1

*p < .05, ** p < .01, ***p < .00.

Age was found to be a significant predictor, R^2 = .043, adjusted R^2 = .033, $F(1, 96)$ = 4.35, p = .04. After other predictors were entered into the model, the effect of age disappeared and the Emotional Stroop task score was found to be a significant predictor, R^2 = .094, adjusted R^2 = .075, $F(2, 95)$ = 4.95, p = .009. Other predicors did not enter into the model. Table 18 shows the details of the models.

Table 17
Partial correlations between syntactic complexity score (outcome), ToM score, Emotional Stroop Task score and the comprehension of complements score with age controlled

	Syntactic Comp.	Emotional Stroop	ToM	Comprehension of Complements
Syntactic Comp.	1	.23*	-.004	.06
Emotional Stroop		1	.20<*>	.31**
ToM			1	.19<*>
Comprehension of Complements				1

*p < .05, ** p < .01, ***p < .001, <*> marginally significant at p = .05.

Table 18
Results of regression analysis predicting syntactic complexity

		B	β	t	Sig.
Step 1	Constant	13.11		3.67	.000
	Age	.08	.21	2.09	.04
Step 2	Constant	1.57		.26	.80
	Age	.03	.09	.82	.42
	Executive function	18.47	.26	2.31	.02

4.7. Discriminant Function Analysis

To investigate the relationship between the three levels of complexity and how they accounted for the age differences, a discriminant functon analysis was conducted. It revealed three discriminant functions. The first function explained 93.1% of the variance, canonical R^2 = .46. The second and third ones explained only 6.4%, canonical R^2 = .05, and 0.5% of the variance, canonical R^2 = .004, respectively. In combination, these three functions significantly differentiated between the age groups, Λ = 0.51, $\chi^2(9)$ = 66.69, p < .001. Removing the first function, the combination of the second and third function did not differentiate between the age groups, Λ = 0.84, $\chi^2(4)$ = 6.00, p > .05. Removing the second function, the third function did not differentiate between the age groups, Λ = 1.00, $\chi^2(1)$ = 0.41, p > .05. As Table 19 presents, the correlations between the levels of complexity and the

discriminant functions revealed that the plot complexity score loaded highly onto the first function whereas the syntactic complexity score loaded highly onto the second function and the evaluative complexity score loaded highly onto the third function.

Table 19
Correlations between the levels of complexity and the three discriminant functions

	Function		
	1	2	3
Syntactic complexity	.14	.96*	.23
Evaluative complexity	-.11	.29	.95*
Plot complexity	.94*	-.06	.35

*p < .05.

The discriminant function plot presented in Figure 30 indicates that the first function discriminates between 4-year-old and the 5-year-old groups. It also differentiates between the 5-year-old group and two older age groups. The second function did not differentiate between the 4-year-old and the 5-year-old group. It slightly differentiates between the 5-year-old group and the older two age groups.

Due to the fact that the first discriminant function differentiates more between the age groups, the discriminant score related to it was considered as the combined score of the three levels of complexity – yet bearing in mind that it was mostly constituted by plot complexity. To test whether this combined complexity score was predicted by age, executive function, ToM, and comprehension of complement clauses, a multiple regression analysis was run with the combined score as the outcome. Age in months was included in the analysis with the forced entry method. Other predictors, ToM score, the Emotional Stroop Task score and the comprehension of complement score, were included through the step-wise procedure. Table 20 presents the Pearson correlation coefficients between the criterion and predictor variables, and Table 21 presents the partial correlations with age (in months) controlled.

Age was found to be a significant predictor, $R^2 = .36$, adjusted $R^2 = .35$, $F(1, 96) = 53.44$, $p < .001$. After other predictors were entered into the model, age and the comprehension of complement score were found to be significant predictors of combined complexity, $R^2 = .42$, adjusted $R^2 = .41$, $F(1, 95) = 10.10$, $p < .01$. Other predicors did not enter into the model. Table 22 presents the details of the models.

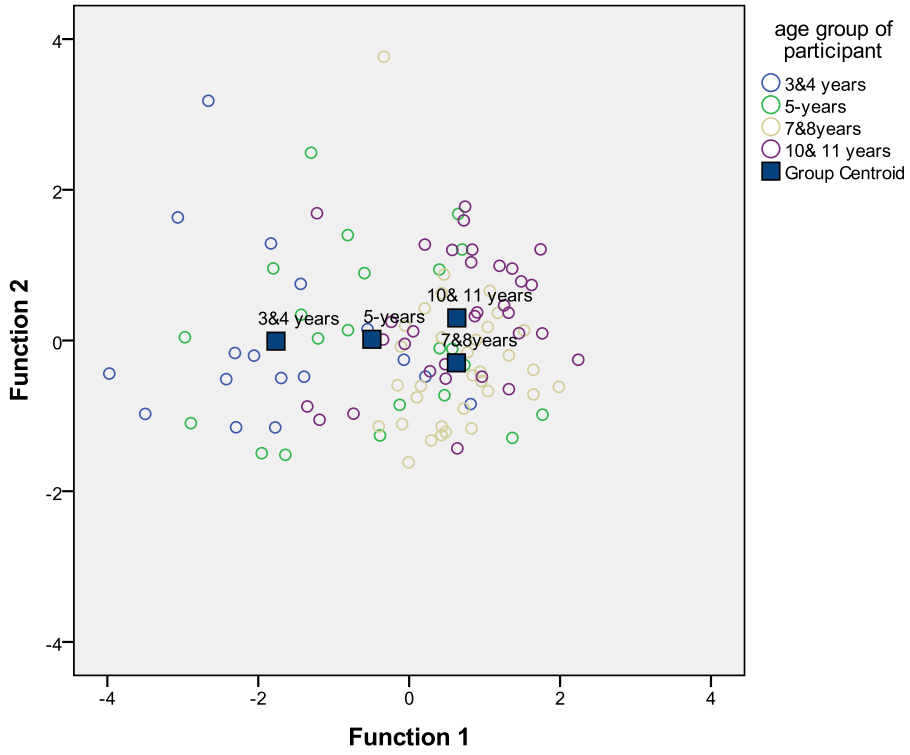

Figure 30. Group Centroids of Canonical discriminant functions 1 (Plot complexity) and 2 (Syntactic complexity).

Table 20

Bivariate correlations between combined complexity score (outcome), age, ToM score, Emotional Stroop Task score and the comprehension of complements score

	Combined Comp.	Age	Executive Function	ToM	Comprehension of Complements
Combined comp.	1	.60***	.42***	.41***	.53**
Age		1	.47***	.49***	.53***
Executive Function			1	.38***	.48***
ToM				1	.40***
Comprehension of Complements					1

*p < .05, ** p < .01, ***p < .001.

Table 21

Partial correlations between combined complexity score (outcome),ToM score, Emotional Stroop Task score and the comprehension of complements score with age (in months) controlled

	Plot Comp.	Executive Function	ToM	Comprehension of Complements
Combined Comp.	1	.20<*>	.17	.31**
Executive Function		1	.20<*>	.31**
ToM			1	.19<*>
Comprehension of Complements				1

*p < .05, ** p < .01, ***p < .001, <*>marginally significant at p = .05.

Table 22

Results of regression analysis predicting combined complexity score

		B	β	t	Sig.
Step 1	Constant	-2.35		-6.97	.000
	Age	.03	.60	7.31	.000
Step 2	Constant	-3.48		-7.26	.000
	Age	.02	.443	4.80	.000
	Comprehension of complements	2.43	.29	3.18	.002

CHAPTER 5

DISCUSSION

In this section, first the findings of the present study regarding the development of ToM, executive function and comprehension of complex syntax are discussed. Following the discussion of the findings about the general structure of the narratives, the development in each level of complexity and its relation to ToM, executive function and comprehension of complex syntax are addressed. Integrated into a general discussion of the findings suggestions for future research are introduced. The discussion of the limitations are followed by a general conclusion.

5.1. Development of Theory of Mind (ToM)

Considering the developmental changes in ToM mentioned in the literature, to assess ToM development in the present study, a first-order false belief task and the real-apparent emotion task were given to 4-year-old participants, and a second-order false belief task was administered to participants in older age groups. The first-order ToM performance of 4-year-old participants was found to be very low. Only 23.5% of those participants were able to pass the false-belief task. This finding did not match with those in the literature demonstrating a development in false-belief understanding around the fourth year of life (e.g. Astington & Jenkins, 1999; Flavell, 1992; Lewis & Osborne, 1990). The percentage of participants who passed the real-apparent emotion task was even lower.

Wellman and Liu (2004) stated that there are regularities in children's understanding of different kinds of mental states. Understanding of others' desires develops earlier than understanding of others' beliefs. Moreover, understanding that different individuals can have diverse beliefs and behave differently according to those beliefs precedes the judgment of false-beliefs and the understanding of the fact that individuals can be mistaken because of their false-beliefs. The comprehension of emotions and the differences between real emotions and emotions that individuals show to others develops even later. In the present study, performance on the first-order false-belief task relies on the ability to make a distinction between belief and reality, to represent other minds and to understand that the actions can depend on false-beliefs rather than the real situation (Wellman, et al., 2001). Performance on the other ToM task, the real-apparent emotion task, depends on understanding of another

individual's real emotions, judging his/her intentions and expectations, and the emotions s/he will display on the basis of these expectations which will be different from the real one. Considering the sequence of the development of understanding of different kinds of mental states, it can be claimed that in the present study the difficulty level of ToM tasks was high and this might be a factor resulting in the low performance of the participants.

The second-order ToM performance of the participants indicated a continuous development. Five-year old participants' performance on the ToM task was lower than that of 7- and 8-year-old participants and the latter was lower than the performance of 10- and 11-year-old participants. These findings supported the hypothesis that ToM performance would increase with age. It is generally accepted that the second-order ToM reasoning is more complex than the first-order ToM reasoning. The first-order ToM includes only the evaluation of someone's belief about something in the world whereas the second-order ToM requires the consideration of someone's belief about someone else's belief about something in the world. As a result of this difference, second-order ToM reasoning emerges one or two years later than the first-order one, around the age of 5 or 6 (Miller, 2009).

In the present study, only a small group of 5-year-old participants was able to pass the second-order ToM tasks. This low performance did not match with some findings in the literature showing at least 50% success at 5 years of age on the second-order ToM tasks (e.g. Astington et al., 2002; Banerjee & Yuill, 1999; Filippova & Astington, 2008; Hasselhorn, Mahler, Grube, 2005; Jingxin, Jiliang, & Wenxin, 2006), but was consistent with some other studies indicating 20 to 30% of correct performance (e.g. Mizokawa & Koyasu, 2007; Perner & Wimmer, 1985). Miller (2009) attributed the differences in these studies to the stories used in the second-order ToM tasks. There are two commonly used sets of stories; one constructed by Perner and Wimmer (1985) and the other one created by Sullivan et al. (1994). Stories of Perner and Wimmer were claimed to be more difficult, longer, and less child-friendly with more characters and scenes compared to those of Sullivan et al. (Sullivan et al., 1994; Miller, 2009). In fact, studies using Perner and Wimmer's stories indicated mastery in second-order ToM reasoning approximately a year later than those using Sullivan et al.'s stories (Miller, 2009). The findings mentioned above about 50% success at 5 years of age were obtained in studies using Sullivan et al.'s stories or their modified versions whereas the other ones indicating lower performance were the findings of studies using Perner and Wimmer's stories (Miller, 2009).

In the present study, stories from both sets were used. The chocolate story is one of Perner and Wimmer's stories and the birthday present story is one of Sullivan et al.'s stories. In each age group, children's performance was better in the first one than in the second one. Consistent with other studies using Perner and Wimmer's stories, 30% of 5-year-old participants passed the chocolate story. Only 15% of them passed the birthday present story. Even in the oldest age group, only half of the children were able to pass the birthday present story while 90% of them

passed the chocolate story. This difference suggests that the birthday present story is more difficult compared to the chocolate story. Flobbe (2006) also reported performance differences reflecting different difficulty levels between these two stories in 8- to 10-year-old children. In the birthday present story, the mother deceived her son about the birthday present. Some of the young children in the present study could not accept this deception, considered it as a lie and mentioned that the mother should not lie to her son. Thus, the deception might make the understanding of the story difficult for the children. In addition, the second order false-belief question was about the answer of the mother (*Anne bu soruya ne cevap verir?*) to a question asked by the grandmother in a phone conversation (*Mehmet doğum günü için ona ne aldığını düşünüyor?*). This indirectness might have resulted in comprehension difficulties. These difficulties could be seen in the answers of the children to the second-order false belief questions and their justifications in the present study. For example, some of the children could not understand the second-order false belief question and told that the mother should state correctly to the grandmother what she bought for her son, because she should not lie to her. In the chocolate story, there were only two characters interacting with each other. None of them deceived the other one. In addition, the false-belief question (*Ece Can'ın çikolatayı nerede arayacağını düşünür?*) was directly asking for one character's belief over the other one's belief. These differences between the stories might have resulted in performance differences although they did not support the claims of Sullivan et al. (1994) and Miller (2009) about the differences between the two story sets.

5.2. Development of Executive Function

In the present study, executive function was assessed with the Emotional Stroop Task developed by Lagattuta et al. (2011). Results demonstrated that the performance of 4-year-old and 5-year-old participants was lower than that of older children. Seven- and 8-year-old and 10- and 11-year-old participants' correct performance reached 90% which was very close to the performance of adult participants. These findings supported the hypothesis that executive function would increase with age. Moreover, participants in each age group took more time to complete the task than the ones in the older groups. This indicated a continuous decrease in total response time with age. Combined with the findings regarding correct performance, it suggested that with age participants could give more correct responses in a shorter time interval as a result of the continuous development in executive control between the ages of 4 and 11.

The findings of the present study in the Emotional Stroop Task were consistent with those of Lagattuta et al. (2011). Similar to the present study, in their study, 4- to 11-year-old participants' performance increased and their response time decreased with age. The percentages of correct responses and the response times in each age group in both studies were very similar. Furthermore, the present findings

matched with other studies indicating a development in executive function with age (Clark et al., 2013; Diamond & Taylor, 1996; Gerstadt et al., 1994).

Executive function is not a unitary construct and includes different cognitive abilities. The Stroop tasks like the one used in the present study assess the function of inhibitory control (e.g. Carlson & Moses, 2001; Gerstadt et al., 1994). On these conflict tasks, the participants have to respond counter to a prepotent response. For instance, on the present task, the prepotent response was saying *"üzgün*'sad'*"* when presented with a sad face and saying *"mutlu* 'happy'*"* when presented with a happy face. The prepotent response might interfere with the correct response, therefore it should be inhibited (Gerstadt et al., 1994). In addition, it should be replaced with a conflicting response. To activate this new response on the basis of a rule, working memory is necessary (Carlson & Moses, 2001; Gerstadt et al., 1994). In the present study, the rule stated that the participants had to respond saying *"üzgün*'sad'*"* when presented with a happy face and saying *"mutlu* 'happy'*"* when presented with a sad face. For a correct response they had to remember and use this rule. Thus, the conflict tasks rely also on working memory. In the present study, the increased performance on the Emotional Stroop Task might be an indicator of the development in both of inhibitory control and working memory.

5.3. Development of the Comprehension of Complex Syntax

In the present study, the comprehension of complex syntax was assessed with a task in which the participants were expected to comprehend Turkish object nominalizations embedded in syntactically complex clauses uttered by the experimenter (*Kaplumbağaya dün ne yaptığını sana anlatmasını söyler misin?* 'Could you ask the turtle to tell you what he did yesterday?') and to direct them to a puppet as direct questions (*Bana dün ne yaptığını anlatır mısın?* 'Can you tell me what you have done yesterday?). Four-year-old participants' performance on this task did not differ from that of 5-year-old participants. But starting from 5 years of age there was a continuous increase in participants' performance. Seven- and 8-year-old participants performed better than 5-year-old participants and 10- and 11-year-old participants performed better than 7- and 8-year-old participants. These findings supported the hypothesis stating that the comprehension of complex syntax would increase with age.

In a previous study, Altan (2002) assessed 3- to 6-year-old children's ability to comprehend Turkish complements with a task from which the present task was adapted. She found a difference in the performance of 4- and 5-year-old participants implying a development in the ability to comprehend complement clauses around the age of 5. In the present study, this development was observed later, between the ages of 5 and 7. Moreover, in Altan's (2002) study, the performance of the oldest age group was far from perfect (71%) suggesting further development after the age of 6. In this regard, the findings of the preset study extended those of Altan's study indicating that additional developmental changes occur between 7 and 11 years of age. Furthermore, the oldest group of children in the present study could not reach

the adult level performance suggesting that the development continues after the age of 11.

In the present study, the participants' performance on complement clauses with single embedding was higher than their performance on complement clauses with double embeddings. Seven- and 8-year-old participants (97%) reached adult-level ceiling performance (98%) on the single-embedded complement clauses whereas even the oldest participants' performance on the double-embedded complement clauses (71%) was far from it. Consistent with Altan's (2002) study, this finding indicated that processing of clauses with double embeddings is more difficult than processing of clauses with single embedding.

Although the comprehension of complement clauses task used in the present study was claimed to assess the comprehension of the embedded structure of syntactically complex clauses, it also requires reproduction of clauses with single or double embeddings. Thus, it combines both comprehension and reproduction of syntactically complex clauses. Thornton (1996) identified tasks similar to the present one as the elicited production tasks in which a prompt was provided to the participants to elicit the expected syntactic structures. Hence, the findings of the present study do not only reflect the development of the ability to comprehend the complement clauses, but also to produce them. With regard to this, it can be claimed that the performance of the participants on this task is an indicator of their level in comprehending and producing syntactically complex structures. This level was found to increase with age between 5 and 11 years of life. In addition, the comprehension and production of the double-embedded complement clauses were shown to develop later than those of single-embedded complement clauses. This finding supported the claim that multiple embedding is more complex than single embedding (Hollebrandse et al., 2008).

5.4. Narrative performance

In the present study, narrative performance was evaluated in terms of narrative productivity and narrative fluency. Narrative productivity was analyzed with parameters including the number of C-units, the total number of words and the mean length of C-units. It was found that 5-year-old participants constructed less C-units compared to 7- and 8-year-old participants who produced more C-units compared to 10- and 11-year-old participants. Moreover, 5-year-old participants uttered fewer words in their narratives than 7- and 8-year-old participants. In addition, the mean length of C-units of 7- and 8-year-old participants was lower than that of 10- and 11-year-old participants.

In the narrative literature, the number of C-units and the total number of words have been considered as measures of narrative productivity. Several studies have indicated that narrative productivity increase during the preschool and early school ages. For instance, Mäkinen et al. (2014) demonstrated that the number of C-units increased between 4 and 5 years of age. On the other hand, this early development was not observed in Muñoz et al.'s (2003) study. The present findings

were in line with the finding of Muñoz et al. (2003) and demonstrated no increase in the number of C-units between 4- and 5-year-old participants. Similarly, in the present study no increase in the total number of words was observed between the ages of 4 and 5. This finding was also consistent with Muñoz's et al.'s finding and suggested that preschool children produce narratives at similar productivity levels.

The present study showed that 5-year-old participants constructed fewer C-units compared to 7- and 8-year-old participants. Moreover, 5-year-old participants used fewer words in their narratives than 7- and 8-year-old participants. These findings match with the finding of Justice et al. (2006) and imply that the time period between 5 and 7 years of age is important for the development of narrative productivity. After the age of 7 and 8, the increase in the number of C-units got reversed. Ten- and 11-year-old participants constructed less C-units than 7- and 8-year-old ones. Consistent with this finding, Justice et al. (2006) demonstrated that after the age of 10 the number of C-units decreased and the length of the narratives of 11- and 12 year-old children was similar to that of 8- and 9-year-old children. They attributed this drop in narrative productivity to loss of interest in the narration during this developmental period. However, another explanation is possible when the mean length of C-units (in words) is taken into account.

In some studies, the mean length of C-units has been accepted to be a measure of syntactic complexity (Mäkinen et al., 2014) (however, in the present study it was not initially considered in this respect). In the present study, it was found to be lower in the narratives of 7- and 8-year-old participants than in the narratives of 10- and 11-year-old participants. Combined with the findings about the number of C-units, this indicates that 7- and 8-year-olds constructed more, but shorter C-units than 10- and 11-year-olds who produced narratives with less but longer C-units. Mäkinen et al. (2014) argued that as the ability to form syntactically complex clauses in narrative increases, the number of C-units will decrease. Based on this argument, the drop in the number of C-units around the age of 10 can be attributed to an increase in syntactic ability during this time period. Nevertheless, in the present study, syntactic complexity was defined in terms of the use of subordination. Therefore, this issue will be discussed again when syntactic complexity in the narratives is addressed below.

The duration of the narrative, the total duration of the clauses and the mean duration of the C-units were considered as parameters of narrative fluency. It was found that the duration of the narratives of 4-, 5- and 7- and 8-year-old participants did not differ. The contrast between the lack of this difference and the finding that the number of C-units and the total number of words of younger participants were lower than that of 7- and 8-year-olds suggested that the fluency increases with age in such a way that in the same time interval older children can produce more C-units with more words than younger children.

The increase in narrative fluency with age was further supported by the finding that although the mean length of the C-units of 5-year-old participants did not differ from that of 7- and 8-year-old participants, the mean duration of C-units in the

narratives of the former group was longer than that of the latter group. This indicated that older children can construct C-units with similar numbers of words in a shorter time interval than younger children. This might also reflect differences in general linguistic abilities.

Consistent with the finding that 7- and 8-year-old participants produced narratives with more C-units than 10- and 11-year-old participants, the narratives of 7- and 8-year-old participants were found to be longer in terms of the total duration of the clauses. However, this parallel was not observed in the mean duration of the C-units. The mean duration of the shorter C-units in the narratives of 7- and 8-year-old participants were found to be longer than that of the longer C-units in the narratives of 10- and 11-year-old participants. This is also another indication of the increase in narrative fluency with age. Moreover, the content external to the narrative including interruptions, conversation with the experimenter, and silence was found to be less in the narratives of 5-year-old participants than in the narratives of 4-year-old participants. Similarly, it was less in the narratives of 10- and 11-year-old participants than in the narratives of 7- and 8-year-old participants. This finding suggests that with age children get less distracted by external factors and can focus more. This might in turn contribute to the increase in the fluency level.

5.5. Development of Levels of Complexity

5.5.1. Development of Plot Complexity

In the present study, the level of plot complexity was found to increase with age. The narratives of 5-year-old participants were more complex than those of 4-year-old participants in terms of its plot structure. Moreover, the narratives of 7- and 8-year-old participants were richer than those of younger participants in terms of their plot structure. These findings confirmed the hypothesis that plot complexity would increase with age.

The developmental pattern observed in overall plot complexity was also confirmed when each plot component was considered separately. For instance, 4-year-old participants included fewer plot onset and unfolding elements in their narratives compared to 5-year-old participants who in turn included fewer elements than 7- and 8-year-old participants. Furthermore, 5-year-old participants were more successful in including the resolution than the youngest participants, but less successful in reporting the search theme than 7- and 8-year-old participants. Similar developmental trends in Turkish-speaking children were also reported by Aksu-Koç (1994), Aksu-Koç and Tekdemir (2004) and Berman and Slobin (1994b). They were also observed to hold for English-, German-, Hebrew- and Spanish-speaking children's narratives (Berman & Slobin, 1994b). In addition, Mäkinen et al. (2013) found that the number of reported events increased between 4 and 5 years of age and between 6 and 8 years of age in the narratives of Finnish children. The changes in the number of the plot components between 4 and 5 years of age were also reported by Muñoz et al. (2003) in Latino children from a low socioeconomic community and by

Price et al. (2006) in African American preschoolers. These developmental differences suggest that regarding plot complexity there is a transition around the age of 5 during the preschool years, and another transition around the age of 7 and 8 during the early school years. They also support Berman and Slobin's (1994b) suggestion that "general cognitive and expressive development is responsible, over and above the demands and constraints of acquiring a particular native tongue" (p. 43) for the age-related changes.

In the present study, plot complexity in the narratives of 7- and 8-year-old participants was not different from that of 10- and 11-year-old participants. The lack of the difference between these two age groups was also evident for each separate plot component. This similarity might be related to schooling. In their school setting children form an understanding of how the structure of a narrative should be and which elements a story depicted in a picturebook should include (Berman & Slobin, 1994b). This might influence to which components of the plot line children focus in the course of narration as a consequence of which they construct narratives with similar plot complexity.

Moreover, plot complexity of 10- and 11-year-old participants did not reach the level of the adult participants. Similar differences in the plot components and their organization were described between narratives of 8- and 9-year-old Finnish-, English-, German-, Hebrew-, Spanish-speaking children and those of adults (Berman & Slobin, 1994b; Mäkinen et al., 2013). These imply further developmental changes in narrative skills during adolescence toward adulthood as noted by Labov (1972) and Berman and Slobin (1994b).

The analyis of the inclusion of each of the four plot components in the narratives showed that participants were more successful in reporting plot unfolding than plot onset and resolution. Moreover, they reported resolution more successfully than search theme. These findings revealed the difficulty level of each component. Plot unfolding was found to be the easiest plot component. As given in more detail in Appendix L, the subcomponents of plot unfolding included the interaction of the protagonist with various animals while searching for the frog with his dog. The information relevant for reporting these subcomponents is visible in the pictures of the book. Thus, the participants did not have to make any inferences. On the other hand, reporting of plot resolution and some subcomponents of plot onset required inferences. For instance, participants had to infer from the empty jar that the frog was missing or they should assume that one of the frogs that the child found was his own frog. Furthermore, some subcomponents of the plot onset required focusing on the background information such as an introducing event and temporal location. The understanding of these subcomponents as necessary for the overall plotline might be a later development. This might make plot onset more difficult for the child participants than plot unfolding. Search theme was found to be the most difficult plot component. There are several reasons for its relative difficulty. First of all, the narrators should infer the goal of finding the frog through understanding the mental state of the protagonist. Secondly, they have to connect the goal of the protagonist

with his actions throughout the episodes and to make inferences about the search from the actions of the protagonist depicted in the pictures. Moreover, narrators should hold the goal in working memory while continuously updating information during the course of narration. All of these cognitive processes are resource-demanding and effortful. Finally, they should have an understanding that reiteration of the search throughout the narrative is a means to keep the interest of the listeners and to make the narrative more elaborative. This understanding of the requirements of a complete narrative might be a late development.

In the present study, gender was found to be a factor influencing plot complexity. Girls were found to generate narratives with higher level of plot complexity than boys. In the literature, studies examining the development of plot structure did not report such a gender difference (e.g. Aram, Fine, & Ziv, 2013; Fernández, 2011). In some studies it was not even taken into account (e.g. Berman & Slobin, 1994b; Bishop & Donlan, 2005; Mäkinen et al. 2014; Mozeiko et al., 2011; Muñoz et al., 2003). However, Nicolopoulou (1997; 2008) claimed that children have highly distinguished gender-related narrative styles. She studied 3- to 5-year-old English-speaking children's narratives that were freely generated as a daily activity in an everyday classroom setting. She found that narratives of girls start with the introduction of the story characters in social relationships, specifically mostly family relationships. The physical setting of the story, mostly home setting, is clearly depicted. Throughout narratives, the characters leave the home setting, go to different places and then return to their home. The reported events depict an orderly world and if the order is disrupted, it is restored before the end of the story. On the other hand, narratives of boys included unrelated individual characters. They interact with each other in conflict situations that are accompanied by movements and violence as a result of which disorder and destruction are dominant throughout narratives. Nicolopoulou (1997) attributed these gender differences in narrative style to the differences between boys and girls in understanding and representing the world (1997). Even though the differences between narratives of girls and boys suggested by Nicolopoulou (1997; 2008) were observed in a genre different that the one used in the present study, they might offer some insight into the gender differences found in the present study.

The picture story book used to elicit narratives in the present study depicts a story starting in a home setting. The main characters: the boy, the frog and the dog, are connected to each other in a social relationship such as friendship or ownership. The relationship gets disrupted when the frog leaves the house. Throughout the story the boy and the dog try to restore the social order by looking for the frog. At the end, the boy and the dog find the family of the frog and go back to their home with a baby frog. The plot line of this story includes some parallels with the stories composed by girls in the study of Nicolopoulou. Both of them include home settings as the starting and end points. Characters are related to each other in social relationships such as family, friendship or ownership. At the end, the disrupted order is restored. These similarities suggest that the picture book used in the present study presents the

participants a scenario which is more familiar to girls than boys or which corresponds mostly to how the girls represent the world. Consequently, compared to boys girls performed better in incorporating the components of the plot onset such as the introduction of the socially related characters, the setting, and the disruption of the order; the search theme including the attempts to restore the order, and the plot resolution referring to the re-establishment of the order. On the other hand, no gender difference was observed in the inclusion of the plot unfolding components. During plot unfolding, the boy and the dog interact with various unrelated animals described by their actions. They experience conflict situations with them and engage in activities which are violent to some extent. All of these match the characteristics of boys' narrative styles reported by Nicolopoulou, therefore boys might be more familiar with these components or these components might reflect how they understand the world as a consequence of which they focus on them as much as girls who might consider these components as attempts to restore the social order. However, the participants in the study of Nicolopoulou were 3 to 5 years of age whereas the gender differences found in the present study extend to 11 years of age. Thus, whether the gender differences reported by Nicolopoulou can be generalized to older children is questionable. Further research examining gender differences in plot complexity in various age groups and in different narrative contexts will provide a better understanding of their pattern and underlying reasons.

Plot complexity was found to be predicted by the ability to comprehend complex syntax. Although no hypothesis was formed about the relationship between plot complexity and the comprehension and reproduction of complex syntactic structures, this relationship is natural and meaningful. In the present study, children's ability to comprehend and reproduce syntactically complex structures in the Comprehension of the Complement Clauses Task was considered as a measure of general syntactic competence. Since, children who have higher syntactic competence may need less cognitive resource to form the syntactic units during narrative production, they may have more cognitive resources left to focus on the plot elements. On the other hand, children with less advanced syntactic abilities need more cognitive resources to form syntactic constructions and this may have left less resources for the formation of the plot line.

One of the hypotheses of the present study stated that executive function would predict plot complexity. This hypothesis was not supported. However, there was a positive correlation between plot complexity and executive function. This finding matched that of previous correlational studies indicating the relationship between executive function and the formation of the plot line (e.g. Cobo-Lewis et al., 2002; Coelho, 2002; Coelho et al., 1995; Mozeiko et al., 2011). These studies addressed mostly focusing of attention and shifting as executive functions while in the present study only inhibition was included. Hence, the present study suggests that in addition to shifting and attention, inhibition might also be related to plot complexity. The relationship between executive function and one of the plot components, namely the search theme, supported this suggestion further. The

reiteration of the reference to the search of the frog throughout the narrative requires the inhibiton of other information and updating the plotline in terms of the global theme. These might tap on executive functions, expecially inhibition, as demonstrated in the present study.

Although most of the studies about the relationship between ToM and narrative abilities focused on the landscape of consciousness, the study of Fernández (2011) implied that ToM might also be related to the landscape of action. She reported a significant correlation between ToM and the coherence of narratives in terms of including a goal, attempts to reach it and an outcome.This finding was not supported in the present study.

5.5.2. Development of Evaluative Complexity

One of the earliest studies about evaluative complexity in narratives was conducted by Reilly (1992) with 3- and 4-, 7- and 8-, and 10- and 11-year-old English-speaking children. It was reported that the use of evaluative comments attributing emotions to story characters increased with age. Considering this finding, in the present study developmental changes in evaluative complexity were expected in Turkish-speaking children in the same age groups. However, this expectation was not supported. The level of evaluative complexity was found not to differ across the children's age groups. This finding is consistent with the previous finding of Küntay and Nakamura (2004) showing no changes with age in the use of evaluative devices by 4-, 5-, 7- and 9-year-old Turkish-speaking children in narratives elicited with the book used in the present study. They also found no age related changes in Japanese-speaking children. Moreover, Reilly, Losh, Bellugi, and Wulfeck (2004) reported no developmental changes in the frequency of the use of evaluative devices by English-speaking children from 4 to 12 years of age. In addition, Bamberg and Damrad-Frye (1991) found that the frequency of the use of evaluative devices did not differ in the narratives of 5- and 9-year-old English-speaking children whereas adults used more evaluative devices compared to these younger groups. In all these studies, however, there is no consensus on the coded evaluative categories, therefore, the following discussion will consider evaluative complexity only in terms of the evaluative categories examined in the present study.

In the present study, in all age groups approximately 27% of C-units included at least one evaluative device. This finding suggested that starting from the age of 4 children have a notion of narrative and can integrate the landscape of consciousness reflected by evaluative complexity into their narratives to some extent.

The analysis of the relative frequency of the evaluative categories included in the present study provides an in-depth understanding of the level of evaluative complexity. Mental state terms are evaluative devices used to reflect the inferences of the narrator about the emotions, thoughts, beliefs, needs and desires of the story characters. They are also used to create interest and empathy in the audience (Kuntay & Nakamura, 2004). Among them, the child participants in the present study employed emotional state terms and motivation and ability terms more frequently

than affective expression and cognitive state terms. This finding is consistent with the finding of Fernández (2011) demonstrating that 5- to 9-year-old Spanish-speaking children used terms indicating intentions and emotions more than those referring to cognitive states in their narratives.

The acquisition of emotional terms in language is an early accomplishment. It also shows the relationship between language and emotion. At 18 to 20 months of age, children can use words or signs to express their own emotions (Bretherton & Beeghly, 1982; Bretherton, McNew, & Beeghly-Smith, 1981; Reilly, McIntire, & Bellugi, 1986). Around age 2, they also start to understand and talk about their own desires and motivations (Gerhardt, 1991; Wellman, Phillips, & Rodriquez, 2000). Two and a half year old children can attribute emotions to others and 3-years-old children can reason about the causes of others' emotional responses (Stein & Levine, 1987). The relatively higher use of the subcategories of the emotional and motivational terms in the present study might be a reflection of these early abilities.

The production of verbs referring to cognitive activities was also shown to begin during the preschool ages. However, verbs expressing relative certainty were found to be easier compared to the verbs expressing relative uncertainty. Four-year-old children were shown to use the former more frequently than the latter (Nixon, 2005). Moreover, although they can comprehend the distinction between the verbs expressing certainty and uncertainty, the understanding of the distinction between the verbs expressing uncertainty was found to be a later development (Abbeduto & Rosenberg, 1985; Johnson & Maratsos, 1977, Moore, Bryant, & Furrow, 1989, Nixon, 2005, White & Dungan, 1997). Schwanenflugel, Fabricius, and Noyes (1998) demonstrated that 9- to 11-year-old children can employ cognitive verbs expressing certainty such as 'see', 'observe', and 'examine' at adult levels to describe relevant mental activities while they had difficulties in describing mental activities with belief verbs which express uncertainty and inference such as 'guess', 'think', 'understand', 'reason' and 'estimate'. In the present study, the category of cognitive terms included mostly verbs of this second type. In the story 'Frog, where are you?', the story characters understand that the frog is lost when they see the empty jar. They make guesses and inferences about the potential locations of the lost frog to search for him. They are mistaken that the antlers of the deer are the branches of a tree. And they find the frog by making an inference about his location from a sound. The narrators were expected to report all of these mental activities with proper cognitive terms. The low frequency of the use of cognitive terms in 4- to 11-year-old children might be related to the complexity of the cognitive and semantic elaboration required for this. The adult participants used the cognitive terms more frequently than the child participants suggesting that the development of the narrative use of these terms might be a late achievement during the adolescence years. Aksu-Koç and Tekdemir (2004) examined 3- to 9-year-old Turkish- and English-speaking children's and adults' ability to express false-belief of the protagonist resulting from a misrepresentation and to relate it causally with the preceding and following events in the same story. Consistent with the findings of the present study, they reported these

abilities almost only in adults. Furthermore, Fusté-Herrmann et al. (2006) also demonstrated the low rate of the use of belief verbs in the narratives of 9- and 11-year-old English-speaking and Spanish-speaking children. The similarity of these findings with those of the present study suggests that the low frequency of the use of cognitive terms in the present study is not language-specific, and might be the result of the load of cognitive and semantic processes.

The low frequency of the subcategory of the terms referring to affective states in narratives of all age groups including adults might be caused by the possibility that the parts of the story that can be described with them are not salient in the plot line and not directly related to the narrative purposes.

Enrichment expressions were found to be used as frequently as the mental state terms in all age groups. Adverbial expressions referring to the unexpected or inferred nature of an action ('yine' (again), 'birdenbire' (suddenly)), or the manner of a motion ('gizlice' (secretly)), and intensifiers ('çok' (very), 'hep' (always), 'her' (every)) were the most frequently used devices. This suggests that children starting from the age of 4 are able to incorporate these evaluative means into their narratives.

The next frequently used categories were found to be causal expressions, negative qualifiers and character speech. Starting from age of 5, causal expressions constituted approximately 10% of evaluative devices. This suggests that from preschool ages onwards the narrators are able to refer to the motivations of the story characters for their actions, the reasons of the events relevant for the plotline and the causes of the emotions. Any negation of a state or an action was coded as the use of negative qualifiers. Even though not statistically significant, 5- and 7- and 8-year-old children used them twice as frequently as children in other age groups and adults. Although such a difference was not reported in other studies examining the use of this evaluative device (e.g. Bamberg & Damrad-Frye, 1991; Küntay & Nakamura, 2004), reporting the negative states and focusing on the discrepancy between the expectations and the real happenings might imply a discourse strategy employed by these two age groups. Character speech was one of the dominant categories in the narratives of 4- and 5-year-old children. However, its use decreased starting from 7 years of age and in adult narratives its frequency was very low. A similar pattern of decrease with age was also reported by Küntay and Nakamura (2004) in the narratives of Turkish- and Japanese-speaking children. Through attributing speech to the story characters, the children are able to assign intentional states to the characters. As they grow older, they acquire more means for this evaluative function. These means might replace character speech in narratives.

Hedges indicating the level of the narrator's uncertainty for the reported events and the evaluative remarks expressing the subjective point of view of the narrator were found to be rarely used. The low frequency of these evaluative devices even in adult narratives might be an indicator of the fact that the narrative style in the Turkish culture does not include them as preferred evaluative devices.

Although contrastive expressions were rarely used by child participants, they constituted 10% of evaluative devices used by adults. This suggested that Turkish

conjunctions that express unexpected or contrastive occurrences of events such as *ama* and *fakat* 'but' gain narrative evaluative function after the age of 11 through adolescence and employed frequently by adult narrators.

Evaluative complexity was not found to be predicted by ToM, executive function or the comprehension of complex syntax. In the present study, evaluative complexity was defined partly in terms of references to the mental states of the story characters and the reasons and the consequences of the events and behaviors. These components of evaluative complexity were claimed to require ToM abilities (Fernández, 2011). Moreover, the overlap between the time period of ToM development and the time period in which children start to integrate the landscape of consciousness into their narratives suggests a relationship between the development of ToM and evaluative complexity (Astington, 1990). Taking these claimes into account, in the present study it was expected that ToM would predict evaluative complexity. However, this prediction was not supported. On the one hand, this finding contradicted with the previous ones in the literature indicating the predictive effect of ToM on evaluative complexity (e.g. Fernandez, 2011; Pelletier & Astington, 2004). On the other hand, it matched with other findings showing that ToM does not predict evaluative complexity (Charman & Shmueli-Goetz, 1998; Longobardi et al., 2014; Meins et al., 2006; Tager-Flusberg & Sullivan, 1995). The lack of the relationship between ToM and evaluative complexity has been claimed to result from the gap between ToM competence and the spontaneous use of this competence to describe the emotional and mental states of others and to interpret the reason of the events and behaviors (Meins et al., 2006). This claim was supported in a study by Meins et al. (2006) demonstrating that 7- to 9-year-old children's use of internal-state language on different tasks was not related to their ToM performance. The present finding that although the adults in the present study performed close to the ceiling level on ToM tasks, the extent of their use of evaluative devices was very limited seems to extend the finding of Meins et al. to adulthood and further support the idea that "having a ToM is different from using one's ToM capacities to describe other people and explain their behaviour" (Meins et al., 2006, p. 193). This might be expecially true in the context of narratives. Narratives are complex tasks with a lot of cognitive and linguistic demands (Reilly et al., 2004).These loads might hinder the use of ToM abilities as a result of which the use of evaluative devices does not reflect the actual mindreading capacities of the narrators (Aksu-Koç & Tekdemir, 2004).

5.5.3. Development of Syntactic Complexity

In all age groups, approximately 20% of C-units formed by the children in their narratives were syntactically complex. This finding did not support the hypothesis that the level of syntactic complexity would increase with age. In the literature, several studies showed developmental increase in the use of syntactically complex clauses in narratives of English- (Justice et al., 2006 Reilly et al., 2004),

Cantonese- (Kit-Sum To et al., 2010) and Finnish-speaking (Mäkinen et al., 2014) children. The present study did not support the findings of these earlier studies. This difference might be caused by the typological differences between Turkish and the other languages. The present study suggested that Turkish-speaking children aged between 4 to 11 years can use subordinate clauses to the same extent in their narratives. However, adult participants were found to use twice as many syntactically complex clauses as child participants. This difference between the child and adult participants suggests developmental changes in the use of syntactically complex clauses in narratives after the age of 11 until adulthood.

A consideration of the distribution of complex clauses with different number of embedded subordinate clauses might provide more information about the level of syntactic complexity. In the narratives of children in all age groups, complex clauses with only one embedded clause were the dominant type. The frequency of this type of clause in the narratives of 4-, 5- and 7- and 8-year-old children was very similar. In addition, these three groups of children used complex clauses with two subordinate clauses to the same extent. None of the children in the youngest age group was able to form clauses with more than two-embedded clauses. The rate of this type of clause was very low in the narratives of 5- and 7- and 8-year-old children. These findings suggested that between the ages of 4 and 8, the level of syntactic complexity in narrative does not change. On the other hand, 10- and 11-year-old children were found to use fewer clauses with one-embedded subordinate clause and more clauses with two- embedded subordinate clauses than 7- and 8-year-old children. This difference indicated a developmental change in syntactic complexity between these two age periods. Moreover, a further development until adulthood was indicated by a decrease in the frequency of clauses with one-embedded clause and an increase in the frequency of the clauses with more than two-embedded clauses in adult narratives compared to those of oldest children.

Reilly et al. (2004) suggested that the types of complex syntactic structures employed in the narratives might be also a means to examine syntactic complexity. To broaden the understanding of the developmental changes in syntactic complexity, syntactic diversity was analyzed in terms of the distribution of subordinate clauses with different functions. In general, noun clauses were found to be used more frequently than adverbial clauses which were more frequent than relative clauses.

The production of noun clauses formed with the subordinators –mAK is an early accomplishment. In narratives, 40% of the noun clauses formed by children and 60% of noun clauses formed by adults were of this type. Considering their early acquisition, it was thought that their prevalent use in narratives might not be a good indicator of syntactic complexity. Thus, they were excluded from further analyses of this level of complexity. It was then found that 4- and 5-year-old children used as many noun clauses as adverbial clauses and fewer relative clauses. This pattern changes in 7- and 8- and 10- and 11-year-old children. They used more adverbial clauses than noun clauses and relative clauses. This change implies that although the extent of the use of complex clauses in narratives did not change quantitatively

between 4- and 11-years of age, there were qualitative differences among the age groups reflecting variation in syntactic complexity. Moreover, despite the fact that almost none of the 4-and 5-year-old children used relative clauses in their narratives, 7- and 8-year-old children included them to some extent and their frequency increased through adulthood. These findings were consistent with those of Dasinger and Toupin (1994) showing the lack of use of relative clauses in narratives of preschool-aged Turkish-speaking children and an increase around the age of 9 years. Dasinger and Toupin (1994) also indicated that Turkish-speaking children start to use relative clauses later than Hebrew-, Spanish- and German-speaking children in their narratives. They attributed this difference to morphosyntactic complexity of Turkish relative clauses. Experimental studies also supported the late acquisition of Turkish relative clauses (Özcan, 1997; Özge, Marinis, & Zeyrek, 2010; Slobin, 1986). Thus, the increased use of these structures might be an indicator of the increase in syntactic complexity.

To be able to analyze syntactic diversity in more detail, adverbial and noun clauses were further categorized. The use of each category across the age groups is discussed further below.

The adverbial clauses were classified into four categories. 1) converbs that are formed with –(y)IncA and –(y)ken and cannot be marked for person, 2) converbs that are formed with –DIk, -AcAk and –mA and can be marked for person (except –DIkçA and –DIktAn sonra), 3) converbs that are formed with –(y)ArAk, and 4) finite adverbial clauses formed with *diye* and *ki*. In Turkish, finite adverbial clauses are used less widely than non-finite adverbial clauses or converbs (Göksel & Kerslake, 2005).In the present study, 4-year-old children used finite adverbial clauses formed with *ki* and *diye* to the same extent with the converbs formed with –DIk, -AcAk and –mA. However, in older age groups the rate of the use of finite adverbial clauses decreased while the rate of the use of converbs increased. This might be related to the acquisition of more nonfinite forms and their functions with age. In general, the converbs formed with –(y)IncA and –(y)ken and the converbs formed with –DIk, -AcAk and –mA were used to the same extent. In the first category of converbs –(y)IncA expresses succession while –(y)ken expresses simultaneity (Slobin, 1995). In the present study approximately 40 % of adverbial clauses formed by the children in each age group were from this category. This finding is consistent with Slobin's (1988; 1995) finding indicating early use of these converbs in spontaneous speech and narratives. He claimed that their early acquisition results from the straightforwardness of their temporal meanings. When children acquire an understanding of simultaneity and sequence, they can map them to the relevant converbs and start to use them around the age of 2 years. In narratives, the converbs in the second category formed with –DIk, -AcAk and –mA were mostly used to express temporal and causal relationships as in [24]-[26].

[24] Uyandıklarında çok şaşırıyorlar.
'When they woke up, they became very surprise'

[25] Sonra baykuş çocuğa kızdığı için çocuğun peşine düşmüş.
'Then, because the owl is angry with the boy, it started to follow him'
[26] Çocuk ve köpek kurbağayı aramaya gidiyorlar.
'The boy and the dog went to look for the frog'

The acquisition of –(y)ArAk lags behind that of the other two categories. It was not used by any of the 4-year-old children. In other age groups, less than 10% of adverbial clauses were from this category. Its rate of use increased to 20% in adults' narratives. Slobin (1988; 1995) claimed that this converb is semantically complex. It does not express causal or temporal relationships, but as the examples in [27]-[37] demonstrated it relates "two phases of a situation (sequential or simultaneous) in the construction of a coherent event" (1995, p.368). Its use requires splitting the scenes into phases and syntactically packaging these phases. Slobin found that the first requirement is accomplished around the age of 5 and the second requirement develops later when children can shift between the micro- and macrostructures of the events (Slobin, 1995). The present findings that some of 5-year-old children were able to use –(y)ArAk, its frequency remained very low even in the oldest children and increased in adulthood indicated that these abilities start to emerge earlier than Slobin suggested and develop further after the age of 11 through adulthood.

[27] El sallayarak diğer kurbağalara eve dönüyordu.(10- & 11-year-old)
'Waving hands to the other frogs, he went back to home'
[28] Kovandan arılar pek hoşlanmayarak çıkıyor. (7- & 8-year-old)
'The bees left the beehive not very pleased'
[29] Sonra kurbağayı aramış bir taşın üstüne çıkarak.(5-year-old)
'Then he searched the frog climbing on a stone'
[30] …kütüğün arkasına saklanarak kurbağalarını bulmuşlar (5-year old)
'Hiding behind a wood block, they found their ftog'
[31] Ve alarak evlerine geri dönmüşler (adult) (5-years-old)
'and taken him, they went back to their home'
[32] seslenerek bağırarak her yere bakmaya başlamışlar (adult)
'shouting yelling, they started to look everywhere.
[33] köpek de koklayarak kurbağayı bulmaya çalışıyordu.(adult)
'through sniffing the dog tried to find the frog'
[34] Suyun içindeki ağacın üstüne çıkarak arkasına baktı (adult)
'Climbing the tree on the water, he looked back.
[35] Daha sonra ormana doğru yol alarak ormanın bir köşesinde durdular
'After that moving toward the forest they stopped in a corner of the forest' (10- & 11-year-old)
[36] Geyik hızlıca koşarak çocuğu atmış (7- & 8-year-old)
'running fast, the deer dumped the boy'

[37] Sonra da kopek onu yalıyormuş gülerek. (7- & 8-year-old)
'Then the dog was licking him smiling.

The noun clauses were also analyzed in more detail. They were classified into four categories: 1) direct speech statements, 2)indirect speech statements, 3) complement clauses formed with –DIK, -(y)ACAK, and –mA, and 4) other subordinate noun clauses including finite noun clauses formed with *ki*. The findings indicated that children aged between 4 and 8 years used direct speech statements more frequently than other noun clauses in their complex clauses. Around the age of 10, the frequency of their use decreased and the frequency of complement clauses increased. Adults used even less direct speech statements and more complement clauses. Four- and 5-year-old children did not form any indirect speech statements. They occurred at the age of 7 years and increased slightly towards adulthood. However, their frequency remained low even in adulthood. The developmental changes in the use of direct and indirect speech statements are related to the use of character speech as an evaluative device. This relationship is an indicator of the dependency between syntactic and evaluative complexity in narratives. Children in all age groups used the other subordinate clauses formed mostly by finite noun clauses formed with *ki* to the same extent and its frequency increased only slightly in adulthood. The complement clauses formed with –mA, –DIK and –(y)AcAK have a more complex syntactic structure compared to the direct speech statements and finite noun clauses formed with *ki* (Altan, 2008). In the latter ones, the embedded clauses were not syntactically modified whereas in the former ones, the nominalization suffixes of –mA, –DIK and –(y)AcAK are followed by the possessive morpheme which has to agree with the subject of the embedded clause. Then the embedded clause was marked with the case suffix assigned by the matrix predicate. Four-year-old children were found to use these complement clauses sporadically in their narratives and the extent of their use increased with age, especially in 10- and 11-year-old children and adults. Aksu-Koç (1994) reported a similar developmental pattern in the use of these complement clauses. On the one hand, this developmental change might be related to the increased syntactic ability with age. On the other hand, Aksu-Koç (1994) argued that these constructions "present a situation as the object of cognition, perception, intention, communication, or manipulation of an experience or agent" (p.381) as a result of which their use depends "on the development of an understanding of the representational nature of mind". In the present study, the increase in the use of these constructions was parallel to the increase in the use of cognitive mental state terms. In the narratives of older children and adults the complement clauses formed mostly with –DIK were embedded in complex clauses whose main verb refers to cognitive states such as *san* 'suppose', *düşün* 'think', *fark et* 'notice', *anla* 'understand', *umut et* 'hope', *bil* 'know', *merak et* 'wonder', *farkında olmak* 'be aware of' as shown in [38]-[40] below. This supports Aksu-Koç's claim. It is also another indicator of the dependency between syntactic and evaluative complexity in narratives.

[38] En son bir ağaca çıktığını sandı.
'lastly, he thought wrongly that he climbed on a tree.'
[39] ertesi sabah kalktıklarında kurbağanın yerinde olmadığını fark ederler.
'When they woke up the next morning, they notices that the frog was not in his location'
[40] Çocuk ne yapacağını bilemiyor.
'the boy could not know what to do'

Performance on the executive function task was found to predict the level of syntactic complexity in narratives. This relationship supported the hypothesis that executive function would predict syntactic complexity. The formation of clauses with embedded subordination requires planning, holding the syntactic units in mind, inhibiting irrelevant information and combining the units. Executive function might play a role in all of these requirements. However, in the literature executive function was mostly addressed together with syntactic development in studies examining the cognitive precursors of ToM to resolve the debate about whether ToM development is related to conceptual development, syntactic development or the increase in executive function (e.g. Hughes, 1998; Perner & Lang, 1999; Sabbagh, Moses, & Shiverick, 2006; Stephanie & Julie, 2015, Russell, Mauthner, Sharpe, & Tidswell, 1991). In these studies, the focus was mainly on the relationship between ToM and the ability to produce or comprehend complement clauses; or ToM and executive function. The link between the ability to form or comprehend complement clauses and executive function was not directly taken into account. Looking at this relationship, the present study suggests that executive function is another cognitive domain influencing processing of syntactically complex structures. This was further supported by the significant correlation between executive function and participants' ability to comprehend and reproduce syntactically complex clauses on the Comprehension of Complement Clauses Task.

The difficulty of forming and comprehending syntactically complex linguistic structures has been attributed to the limited capacity of working memory (e.g. Abney & Johnson 1991; Babyonyshev & Gibson 1995; Bever, 1970; Chomsky & Miller 1963; Cowper 1976; Gibson 1991; Hakuta 1981; Kimball 1973; Lewis, 1996; MacWhinney 1987; Miller & Isard 1964; Stabler 1994; Wanner & Maratsos, 1978). In terms of competence, it is possible to embed an unlimited number of subordinate clauses into one complex clause, thus there is no limit to the length of any sentence. However, in performance there are limits and one of their reasons is considered to be the limit of the working memory capacity. The more specific effect of working memory was observed in studies showing that the working memory span influenced the resolution of syntactic ambiguity in adults (e.g. MacDonald, Just & Carpenter, 1992; Meldelsohn & Pearlmutter, 1999; Swets, Desmut, Hambrick, & Ferreira, 2007), and the production and comprehension of relative clauses in adults and children (Booth, MacWhinney, & Harasaki, 2000; Felser, Marinis, & Clahsen, 2003; Traxler, Williams, Blozis, & Morris, 2005; Weighall & Altmann, 2011). In future

studies, the effect of working memory on syntactic complexity should also be addressed.

Executive function was found to account for only 8% of the variation in syntactic complexity suggesting that there are other factors influencing syntactic complexity in narratives. Neither ToM nor the ability to comprehend complement clauses was found to be one of these factors. Fitch (2005) claimed that allowing the embedding of the representation of other minds into one's own representation, ToM is a precursor of the ability to form syntactically complex embedded structures. The present findings showing no relationship between ToM development and the development of syntactic complexity in narratives did not support this claim and the hypothesis that ToM would predict the development of syntactic complexity. There was also no correlation between them. As discussed above, the performance on the Comprehension of the Complement Clauses Task requires the production of complement clauses as well as their comprehension. In this respect, it overlaps with constructing syntactically complex clauses including complement clauses in narratives. Because of this similarity it was expected that the ability to comprehend complement clauses would predict syntactic complexity. However, there was no relationship between these two linguistic performances. This lack can be attributed to the context and cognitive load of narration as discussed below.

5.5.4. Relationship between the levels of complexity

One of the aims of the present study was to examine how the three levels of complexity are related to each other. A high positive correlation between evaluative complexity and syntactic complexity (r=.49) was found. This finding supported the hypothesis that there would be a positive relationship between evaluative and syntactic complexity. The relationship between the use of complex syntactic structures and evaluative devices was also reported in literature (Fernández; 2011).

As discussed above in Section 5.5.3, the relationship between evaluative and syntactic complexity has two possible indicators. First of all, direct speech statements display two functions in the narratives simultaneously, one as an evaluative device, and another one as a means to create syntactically complex clauses. Children use them frequently to refer to the intentional states of the story characters between 4 and 8 years of age. During this developmental period, 70% of noun clauses embedded in syntactically complex structures included direct speech statements. Secondly, the increase in the use of complement clauses was found to correspond to the increase in the use of cognitive state terms. Narratives of older children and adults included complement clauses formed with –DIk in syntactically complex clauses whose matrix predicates are cognitive state verbs such as *san*'suppose', *düşün* 'think', *anla* 'understand' etc. serving as evaluative devices describing the mental states of the story characters. The relationship between evaluative and syntactic structure was found to change with age. There were a highly positive correlation between them in narratives of 4- year-olds (r=.91) and a moderately positive relationship (r=.48) in narratives of 7- and 8-year-olds whereas they were unrelated to each other in

narratives of 5-year-old and 10- and 11-year-old children. The lack of the relationship in the older children makes the second indicator less likely. Future studies digging more deeply into the cognitive and linguistic mechanisms underlying this relationship will also provide a clearer picture of its developmental pattern.

A relationship between plot complexity and syntactic complexity was expected in the present study. This expectation was not confirmed. The distinction between narrative productivity and syntactic complexity seems to be crucial to evaluate this lack. In the literature, studies looking at the relationship between the inclusion of the plot components and linguistic complexity mostly focus on the number of clauses, the number of utterances, and the number of words in type and token as measures of linguistic competence. Some of them found relationships between these measures and the inclusion of the plot components. However, these measures are mostly measures of narrative productivity. On the other hand, the mean communication unit in words (MLCU) and clausal density (CD) measured as the mean number of clauses in one C-unit were considered to be measures of syntactic complexity. Mäkinen et al. (2014) looked at the relationship between these measures and the inclusion of plot components and found no relationship in 4- to 8-year-old Finnish-speaking children. The present study extends this finding to Turkish narratives in a wider age range. These findings suggest that the levels of plot complexity and syntactic complexity are not related in narratives. In other words, a complex plot line might not be reflected in syntactically complex structures or syntactically complex structures in narratives might not describe all the plot components (see also Justice et al., 2006). Hargrove, Frerichs, and Heino (1999) suggested that narrators have limited linguisitic capacities. These possible trade-offs between plot and syntactic complexity might be a result of this restricted capacity (Justice et al., 2006).

No relationship between evaluative complexity and plot complexity was found in the present study in general. This finding did not support the hypothesis that the levels of plot complexity and evaluative complexity would be related to each other. Nevertheless, specifically in narratives of 7- and 8-year-old children there was a moderately positive correlation between plot complexity and narrative complexity. This finding is consistent with the findings of Aldrich et al.'s (2011) study conducted with 5- to 8-year-old English-speaking children and Beck et al.'s (2012) study conducted with 7- to 8-year-old German-speaking children. The time period of transition to middle childhood is marked by emotional, cognitive and linguistic advances which might be associated with the relationship between the plot structure and the use of evaluative devices during this time periods (Beck et al. 2012).

Where the evaluative devices are placed in narratives might be critical to understand the relationship between plot complexity and evaluative complexity. Bamberg and Damrad-Frye (1991) analyzed the distribution of the use of evaluative devices across the episodes of the frog story which is also used in the present study. They demonstrated that in narratives of 5-year-old children the use of frames of mind referring to emotional and cognitive states of the story characters clustered around an

episode of the narrative which is not crucial for the main plot line, but in which the emotion and its cause can be easily derived from the corresponding picture. More specifically, they did not mention the connection between the emotion in this episode and the whole story. Furthermore, they did not refer to the emotion of the story character(s) at the resolution which is not clearly depicted in the picture, but can be derived from the overall plot line. These findings suggest that young children focus on the local aspects of events in the narrative. On the other hand, starting from the age of 9 years narrators try to incorporate the localized emotions, their reasons lying in the global structure of the story and their significance for the various pieces of the story together in their narrative. A similar developmental pattern was observed by Aldrich et al. (2011). Following Bamberg and Damrad-Frye, they examined the placement of emotional expressions in 5- to 6- and 7- and 8-year-old children's narratives. They found that the younger group of children used more emotional expressions on the local level while the older group started to integrate them into the global narrative structure. These developmental changes were summarized by Bamberg and Reilly (1996). "With increasing age, references to emotions become increasingly motivated by textual assumptions, i.e., the narrator's attempts to organize and give shape to the plot (in light of an assumed dramatic relationship) becomes the organizing force for the deployment of emotion terms" (p.336). In the present study, only the frequency of the use of evaluative devices was considered. Analysis of the form- function relationships on the basis of the distribution of evaluative devices across narratives might have been a better way to examine evaluative complexity and its relation to plot complexity.

Considering the possible relationships between the three levels of complexity and their development with age, the levels of complexity were combined through discriminant analysis. Discriminant analysis showed that among the levels of complexity mostly plot complexity can discriminate between age groups. Thus, the combined complexity score was mostly constituted by plot complexity. Other factors, namely evaluative complexity and syntactic complexity, were found not to discriminate between the age groups.As suggested before, this lack of the increase in the levels of evaluative and syntactic complexity depends on quantitative measures. More qualitative analyses provided indicators of change with age. The ability to comprehend and reproduce syntactically complex structures was found to be the sole predictor of the combined complexity score. As discussed in Section 5.5.1., performance on the comprehension of complement clauses task can be considered as an indicator of their general syntactic ability. In this respect, it might predict the general narrative ability. If the general syntactic ability is high, children have more resources for narration. On the other hand, if the general syntactic competence is low, children use more cognitive resources to form syntactic units; consequently less resources remain for narration. Moreover, the combined score was found to correlate marginally with executive function after age was controlled, and the regression analysis did not support any predictive relationship.

5.6. Summary and General Discussion

One of the aims of the present study was to examine 4- to 11-year-old Turkish-speaking children's narrative skills with respect to plot, evaluative and syntactic complexity. Another aim was to study how each level of complexity was related to some possibly underlying cognitive and linguistic abilities, namely ToM, executive function and the comprehension of complex syntax.

Plot complexity defined as the extent of the inclusion of the plot components in a temporal and thematic organization corresponds to the landscape of action in narrative. It is relevant for the referential function of the narrative. In line with the previous research, the present study demonstrated that the the fifth and seventh years of life are transitional periods for its development. Moreoever, it seems to develop further after the age of 11 throughout adolescence until adulthood. The finding that the ability to comprehend and reproduce syntactically complex clauses predicted plot complexity suggested that linguistic abilities are influential in the development of plot complexity. As the syntactic abilities of children improve, their use of cognitive resources for the formation of linguistic units decreases as a consequence of which they have more resources left for the construction of the plot line. Although executive function was not found to predict plot complexity, it was found to be positively related to it. Combined with the previous findings in the literature, it can be claimed that executive function with its components of shifting, updating and inhibition is crucial for plot complexity. Plot components were shown to have different levels of difficulty. Further studies taking these differences into account for the assessment of plot complexity might provide a more detailed account for its development and its relationship with other cognitive and linguistic skills.

Referring to the landscape of consciousness, evaluative complexity is defined as the extent of the use of evaluative devices as a means to express the mental states of the story characters, to describe the reasons and the consequences of the events and the behaviors, and to integrate the narrator's viewpoint into the plot line. It performs the evaluative function of the narrative. The present study suggested that within the period of 4 to 11 years of age children can integrate the landscape of consciousness into their narratives to some extent. However, children have preferences for evaluative devices and these preferences change with age. These changes might be related to the difficulty of cognitive and semantic elaborations and the complexity of syntactic constructions required for the use of particular evaluative devices. As children acquire more means for the specific evaluative functions, they can use them interchangeably or in combination with each other in their narratives. ToM was not found to be related to evaluative complexity. This finding suggested that using ToM, especially in narrative, is different than having ToM (Meins et al., 2006). The cognitive and linguistic demands of constructing a narrative might impede on the use of ToM as a result of which evaluative devices are neglected

throughout narratives. Supporting this idea, the use of evaluative devices was found to be very low in the narrative of adults despite the fact that they performed highly on ToM tasks. Showing that even adults used some evaluative categories rarely, the present study also supported the existence of specific discourse strategies that might be specific to a culture as discussed below.

In addition to linguistic evaluative devices considered in the present study, there are also paralinguistic devices such as affective prosody including stress, intonation, pitch, volume and rate of speech; facial expressions and gestures. Reilly and Seibert (2002) studied the use of these devices together with linguistic ones in 3- to 11-year-old children speaking English or signing in American Sign Language (ASL).Their findings indicated that in the two different modalities, signed and spoken languages, first the use of paralinguistic devices, especially prosody develops as a mean to communicate emotions. Then, the use of linguistic devices increases and the narratives become more complex, but affectively less rich. After this step, both paralinguistic and linguistic devices get integrated in the narratives (Reilly & Seibert, 2002). Although in the present study the use of paralinguistic devices was not analyzed, during data collection their extensive use, especially by young children, was observed. For example, statements including character speech, especially direct speech, as an evaluative device were accompanied with animated voice and intonation. Narrators also used gestures to imitate the behaviors of the story characters. On the basis of these observations, it can be claimed that for a thorough analysis of evaluative complexity, paralinguistic devices should be also taken into consideration in future studies. They will provide a better understanding particularly for the evaluative complexity in narratives, and generally for the relationship between language and emotion as suggested by Reilly and Seibert (2002).

The level of syntactic complexity refers to the extent of the use of syntactically complex clauses in the service of the depiction of the coherent causal, temporal and logical order of the reported events. Between 4 and 11-years of age, children's narratives were found not to differ in terms of the frequency of the use of syntactically complex clauses. Nevertheless, a more detailed analysis of the syntactically complex clauses in terms of their structure and syntactic diversity demonstrated changes among age groups. For example, although the complex clauses with one-embedded subordinate clause was the dominant type among syntactically complex clauses in each age group, 10- and 11-year-old children produced more clauses with two-embedded subordinate clauses compared to younger ones. In addition, the use of complement clauses which have a more complex syntactic structure compared to the other noun clauses was demonstrated to lag behind the use of other noun clauses in 4- to 8-year-old children's narratives, but to surpass it in narratives of older children and adults.

Executive function was found to predict the level of syntactic complexity. Considering the requirements for the formation of syntactically complex clauses such as planning and combining the syntactic units, this relationship was expected.

However, it accounted for only a small part of the variation in syntactic complexity suggesting the presence of other predictors. ToM and the ability to comprehend complement clauses were not among these predictors. This finding contradicted with Fitch's (2005) claim that due to the fact that ToM allows the embedding of the representation of other minds into the own representation of the person, it is essential for the formation of syntactically complex structures. The lack of the relationship between the level of syntactic complexity and the comprehension of complex syntax was unexpected considering that they tap on similar linguistic abilities. Resembling the lack of the relationship between ToM and the use of evaluative devices, this lack might also be attributed to the context and cognitive load of narration. Although children's ability to comprehend and reproduce complement clauses increase with age as shown by their performance in the Comprehension of the Complement Clauses Task in the present study, this increased ability might not be reflected in narratives due to the high demands of the narrative task. This possibility is also consistent with Slobin's (1988) claim that the"difficulty lies in the packaging of information for narrative purposes". Moreover, there was not much variance in syntactic complexity scores of children in each age group. This might have influenced statistically the results of the relevant regression analyses and led to the lack of a predictive relationship between syntactic complexity, and other factors.
Further research focusing on syntactic complexity not only in terms of the use of subordination but also in terms of syntactic diversity might provide a better insight into this level of complexity, its development and its relationship to cognitive and linguistic competence.

Another aim of the present study was to examine how the three levels of complexity are related to each other. The levels of evaluative and syntactic complexity were found to be positively related to each other. The study offers further indicators of their dependency. First of all, direct speech statements as evaluative devices serve at the same time as noun clauses embedded in syntactically complex clauses. Moreover, the complement clauses were mostly embedded in matrix clauses whose predicates were cognitive state verbs that were also considered as evaluative devices. The lack of relationship between plot complexity and syntactic complexity suggested that they might be independent from each other. Similarly, no relationship between plot complexity and evaluative complexity was observed. However, a qualitative analysis of the localizations of evaluative devices in the plot line might have been more informative about their relationship. Further research with finer measures for the levels of complexity and qualitative analysis for the possible relationships between them seem to be crucial.

Narration is not only an individual activity depending on cognitive and linguistic skills, but also a sociocultural one (Aksu-Koç, 1996; Nicolopoulou, 1997). Multiple sociocultural factors which manipulate children's familiarity with narratives and shape their understanding about how a narrative should be might have influenced the findings of the present study.

One of these factors is culture. Cultures might differ in their narrative styles which determine on which constituents of a narrative the narrators should focus on. Combined with the previous findings of Aksu-Koç and Tekdemir (2004) and Küntay and Nakamura (2004), the findings of the present study suggested that Turkish adult narrators focus more on the objective plot elements of the stories than their subjective evaluations. This plot-oriented narrative style might be learned by children though socialization practices in story-telling and story-reading contexts.

The plot-oriented narrative style of the Turkish narrators might be a result of the collectivist orientation of Turkish culture[7]. Markus and Kitayama (1991) proposed that interdependency is important in collectivist cultures. Individuals are considered to belong to their in-groups. Harmony in and loyalty to the group are emphasized. To protect the order in the group, communication is indirect. Attention to the needs of others is expected and an individual's own desires can be inhibited for the sake of the collective good. This type of cultural orientation is claimed to create childhood socialization practices which might enhance children's ability to understand others' mind (Fernández, 2011). On the basis of this claim, narratives in collectivist cultures might be expected to include more references to the mental states of the story characters and the reasons of their behaviors than those in individualistic cultures. In other words, they might be expected to have richer evaluative complexity. However, the studies of Küntay and Nakamura (2004) and Aksu-Koç and Tekdemir (2004) which compared Turkish children's reference to the mental states of the story characters in their narratives with that of children who were reared in the individualistic English culture did not support this expectation.

On the other hand, Mesquita (2001) showed that the meaning of an emotional situation is regarded as obvious for every individual who is familiar with that situation in the Turkish culture. This finding might explain the plot-oriented narrative style in Turkish culture. In their narratives, Turkish narrators might focus on the events in the plot structure and leave their evaluation at the implicit level, because they assume that the meaning of the events are obvious for the listeners. Consequently, they might not need to focus on the landscape of consciousness in their narratives.

In addition, gender as one of the factors creating subcultures within a culture is also related to narrative abilities. In the present study, its effect on plot complexity was demonstrated. Girls were found to generate narratives displaying higher plot complexity than boys. As discussed in Section 5.5.1., the plot line of the story 'Frog, where are you?' seems to have more components which match to how girls understand the world than those which are more familiar for boys. The differences in to which types of events or to which aspects of events girls and boys focus are socioculturally constructed in gendered subcultures. Thus, the present gender

[7] According to Hofstede's (2010) cultural dimensions, Turkey ranks low on individualism and but high on collectivism.

differences in plot complexity might be the result of gender-based socialization practices.

Previous research has shown that girls use more evaluative devices than boys in their narratives (e.g. Fernández, 2011). This difference was attributed to socialization patterns in parent-child discourse in which mothers were found to talk more about emotions with their girls than with their boys (Dunn, Bretherton, & Munn, 1987; Flannagan, & Perese, 1998; Melzi & Fernández, 2004). The present study did not support the gender effect on evaluative complexity, though. This might be the product of the general lack of talking about emotions in the Turkish culture.

In addition, story books familiarize the children with narratives. In this respect, the content of storybooks might be important for the development of narrative abilities. Storybooks for children cover mostly social issues relevant for the children such as friendship, loneliness, envy and collaborations (Aram et al., 2013). A more detailed examination of the content of the storybooks in English literature demonstrated that storybooks also contain frequently the reasons of the events, and the motivations, feelings, beliefs and thoughts of the characters (Dyer, Shatz, & Wellman, 2000). However, the content of the storybooks by itself is not sufficient to improve narrative, social and cognitive skills (Aram et al., 2013). The quality of the shared book reading interactions is critical. It might be related to culture and socioeconomic status of parents (de Temple & Snow, 1996; Heath, 1983; Korat, Klein, & Segal-Drori, 2007; Ninio, 1980; Wells, 1985). Shared interactions between parents and children focusing on the differences between the story characters' points of view, discussing the reasons of the behaviors and events, and mentioning the emotional and cognitive states of the story characters are shown to be essential to promote social cognitive abilities (e.g. Adrián, Clemente, & Villanueva, 2007; Clancy, Kay, Lambert, & Williams, 1998; Curenton & Craig, 2011; Garner, Jones, Gaddy, & Rennie, 1997; Symons et al., 2005; Slaughter, Peterson, & Mackintosh, 2007; Whitehurst et al., 1994). An intervention study conducted by Aram et al. (2013) with parents from middle and low SES supported further the importance of the quality of the book reading practices for the development of narrative and social abilities. Parents were instructed to focus on the plot line of the stories, refer to the characters' emotional and cognitive states, ask the children relevant questions and discuss how the events in the story might be related to the children themselves. It was found that these interventions lead to an increase in the inclusion of the plot components and socio-cognitive issues including mental and emotional states and the narrator's own view point, in the narratives of children. Thus, further studies about the content of story books in Turkish literature to test whether they have the characteristics mentioned above and Turkish parents' shared book reading practices with their children will provide a better account for the present findings.

Another important factor influencing the familiarity of the children with narratives is education (Aldrich et al., 2011; Bamberg & Damrad-Frye, 1991; Fusté-Hermann et al., 2006). Ukrainetz et al. (2005) claimed that due to the fact that narratives are used as instructional tools and means for the development of language

and literacy skills in school settings, they become more salient for children. Furthermore, creativeness is encouraged in narratives produced by children as a consequence of which they try to incorporate various syntactic constructions and elaborative expression in their narratives starting from the early grades on. However, these practices cannot be observed in the education system of Turkey. A Turkish language teacher in one of the schools participated in the present study stated that although she likes creative linguistic activities and wants to engage her students in narrative generation tasks like the one used in the present study, she cannot do it because of the fact that she has to follow the syllabus which places no importance on these types of activities. This lack of experience might have contributed to the overall low use of narrative devices in the present study.

Nicolopoulou (2008) suggested that the presentation of the topic, the characters and a ready-made plot to the narrators in an experimental elicitation task like the one used in the present study direct the narrators toward particular narrative means, restrict their options and hinder the use of their actual potential and abilities. According to her, the spontaneously self-generated narratives in everyday contexts including a real interactional audience will capture the narrators' actual narrative abilities and the dynamics of their development better. These ideas suggest that the present findings regarding the development of three levels of narrative complexity should be interpreted cautiously only in the context of the experimental narrative elicitation.

Previous research has shown that the use of a particular experimental narrative elicitation task constrains the interpretation of the findings, because not every experimental narrative elicitation procedure taps on the same narrative abilities and reflect the same trajectory of development (Coelho, 2002; Liles, 1993; Liles, Coelho, Duffy, & Zalagens, 1989; Merritt & Liles, 1987; Ripich & Griffith, 1998). As Hickmann (1998) suggested, the picture book elicitation task used in the present study "requires that [narrators] decode visual information about complex event sequences (line drawings), construct on this basis a global cognitive representation of the story, and 'transform' this representation into a sequentially and hierarchically organized narrative" (p. 34). It imposes various cognitive demands. Its comparison to other contexts of narrative production by Berman (2004) indicates that it is more difficult than some other story generation tasks such as the production of an event script and the verbal reconstruction of a personal experience; and some other story retelling tasks such as the generation of a narrative based on a set of small number of pictures depicting familiar scripts (Berman, 2004). Children were found to achieve a temporally organized sequence of events and the hierarchically global structure at an earlier age in the latter ones. On the other hand, the picture book elicitation task was found to be easier than the film elicitation task on which the narrators have to

remember several unrelated characters and events in combination with each other. The differences between different types of story retelling and generation contexts were attributed to the differences in their cognitive loads (Berman, 2004).

Moreover, Berman (2004) argued that specific narrative contexts are claimed to require or encourage specific kinds of abilities as a result of which the same narrative abilities might be observed in different time periods in different contexts. For instance, scene-setting information is encouraged in narratives based on personal experience. Thus, its inclusion develops early and quickly in this particular context. However, in narratives based on picture books, its inclusion is a later development (Berman, 2001). Coelho (2002) compared adults' narratives in a picture story retelling task with narratives generated on the basis of what was happening in a picture. Supporting Berman's argument (2004), he found that adults produced longer and syntactically more complex clauses in story generation and included more plot constituents in story retelling. This difference was attributed to the fact that in story retelling tasks the story is presented frame by frame which makes the plot components salient to the narrators, restricts them to the sequence of the events and discourages further elaborations in longer clauses.

Furthermore, different cognitive abilities might be related to the construction of narratives in different contexts. For instance, Mozeiko et al. (2011) claimed that the inhibition function of executive function might be more relevant to the context of story generation than to the context of story retelling, because the former one is less structured and more open to irrelevant information compared to the later one.

Considering all of these differences depending on the types of elicitation tasks, the interpretation of the present findings should be constrained to the particular narrative context. Nevertheless, Coelho (2002) suggested that the narrative task should be selected on the basis of the aims of the study. In this respect, the story retelling task in which narratives were elicited with the picture story book 'Frog, where are you?" seems to be suitable for the main aim of the present study which was to examine the development of plot, syntactic and evaluative complexities in narratives. As previously emphasized by Fernández (2011), this book depicts a story with several characters interacting with each other in temporally ordered and causally related events. Consequently, the story has a clear plot line which permited the examination of plot complexity. Moreover, the pictures portray internal states of the characters and their cognitive states can be derived from their experiences and behaviors. Thus, it allowed the examination of the use of evaluative devices for the analysis of evaluative complexity. In other words, the book seems to foster the combination of the landscape of action with the landscape of consciousness. Besides, the expression of the causal and temporal relationships in the story necessitates the use of syntactically complex clauses. Hence, syntactic complexity could also be comprehensively analyzed.

5.7. Limitations

The present study has several limitations. First of all, the assessment of executive function was limited. Considering the claims about the contribution of inhibitory control to both of ToM and narrative development, this cognitive component of executive function was examined. Due to the time restrictions, only one task, Emotional Stroop task, was used to assess inhibitory control. Combining several tasks assessing inhibitory control might have provided a better assessment. In addition to inhibition, two other cognitive constituents of executive function, shifting and updating, were claimed to be necessary for narrative production (Mozeiko et al., 2011). Multiple tasks assessing all of these cognitive abilities might have offered a better account of the relationship between executive function and narrative development. Moreover, owing to the fact that some executive function tasks like the Emotional Stroop Task require processes attributed to working memory and working memory is claimed to play a role in narrative discourse (e.g. Connor, MacKay, & White, 2000), future research has to focus on it as well (Coelho, 2002).

Children's linguistic proficiency might be related to their narrative abilities and performance on tasks which require language production and comprehension. In the present study, only syntactic competence was considered on firm theoretical grounds. However, other aspects of language might be also influential. For instance, Fiorentino and Howe (2004) showed that 5-year-old children's receptive vocabulary is related to the organization of their narratives. Thus, different aspects of general linguistic competence should have been measured to control this possible confounding variable.

The switch from the first-order ToM tasks in the youngest group of participants to the second-order ToM tasks in the older ones was another limitation. First of all, because of the fact that these two types of tasks tap on different representational skills, the shift between them did not allow the assessment of developmental changes in ToM between 4 and 5 years of age which might be important in terms of sociocognitive development as well as narrative development. Treating first- and second-order ToM performances as a single predictor creates further problems for the interpretation of the findings. Furthermore, as discussed in Section 5.1., the stories used in the second-order ToM task had different levels of difficulty. This difference might have impeded on the assessment of ToM skills. The lack of the relationship between ToM and the levels of complexities should be evaluated in light of these methodological limitations.

Research has shown that some aspects of family background such as the occupation of parents, the educational level of mothers and the number of siblings influence the ability to understand emotions and ToM development (e.g. Azmitia & Hesser, 1993; Cutting & Dunn, 1999; Dunn & Brown, 1994; Dunn, Brown, Slomkowski, Tesla, Young-blade, 1991; Jenkins & Astington, 1996; Lewis, Freeman, Kyriakidou, Maridaki-Kassotaki, & Berridge, 1996; Perner, Ruffman, & Leekam, 1994). Furthermore, socioeconomic status (SES) was revealed to influence familiarity with narratives and shared book reading interactions (e.g. De Temple

&Snow, 1996; Heath, 1983; Korat et al., 2007; Ninio, 1980; Wells, 1985). After the child participants completed the study, the demographic questionnaires presented in Appendix C were sent to the parents to obtain information about family background and socioeconomic status. However, most of these questionnaires were not returned. Therefore, these possible confounding variables could not be controlled.

The last limitation was related to the audience. The participants told the story to a single experimenter who had full access to the picture book when the participants went over the pages before starting to narrate and also when they looked at them throughout narrating. This creates an artificial story-telling environment in which the audience was already familiar with the to-be-told story. The nature of the audience was shown to influence the construction of the narratives. For instance, adult narrators who were instructed to imagine a child-like audience during narrating were found to generate longer narratives with more evaluative devices compared to the narrators who told the story to the adult experimenter (Bamberg & Reilly, 1996). In addition, 7- to 9-year-old children were shown to produce more coherent narratives with richer content in the presence of a naïve listener than in the presence of a listener who was familiar with the to-be-told material (Liles, 1985; 1987). These findings suggest that narrators modify their narratives as a function of their audience. In the present study, a more natural audience like a naïve or imaginary listener might have created a better context for the generation of narratives reflecting the narrative skills of interest for the present study.

5.8. Conclusion

All in all, focusing on the three levels of complexity, the present study provided valuable insight into how the landscape of action and the landscape of consciousness are integrated in narratives through the use of syntactic means. Within this complexity approach, it also had significant implications for the cognitive, linguistic, and social abilities underlying this process. Consequently, exploring how and through which mechanisms different types of information are represented, stored and used for narrative purposes, the present study contributed to the literature particulary in narrative development, and generally to developmental cognitive science. Future studies that investigate competence of narrators speaking typologically different languages in different discourse contexts with respect to the levels of complexity and in relation with various cultural, social, linguistic and cognitive underpinnings in various age groups covering the developmental periods from preschool to adulthood will shed more light into the narrative skills and their development.

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APPENDICES

APPENDIX A: INFORMED CONSENT FORM FOR THE CHILD PARTICIPANTS

Veli Onay Mektubu (Okul Dönemindeki Çocuklar için)
Veli Onay Mektubu (Okul Dönemindeki Çocuklar için)

Sayın Veli,

Orta Doğu Teknik Üniversitesi Enformatik Enstitüsü Bilişsel Bilimler Ana Bilim Dalı doktora öğrencisi olarak Yard. Doç. Dr. Annette Hohenberger danışmanlığında "Okul-öncesi ve okul dönemindeki çocuklarda değerlendirici anlatı öğelerinin kullanımının, zihin kuramının ve tümleç yantümcelerinin anlaşılmasının gelişimi: Türkçe konuşan ve Türk İşaret Dili kullanan çocuklar arası karşılaştırma" konulu doktora tez araştırmamı yürütmekteyim. Bu mektubun size yollanış amacı çocuğunuzun çalışmama katılması için izninizi istemektir.

Araştırmanın amacı Türkçe konuşan ve Türk İşaret Dili (TID) kullanan çocukların anlatılarında değerlendirici anlatı öğelerinin gelişimini araştırmaktır. Ayrıca, bu gelişimin zihin kuramı,tümleç yantümcelerinin anlaşılması ve kaynak göstergelerininin kullanımı ile ilişkisini incelemektir. Bu doğrultuda ekte özetini sunduğum çalışmalar uygulanacaktır. Uygulamalar bir kamera vasıtasıyla kaydedilecektir. Elde edilen veriler tamamen gizli tutulacaktır. Çocuklar bireysel olarak değerlendirilmeyecek, verilerden ortalamalar alınarak genel bulgulara ulaşılacaktır. Çalışmaların çocuğunuza hiçbir zararı olmayacaktır. İşlemler sırasında devam etmek istemediğini belirten çocuklar istedikleri anda çalışmayı bırakabileceklerdir.

Çalışmaya ya da çocuğunuzun katılımına yönelik daha fazla bilgi için 0542 683 5964 numaralı telefondan veya hale.ogel@gmail.com e-mail adresinden bana, 0 312 210 3789 numaralı telefondan veya hohenberger@ii.metu.edu.tr e-mail adresinden Yard.Doç.Dr. Annette Hohenberger'e ulaşabilirsiniz.

İlginiz için teşekkür ederim.

Hale Ögel-Balaban

Adres:
Tel:

Yukarıda açıklamasını okuduğum çalışmaya, oğlum / kızım _____
nın katılmasına izin veriyorum.

Ebeveynin Adı-soyadı: İmzası:
Tarih:

İmzalanan bu formu lütfen çocuğunuzun öğretmeni aracılığı ile Hale Ögel-Balaban'a ulaştırın.

Çocuğunuzun katılımı ya da haklarının korunmasına yönelik sorularınız varsa ya da çocuğunuzun herhangi bir şekilde risk altında olabileceğine, strese maaruz kalacağına inanıyorsanız Orta Doğu Teknik Üniversitesi Etik Kurulu'na 0312 210 3729 telefon numarasından ulaşabilirsiniz.

Tez araştırmasının amacı:

Türkçe konuşan ve Türk İşaret Dili (TİD) kullanan çocukların anlatılarında değerlendirici anlatı öğelerinin gelişimini araştırmaktır. Ayrıca bu gelişimin zihin kuramı, tümleç yan tümcelerinin anlaşılması ve kaynak göstergelerininin kullanımı ile ilişkisi incelenecektir.

Örneklem:

Çalışmaya 60 3-4 yaş arası, 7-8 yaş arası ve 10-11 yaş arası duyan ve Türkçe konuşan çocuk ile aynı yaş gruplarında 60 işitme engelli ve TİD kullanan çocuk katılacaktır. On duyan ve Türkçe konuşan, 10 işitme engelli ve TİD kullanan yetişkin kontrol grubunu oluşturacaktır.

Uygulanacak çalışmalar:

Anlatı anlatma: Katılımcılara resimli "Kurbağa, neredesin?" kitabı gösterilecektir. Bu kiatptaki resimlerden bir anlatı anlatmaları istenecektir.

*Duygusal Stroop Test*i: Katılımcılara bazı duyguları gösteren yüz ifadeleri sunulacak ve bu ifadelerin tersini söylemeleri istenecektir.

Zihin kuramı çalışmaları: Katılımcılara başkalarının düşünceleri ile ilgili çıkarım yapmalarını gerektiren hikayeler anlatılacaktır. Bu hikayelerin anlaşılmasını kolaylaştırmak için hikayelerdeki olayları gösteren resimler sunulacaktır.

Tümleç yantümcelerinin anlaşılması: Katılımcılara bazı sorular söylenecek ve onlardan bu soruları bir oyuncağa yöneltmeleri istenecektir.

Uygulama:

Belirtilen çalışmaların uygulanması yaklaşık 20-30 dakika sürecektir

APPENDIX B: INFORMED CONSENT FORM

FOR THE ADULT PARTICIPANTS

Bilgilendirilmiş Olur Formu

Sayın Katılımcı,

Orta Doğu Teknik Üniversitesi Enformatik Enstitüsü Bilişsel Bilimler Ana Bilim Dalı doktora öğrencisi olarak Yard. Doç. Dr. Annette Hohenberger danışmanlığında "Okul-öncesi ve okul dönemindeki çocuklarda değerlendirici anlatı öğelerinin kullanımının, zihin kuramının ve ortaçlı cümle yapılarının anlaşılmasının gelişimi: Türkçe konuşan ve Türk İşaret Dili kullanan çocuklar arası karşılaştırma" konulu doktora tez araştırmamı yürütmekteyim. Araştırmanın amacı Türkçe konuşan ve Türk İşaret Dili (TD) kullanan çocukların anlatılarında değerlendirici anlatı öğelerinin gelişimini araştırmaktır. Ayrıca, bu gelişimin zihin kuramı, ortaçlı cümle yapılarının anlaşılması ve kaynak göstergelerininin kullanımı ile ilişkisini incelemektir. Bu doğrultuda çocukların yanı sıra yetişkinlerden de kontrol amaçlı veri toplamaktayım.

Araştırma dahilindeki çalışmalar bir hafta arayla iki bölümde uygulanacaktır. Her bölüm bir kamera vasıtasıyla kaydedilecektir. İlk bölüm yaklaşık 10 dakika, ikinci bölüm ise yaklaşık 20 dakika sürecektir. Elde edilen veriler tamamen gizli tutulacaktır. Katılımcılar bireysel olarak değerlendirilmeyecek, verilerden ortalamalar alınarak genel bulgulara ulaşılacaktır. Çalışmaların katılımcılara hiçbir zararı olmayacaktır. İşlemler sırasında devam etmek istemediğini belirten katılımcılar istedikleri anda çalışmayı bırakabileceklerdir.

Çalışmaya ya da katılımınıza yönelik daha fazla bilgi için 0542 683 5964 numaralı telefondan veya hale.ogel@gmail.com e-mail adresinden bana, 0 312 210 3789 numaralı telefondan veya hohenberger@ii.metu.edu.tr e-mail adresinden Yard.Doç.Dr. Annette Hohenberger'e ulaşabilirsiniz.

İlginiz için teşekkür ederim.

Hale Ögel-Balaban

Adres:
Tel:

Yukarıdaki açıklamayı okudum. Çalışmaya gönüllü olarak katılmak istiyorum.

Ad-soyad: İmza:

Tarih:

Katılımınıza ya da haklarınızın korunmasına yönelik sorularınız varsa ya da herhangi bir şekilde risk altında olacağınıza, strese maaruz kalacağınıza inanıyorsanız Orta Doğu Teknik Üniversitesi Etik Kurulu'na 0312 210 3729 telefon numarasından ulaşabilirsiniz.

APPENDIX C: DEMOGRAPHIC INFORMATION QUESTIONNAIRE FOR THE CHILD PARTICIPANTS

1. Çocuğunuzun doğum tarihi (gün/ ay/ yıl):
2. Çocuğunuzun cinsiyeti: □ Kız □ Erkek
3. Çocuğunuz işitme engelli mi? □ Evet □ Hayır

   Bu soruya "Evet" cevabı verdiyseniz lütfen 4.sorudan devam ediniz.

   Bu soruya "Hayır" cevabı verdiyseniz lütfen 5. sorudan devam ediniz.
4. Ailenizde başka işitme engelli kişi var mı? □ Evet □ Hayır

   Lütfen bu kişi veya kişilerin çocuğunuza yakınlık derecesini belirtin (örnek: anne, baba, amca... gibi)

   1.işitme engelli kişi:

   2.işitme engelli kişi:

   3. işitme engelli kişi:

   4. işitme engelli kişi:

   Diğer işitme engelli kişiler (lütfen diğer kişileri sıralayınız):.....
5. Çocuğunuz Türk İşaret Dili'ni biliyor mu? □ Evet □ Hayır

   Bu soruya "Evet" cevabı verdiyseniz lütfen 6.sorudan devam ediniz.

   Bu soruya "Hayır" cevabı verdiyseniz lütfen 11. sorudan devam ediniz.
6. Çocuğunuz Türk İşaret Dili'ni ne zaman öğrendi?

   .....
7. Çocuğunuz Türk İşaret Dili'ni nasıl öğrendi?

   □ Anne-babasından

   □ Kardeşinden

   □ Diğer akrabalardan

   □ Okulda

   □ Arkadaşlarından

   □ Diğer kaynaklardan (lütfen belirtin):.....

8. Çocuğunuzun Türk İşaret Dili'ni anlama seviyesini değerlendiriniz.

□ Başlangıç □ Orta □ İyi □ Çok iyi

9. Çocuğunuzun Türk İşaret Dili'ni kullanma seviyesini değerlendiriniz.

□ Başlangıç □ Orta □ İyi □ Çok iyi

10. Çocuğunuzun günlük hayatta hangi dil veya dilleri kullanıyor?

□ Türk İşaret Dili □ Türkçe

□ Diğer (Lütfen belirtin):.....

11. Çocuğunuzun bildiği yabancı diller nelerdir?

1. Yabancı dil:.....

Bu dili bilme seviyeniz:

□ Başlangıç □ Orta □ İyi □ Çok iyi

2. yabancı dil:.....

□ Başlangıç □ Orta □ İyi □ Çok iyi

3. yabancı dil:.....

□ Başlangıç □ Orta □ İyi □ Çok iyi

12. Çocuğunuzun kaç kardeşi var?

□ Yok □ 1 □ 2 □ 3 ve daha fazla

13. Eğitim durumunuz:

□ İlkokul

□ Ortaokul

□ Lise

□ Üniversite

□ Yüksek lisans □ Diğer: .....

13. Evinizin aylık geliri ne kadardır?

□ 1.000 TLden az

□ 1.000-3.000 TL arası

□ 3.000-5.000 TL arası

□ 5.000-7.000 TL arası

□ 7.000 Tlden çok

APPENDIX D: DEMOGRAPHIC INFORMATION QUESTIONNAIRE FOR THE ADULT PARTICIPANTS

1. Doğum tarihiniz (gün/ ay/ yıl):
2. Cinsiyetiniz: □ Kız □ Erkek
3. İşitme engelli misiniz? □ Evet □ Hayır

Bu soruya "Evet" cevabı verdiyseniz lütfen 4.sorudan devam ediniz.

Bu soruya "Hayır" cevabı verdiyseniz lütfen 5. sorudan devam ediniz.

4. Ailenizde başka işitme engelli kişi var mı? □ Evet □ Hayır

Lütfen bu kişi veya kişilerin size yakınlık derecesini belirtin (örnek: anne, baba, amca... gibi)

1.işitme engelli kişi:

2.işitme engelli kişi:

3. işitme engelli kişi:

4. işitme engelli kişi:

Diğer işitme engelli kişiler (lütfen diğer kişileri sıralayınız):.....

5. Türk İşaret Dili'ni biliyor musunuz? □ Evet □ Hayır

Bu soruya "Evet" cevabı verdiyseniz lütfen 6.sorudan devam ediniz.

Bu soruya "Hayır" cevabı verdiyseniz lütfen 11. sorudan devam ediniz.

6. Türk İşaret Dili'ni ne zaman öğrendiniz?

.....

7. Türk İşaret Dili'ni nasıl öğrendiniz?

□ Anne-babamdan

□ Kardeşimden

□ Diğer akrabalarımdan

□ Okulda

□ Arkadaşlarımdan

□ Diğer kaynaklardan (lütfen belirtiniz):.....

8. Türk İşaret Dili'ni kullanma seviyenizi değerlendiriniz.

□ Başlangıç □ Orta □ İyi □ Çok iyi

9. Günlük hayatta hangi dilleri kullanıyorsunuz?

□ Türk İşaret Dili □ Türkçe

□ Diğer (lütfen belirtin):.....

11. Kaç kardeşiniz var?

□ Yok □ 1 □ 2 □ 3 ve daha fazla

12. Bildiğiniz yabancı diller nelerdir?

1. yabancı dil:.....

Bu dili bilme seviyeniz:

□ Başlangıç □ Orta □ İyi □ Çok iyi

2. yabancı dil:.....

□ Başlangıç □ Orta □ İyi □ Çok iyi

3. yabancı dil:.....

□ Başlangıç □ Orta □ İyi □ Çok iyi

13. . Eğitim durumunuz:

□ İlkokul

□ Ortaokul

□ Lise

□ Üniversite

□ Yüksek lisans

14. Aylık geliriniz ne kadardır?

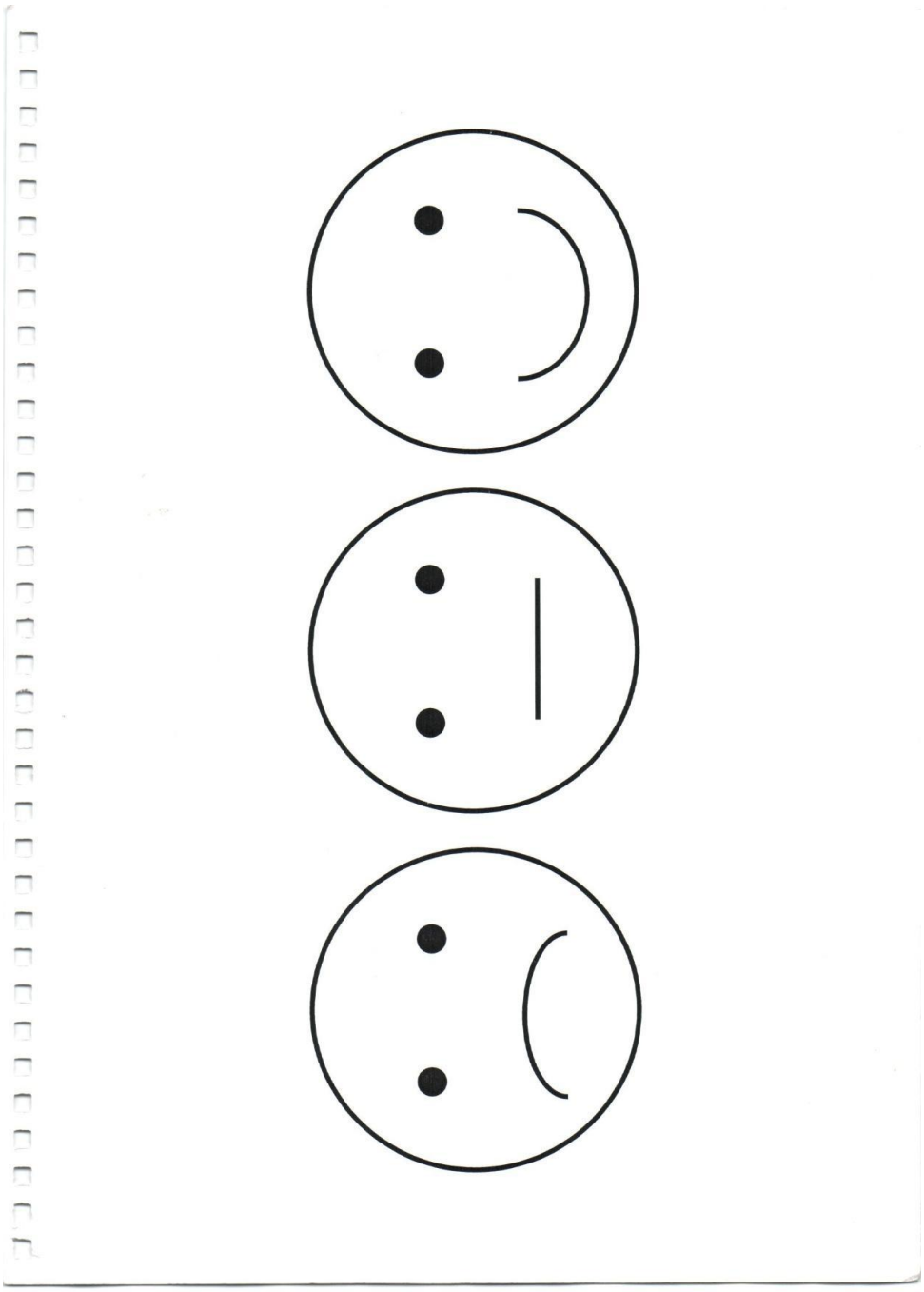
□ 1.000 TLden az □ 1.000-3.000 TL arası □ 3.000-5.000 TL arası

□ 5.000-7.000 TL arası □ 7.000 TLden çok

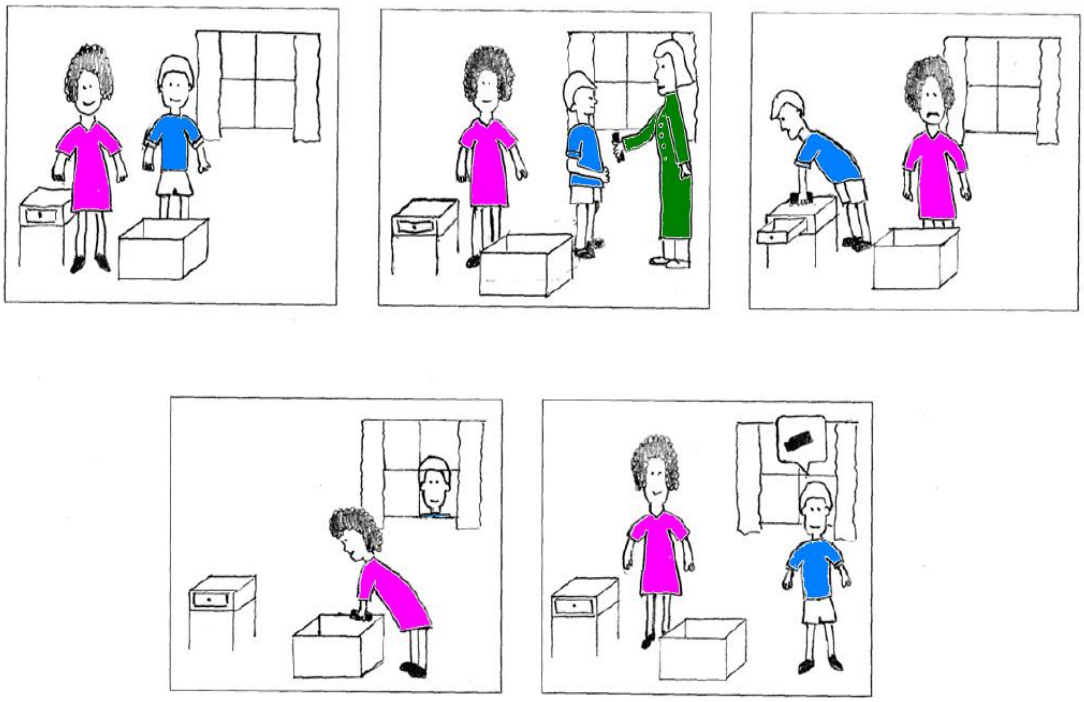
Verdiğiniz bilgiler için teşekkür ederim.

APPENDIX E: TOYS USED IN THE FIRST-ORDER ToM TASK

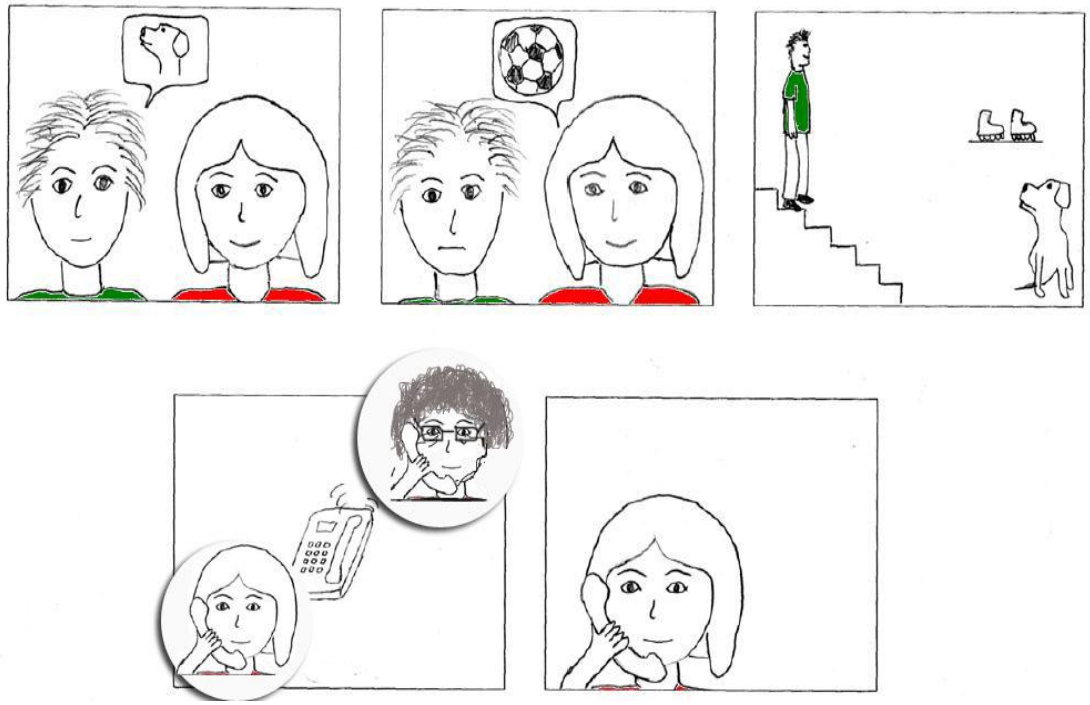
APPENDIX F: HAPPY, NEUTRAL AND SAD CARTOON FACES PRESENTED IN THE REAL-APPARENT EMOTION TASK



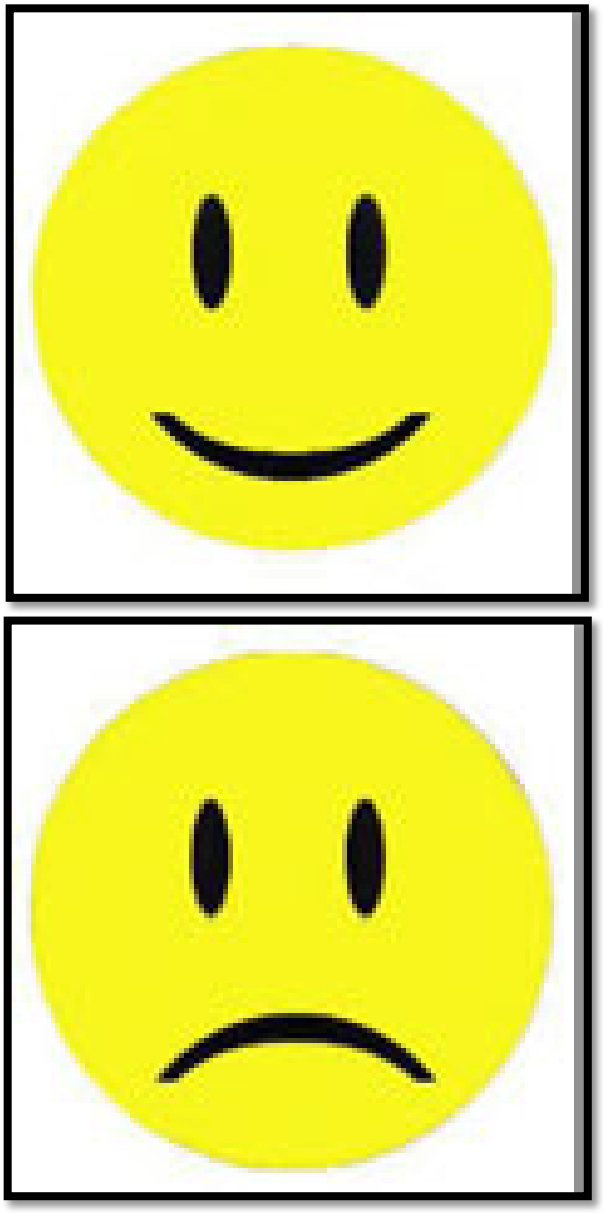
APPENDIX G: DRAWINGS DEPICTING THE CHOCOLATE BAR STORY



APPENDIX H: DRAWINGS DEPICTING THE BIRTHDAY PRESENT STORY



APPENDIX I: HAPPY AND SAD CARTOON FACES USED IN THE EMOTIONAL STROOP TASK



APPENDIX J: CONDITIONS IN THE EMOTIONAL STROOP TASK

1.	M	Ü	M	M	M	M	Ü	Ü	M	Ü	Ü
	Ü	Ü	Ü	M	Ü	M	M	Ü	M		
2.	M	M	Ü	Ü	M	M	Ü	Ü	M	Ü	M
	Ü	M	Ü	M	M	Ü	M	Ü	Ü		
3.	M	Ü	M	M	Ü	M	Ü	M	Ü	Ü	Ü
	M	Ü	M	Ü	M	M	Ü	M	Ü		
4.	Ü	M	Ü	Ü	M	Ü	M	M	M	M	M
	Ü	Ü	Ü	Ü	Ü	Ü	M	M	M		
5.	M	Ü	M	M	Ü	M	M	Ü	Ü	Ü	Ü
	Ü	Ü	Ü	M	Ü	M	M	M	M		
6.	M	M	Ü	M	M	M	M	M	Ü	Ü	M
	Ü	Ü	Ü	Ü	Ü	M	M	Ü	Ü		
7.	M	M	Ü	Ü	M	Ü	Ü	M	M	Ü	M
	M	Ü	Ü	Ü	M	M	M	Ü	Ü		
8.	Ü	M	M	M	Ü	Ü	Ü	Ü	Ü	Ü	M
	Ü	M	M	M	M	Ü	Ü	M	M		
9.	Ü	Ü	M	Ü	M	Ü	Ü	Ü	M	Ü	M
	Ü	M	M	M	Ü	M	M	Ü	M		
10.	M	M	M	Ü	Ü	Ü	M	Ü	Ü	M	Ü
	Ü	Ü	M	M	Ü	Ü	M	M	M		

APPENDIX K: SINGLE- AND DOUBLE-EMBEDDED CLAUSES ON THE COMPREHENSION OF COMPLEMENT CLAUSES TASK

Training:

- Kaplumbağa alışverişe gidecek. Ona ne alacağını sorar mısın?
- Kaplumbağa okula gitmek istiyor. Ona okulda ne yapmayı düşündüğünü sorar mısın?
- Kaplumbağanın çok güzel oyuncakları var. Ondan oyuncaklarını bizimle paylaşmasını ister misin?
- Kaplumbağa ailesiyle tatile gitti. Ona tatilde nereye gittiğini sana anlatmasını söyler misin?

Testing:

- Kaplumbağa aç gibi gözüküyor. Ona ne yemek yiyeceğini sorar mısın?
- Kaplumbağa çok güzel bir resim çizdi. Ona ne resmi çizdiğini sana anlatmasını söyler misin?
- Kaplumbağa TV seyretmeyi çok seviyor. Kaplumbağaya dün akşam televizyonda ne seyrettiğini sorar mısın?
- Kaplumbağa dün çok eğlenmiş. Ona dün ne yaptığını sana anlatmasını söyler misin?
- Kaplumbağanın bir sürü oyun arkadaşı var. Yarın arkadaşlarıyla ne oynayacaklarını düşündüğünü kaplumbağaya sorar mısın?
- Kaplumbağa telefonla konuşmak istiyor. Ona kimi aramayı planladığını sorar mısın?
- Bak kaplumbağa şeker yiyor. Kaplumbağadan bize de şeker vermesini ister misin?
- Kaplumbağa anne babası için bir süpriz hazırlayacak. Nasıl bir süpriz hazırlamayı istediğini sorar mısın?
- Kaplumbağanın sesi çok güzel. Ondan bize şarkı söylemesini ister misin?
- Bak kaplumbağa kitap okuyor. Ona kitabın ne anlattığını sorar mısın?
- (Kaplumbağanın gözleri kapalı) Bu bir şeker kutusu. Şimdi kutuya bir diş fırçası koydum. Kaplumbağaya kutuda ne olduğunu sandığını sorar mısın?
- Oyunumuz bitti. Kaplumbağaya şimdi ne yapacağını sorar mısın?

APPENDIX L: DEFINITION OF COMPONENTS OF PLOT COMPLEXITY
(taken from Ayas-Koksal, 2011 ,p.38-39)

Core Plot Components	Plot Sub-Components	Examples and Explanations
Plot onset	**Precedent event**	The boy wakes up
	Temporal location	In the morning/evening/night
	Characters	The boy/child, the dog, the frog Scoring ranges between 0-3. Only one character=1; Two of the characters= 2 Three characters=3
	The main characters learn something	The boy discovers/realizes that frog is gone away Child looks to the frog and could not find the frog When the boy and the dog wake up and look for the frog, they could not see the frog
	Depiction of inference about the frog's disappearance	The jar is empty The frog run away from the jar The frog left its jar The frog disappeared
	The response of protagonist	The boy gets surprised/worried
Plot unfolding	**Seeking for the lost frog in the home**	Child looks for the frog somewhere in the house
	Encountering with bees	The bees attack to dog, child The dog wants to catch the bees
	Interacting with gopher	Gopher bites the nose of the child Gopher becomes angry to the child Gopher comes while child is calling for the frog

	Interacting with owl	Owl attacks to the child Child is afraid of the owl
	Interacting with deer	Child gets on to the deer Deer throws the child to the lake
	Falling down	Child and the dog fall down into the lake/pond/pool/sea Child falls down to the ground
Resolution	Protagonist finds lost frog	The boy found the missing frog
Search Theme	Explicit mention of lost frog Reiteration of search theme	Whether the narrator explicitly mentions that the frog is missing and the boy was searching for him (range: 0-2). 1 point for mentioning each aspect of initiating the search theme: frog missing, boy looking. -The frog is missing -The boy looking for the frog * Just mentioning that the frog leaves its jar did not get any point
	Reiteration of search theme	Whether the search theme was reiterated later. (range: 0-2). No additional mention = 0; 1 or 2 additional mentions = 1; Multiple additional mentions = 2.

APPENDIX M: CLASSIFICATION OF MENTAL STATE TERMS

1. Classification by Bretherton and Beeghyl (1982):
    a) Perceptual: See, look, watch, listen, hear, taste, smell, feel, cold, freezing, hot, warm, hurt
    b) Physiological: hungry, starving, thirsty, sleepy, asleep, tired, awake, wake-up, sick
    c) Emotional-affective
        a. Positive: happy, have fun, funny, proud, feel, to be alright, better, good, Ok, nice, like, love, have a good time, surprised
        b. Negative: sad, angry, mad, scared, scary, dirty, messy, yucky, bad
        c. Affect expression: hug, kiss, laugh, smell, cry
    d) Volition and ability: want, need, have to, can, hard
    e) Cognition: know, think, remember, forget, maybe, may, understand, pretend, dream, real, guess, mean
    f) Moral judgment and obligation: good, bad, naughty, may, let, supposed to, must, have to, should, can.

1. Classification by Fuste-Herrmann, Silliman, Bahr Fasnacht & Federico (2006):
    a. Motivational verbs: They express desire, need and intentionality (e.g.want, querer, need, try, promise), including the intention to communicate (e.g. say, tell, ask, complain)
    b. Experiential verbs:
        a. Perceptions deriving from sight, hear, taste, touch (e.g. see, hear, taste, smell, feel)
        b. Situational emotions: (e.g. surprised, angry)
        c. Physiological reactions to a mental state: (e.g. thirsty, hungry)

        They stated that "although emotional and physiological states are often encoded syntactically as adjectives, for this study occurrences were classified as verbs".
    c. Belief verbs: (e.g. think, know, guess).

APPENDIX N: MARKING OF SUBORDINATE CLAUSES IN TURKISH

(Göksel & Kerslake,, 2011, p. 310-311)

Subordinating suffix	Type of clause	Example	Translation
-(y)en	Relative Clause	beni tanıyan kadın	the woman who knows me
-diği/-(y)eceği	Relative Clause	(benim) tanıdığım kadın	the woman I know
	Noun Clause	(benim) tanıdığımı san-	think that I know
-me	Noun Clause	(benim) gitmemi iste-	want me to go
-mek	Noun Clause	gitmek iste-	want to go
-(y)iş	Noun Clause	(benim) odaya girişim	my entering the room
-diği gibi	Adverbial Clause	(benim) dediğim gibi	as I have said
-diği halde	Adverbial Clause	(ben) geldiğim halde	although I came
-diği için	Adverbial Clause	(ben) geldiğim için	because I came
-diği kadar	Adverbial Clause	(benim) düşündüğüm kadar	as much as I thought
-diğinden beri	Adverbial Clause	(ben) geldiğimden beri	since I came
-diği zaman	Adverbial Clause	(ben) geldiğim zaman	when I come
-diğinde	Adverbial Clause	(ben) geldiğimde	when I come
-dikçe	Adverbial Clause	x oturdukça	the longer x sits
-dikten sonar	Adverbial Clause	x oturduktan sonar	after x sat down
-meden (önce)	Adverbial Clause	x gitmeden önce	before x went
-mek için	Adverbial Clause	gitmek için	in order to go
-mektense	Adverbial Clause	Gitmektense	rather than go
-meye	Adverbial Clause	bakmaya gel-	Come to look
-mekle birlikte	Adverbial Clause	bilmekle birlikte	in spite of knowing
-(y)e….-(y)e	Adverbial Clause	sora sora	by asking

-(y)ecek kadar	Adverbial Clause	Arayacak kadar sev-	love (s.o.) enough to
-(eli)r…-mez	Adverbial Clause	(x) bakar bakmaz	as soon as X looks
-(y)eli	Adverbial Clause	(x) gideli	since x went
-(y)erek	Adverbial Clause	Sorarak	by asking
-(y)ince	Adverbial Clause	(x) sorunca	When x asks
-(y)inceye kadar	Adverbial Clause	(x) bitirinceye kadar	until x finishes [it]
-(y)ken	Adverbial Clause	(x) yürürken	While x is walking

Adverbial clauses formed with *diye*, *gibi*, *ki* and the auxiliary verb *–ol* will be also coded as syntactically complex clauses.

APPENDIX O: RESULTS OF STATISTICAL ANALYSIS REGARDING SUBORDINATE CLAUSES IN NARRATIVES-TYPE OF CLAUSE

After the –mAk clauses were excluded, the distribution of complex clauses with different types of embedded subordinate clauses was also re-examined.

A 4 (age) X 3 (type of clause) mixed design ANOVA with age as the between-subjects factor and type of clause as the within-subjects factor was run. There was also a significant interaction effect between age and type of clause, $F(3.67, 112.39) = 4.86$, $p < .01$, partial $\eta^2 = .14$, observed power = .94. Results of the follow-up repeated-measures ANOVAs conducted for each age group showed that 4-year-old participants used the three types of clauses significantly differently, $F(1.02, 10.20) = 19.11$, $p < .01$, partial $\eta^2 = .66$, observed power = .98. Tests of within-subjects contrasts indicated that 4-year-old participants used more adverbial clauses [$M = 39.39$; $SD = 22.95$] than relative clauses [$M = 1.29$; $SD = 2.93$], $F(1, 10) = 26.35$, $p < .01$, $r = .85$, partial $\eta^2 = .73$, observed power = 1.00. Their rate of the use of noun and adverbial clauses did not differ, $F(1, 10) = 2.21$, $p > .05$. Similarly, 5-year-old participants used the three types of clauses significantly differently, $F(1.04, 19.76) = 22.33$, $p < .001$, partial $\eta^2 = .54$, observed power = 1.00. Tests of within-subjects contrasts indicated that 5-year-old children used more adverbial clauses [$M = 57.55$; $SD = 27.47$] than relative clauses [$M = 0.83$; $SD = 3.73$], $F(1, 19) = 88.94$, $p < .001$, $r = .91$, partial $\eta^2 = .82$, observed power = 1.00. Their rate of the use of noun and adverbial clauses did not differ, $F(1, 19) = 2.14$, $p > .05$. The rate of the use of three types of clauses differed in 7- and 8-year old children, $F(1.29, 41.23) = 31.44$, $p < .001$, partial $\eta^2 = .50$, observed power = 1.00. Tests of within-subjects contrasts indicated that they used more adverbial clauses [$M = 61.39$; $SD = 30.60$] than noun clauses [$M = 30.54$; $SD = 26.55$], $F(1, 32) = 10.91$, $p < .001$, $r = .50$, partial $\eta^2 = .25$, observed power = .89 and relative clauses [$M = 5.04$; $SD = 11.46$], $F(1, 32) = 79.52$, $p < .001$, $r = .84$, partial $\eta^2 = .71$, observed power = 1.00. Ten- and 11-year-old participants used the three types of clauses significantly differently, $F(1.35, 42.02) = 84.45$, $p < .001$, partial $\eta^2 = .73$, observed power = 1.00. They used more adverbial clauses [$M = 67.87$; $SD = 19.34$] than noun clauses [$M = 24.89$; $SD = 16.48$] and relative clauses [$M = 7.37$; $SD = 9.42$], $F(1, 31) = 48.98$, $p < .001$, $r = .78$, partial $\eta^2 = .61$, observed power = 1.00 and $F(1, 31) = 178.54$, $p < .001$, $r = .92$, partial $\eta^2 = .85$, observed power = 1.00 respectively.

APPENDIX P: RESULTS OF STATISTICAL ANALYSIS REGARDING SUBORDINATE CLAUSES IN NARRATIVES-NOUN CLAUSES

The subordinate noun clauses were also divided into four categories: 1) direct speech, 2) indirect speech, 3) complement clauses, and 4) other noun clauses including finite noun clauses formed with ki and noun clauses formed with –(y)Iş. A 4 (age) X 4 (category of noun clause) mixed design ANOVA with age as the between-subjects factor and type of category of noun clause as the within-subjects factor was run on the percentage of the number of noun clauses in each category over the total number of noun clauses. The interaction between the category of noun clause and age was found to be significant, F (5.95, 154.76) = 4.24, $p < .01$, partial η^2 =.14, observed power = .98. Separate repeated-measures ANOVAs for each age group were run

Results indicated that the effect of the category of noun clause was significant in 4-year-old participants, F(1.79, 19.64) = 14.26, $p < .01$, partial η^2 = .57, observed power = .99. The frequency of direct speech [M = 76.01; SD = 36.71] was higher than that of indirect speech [M = 0.00; SD = 00.00], F(1, 11) = 51.43, $p < .001$, r = .91, partial η^2 = .82, observed power = 1.00. The effect of the category of noun clause was significant in 5-year-old participants, F(1.44, 23.09) = 16.79, $p < .001$, partial η^2 = .51, observed power = .99. The frequency of direct speech [M = 66.32; SD = 33.22] was higher than that of indirect speech [M = 0.00; SD = 00.00], F(1, 16) = 67.77, $p <$ .001, r = .90, partial η^2 = .81, observed power = 1.00. The frequency of complement clauses [M = 24.37; SD = 34.33] was also higher than that of indirect speech, F(1, 16) = 8.57, $p < .05$, r = .59, partial η^2 = .35, observed power = .79. The effect of the category of noun clause was significant in 7- and 8-year-old participants, F(1.58, 37.86) = 21.17, $p < .001$, partial η^2 = .47, observed power = .99. The frequency of direct speech [M = 67.86; SD = 38.71] was higher than that of indirect speech [M = 2.00; SD = 10.00], F(1, 24) = 57.66, $p < .001$, r = .84, partial η^2 = .71, observed power = 1.00. The frequency of complement clauses [M = 19.33; SD = 32.52] was also higher than that of indirect speech, F(1, 24) = 7.30, $p < .05$, r = .48, partial η^2 = .23, observed power = .74. In the 10- and 11-year-old participants, the effect of the category of noun clause was significant, F(2.46, 66.34) = 5.82, $p < .01$, partial η^2 = .18, observed power = .90. The frequency of direct speech [M = 32.32; SD = 36.85] was higher than that of indirect speech [M = 11.16; SD = 23.57], F(1, 27) = 5.02, $p <$ .05, r = .40, partial η^2 = .16, observed power = .58. The frequency of complement clauses [M = 45.21; SD = 37.40] was also higher than that of indirect speech, F(1, 27)= 13.96, $p < .01$, r = .58, partial η^2 = .34, observed power = .95, and that of other noun clauses [M = 11.31; SD = 27.14], F(1, 27) = 10.94, $p < .01$, r = .54, partial η^2 = .29, observed power = .89.

CURRICULUM VITAE

Hale Ögel Balaban
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1. **Name:** Hale Ögel-Balaban
2. **Birth date :** 21.06.1980
3. **Education :**

Degree	Department	University	Dates
BA	Psychology	Bogazici University	2004
MA	Developmental Psychology	Bogazici University	2007
PhD	Cognitive Science	Middle East Technical University	2015

4. Publications

4.1. Journal Publications (SSCI)

Ögel-Balaban, H., Aksu-Koç., A., & Alp, I.E. (2012). Kaynak belleği ile dildeki kaynak göstergeleri arasındaki ilişki. *Türk Psikoloji Dergisi, 27(70)*, 26-42.

4.2. Other Journal Publications

Aksu-Koç, A., Ögel-Balaban, H., & Alp, I.E. (2009). Evidentials and source knowledge in Turkish. *New Directions for Child and Adolescent Development, 125,* 13-28.

4.3. International Conference Proceedings

Ögel-Balaban, H., & Hohenberger, A. (2015). The development of narrative skills in Turkish-speaking children: A complexity approach. Proceedings of the EuroAsian Pacific Joint Conference on Cognitive Science (4th European Conference on Cognitive Science and 10th International Conference on Cognitive Science), 6680-685, Torino, Italy, 25-27 September 2015 .

Zeyrek, D., Demirşahin, I., Sevdik-Çallı, A., Ögel-Balaban, H., Yalçınkaya, İ., & Turan, Ü. (2010). The Annotation Scheme of the Turkish Discourse Bank and An Evaluation of Inconsistent Annotations. Proceedings of the Fourth Linguistic Annotation Workshop, 282–289, Uppsala, Sweden, 15-16 July 2010.

Zeyrek, D., Turan, Ü., Bozşahin, C., Çakıcı, R., Sevdik-Çallı, A., Demirşahin, I., Aktaş, B., Yalçınkaya, İ., Ögel, H. (2009). "Annotating Subordinators in the Turkish Discourse Bank". Proceedings of the Third Linguistic Annotation Workshop, 44-47, 6-7 August 2009, Singapore.

4.4. Conference Presentations

Ogel-Balaban, H., & Hohenberger, A. (April, 2015). The development of narrative skills in Turkish-speaking children: A complexity approach. 2nd International Symposium on Brain and Cognitive Science, Ankara, Turkey.

Demirşahin, I., Sevdik-Çallı, A., Ögel-Balaban, H., Çakıcı, R., & Zeyrek, D. (May, 2012). Turkish Discourse Bank: Ongoing Developments. Poster presentation at 1st workshop at Language Resources and Technologies for Turkic Languages in The International Conference on Language Resources and Evaluation, Istanbul, Turkey.

Ögel-Balaban, H., Kraus, U., Aksu-Koç, A., Köhnken, G., & Wagener, B. (July, 2011). Does the evidential system relate to the development of theory of mind? 12th International Congress for the Study of Child Language, Montreal, Canada.

Kraus, U., Ögel-Balaban, H., Wagener, B., Aksu-Koç, A., & Köhnken, G. (accepted, August, 2010). Does evidentiality count for 3- to 5-year-olds source monitoring performance? A Turkish-German cross-linguistic study.18th Annual Meeting of the European Society for Philosophy and Psychology, Germany.

Zeyrek, D., Demirşahin, I., Sevdik-Çallı, A., Ögel-Balaban, H.(August, 2010). *Bu, şu, o* and Their Referent types in Turkish Discourse Bank. Presentation at the 15th International Conference on Turkish Linguistics, Hungary.

Ögel-Balaban, H., Kraus, U., Wagener, B., Köhnken, G., Aksu-Koç, A. (June, 2010). A cross-linguistic comparison of source monitoring performance of Turkish-speaking and German-speaking children. Poster Presentation at Theoretical Perspectives on Autobiographical Memory, Center on Autobiographical Memory Research, Aarhus, Denmark.

Ögel-Balaban, H., Kraus, U., Aksu-Koç, A., & Köhnken, G. (April, 2010). Çocuklarda Kaynak Belleği ve Zihin Kuramının Gelişimine Dilin Etkisi: Diller-arası Karşılaştırmalı Bir Çalışma. Presentation at the 16th National Psychology Congress, Mersin, Turkey.

Kraus, U., Ögel-Balaban, H., Köhnken, G., Aksu-Koç, A., & Wagener, B. (March, 2010). Können Kinder, die ein evidenzielles Sprachsystem erwerben, besser Personenquellen zu ihren Erinnerungen zuordnen, als Kinder die kein evidenzielles

Sprachsystem erwerben? Presentation at 52. Tagung experimentell arbeitender Psychologen, Saarbrücken, Germany.

Kraus, U., Ögel-Balaban, H., Köhnken, G., & Aksu-Koç, A. (August, 2009). Geben 3,4, und 5 Jahre alte Kinder selbststaendig die Personenquellen in direkten und indirekten Erlebnisberichten wieder und steht diese Wiedergabe in Beziehung zu ihrer Faehigkeit, Personenquellen richtig zuzuordnen? Presentation at 13. Fachgruppentagung Rechtspsychologie der Deutschen Gesellschaft für Psychologie, Giessen, Germany.

Ögel-Balaban, H., Kraus, U., Köhnken, G., & Aksu-Koç, A. (August, 2009) "Does the evidential system relate to source monitoring of 3- to 5-year-old children?" Poster Presentation at the 14th European Conference on Developmental Psychology, Vilnius, Lithuania.

Ögel-Balaban, H., Kraus, U, Aksu-Koç, A., & Köhnken, G. (accepted, July, 2009) "Does the evidential language system help 3- to 5-year-old children to attribute the sources of their knowledge? " Presentation at the 11th European Congress of Psychology, Oslo, Norway.

Ögel-Balaban, H., Kraus, U., Köhnken, G., & Aksu-Koç, A. (April, 2009) "Does the evidential system count for source monitoring? Comparison of source monitoring performances of Turkish and German children" Poster Presentation at the 2009 Society for Research in Child Development Biennial Meeting, Denver, USA.

Ögel, H., & Aksu-Koç, A. (September, 2008) "Kaynak Belleği ile Dildeki Kaynak Göstergeleri Arasındaki İlişki". Presentation at the 15th National Psychology Congress, Istanbul, Turkey.

Aksu-Koç, A., & Ögel, H. (August, 2008) "Evidentiality Marking and Its Relation to Cognition" Presentation at the International Conference on Language, Communication and Cognition, Brighton, England.

Ögel, H., & Aksu-Koç, A. (August, 2007) "Developments in Source Monitoring and Linguistic Encoding of Source" Poster presented at the 13th European Conference on Developmental Psychology, Jena, Germany.

4.5. Other Presentations

Ögel-Balaban, H., Kraus, U., & Aksu-Koç, A., & Köhnken, G. (2010). Does the Turkish evidential system relate to the development of source monitoring? Presentation at Psycholinguistics and Cognitive Science Seminar at Middle East Technical University, Ankara, Turkey.

Ögel-Balaban, H. (2009). The evolution of spatial abilities. Presentation at 'Darwin Day' at Middle East Technical University, Ankara, Turkey.

5. Projects

January 2012- December 2012 Researcher in ODTÜ-BAP 07-04-2012-003: "The development of the use of narrative evaluative devices, theory of mind, and complex syntax in preschool and school children: a comparative study of Turkish and Turkish Sign Language (TID)", Project Director: Annette Hohenberger, (6.800,00 TL).

April 2009- January 2011 Research assistant in ODTU Metin Düzeyinde İşaretlenmiş Türkçe Derlem Çalışması (MEDID). Annotating Turkish discourse markers in METU Turkish Corpus. Founded by Türkiye Bilimsel ve Teknolojik Araştırma Kurumu (The Scientific and Technological Research Counsil of Turkey.

September 2007 – August 2010 Cross-linguistic comparison of children's source monitoring.Comparing source monitoring and theory of mind abilities of Turkish-speaking children with those of German-speaking children (in cooperation with Dr. Uta Kraus, Institut für Psychologie Christian-Albrechts-Universität zu Kiel.

February 2008- January 2009 Researcher in the project "Best success through language loss" by Katharina Brizic (Austrian Academy of Sciences, Vienna, Austria).

Spring 2004 – Fall 2005 Project Research Assistant (Research Project on the speed of information processing of infants, carried out by Prof. Dr. I. Ercan Alp, and Eda Tanyeli (MA), Bogazici University).Responsible for administering Imitation Sorting Task (Alp, 1994), transcribing and coding of data for inter-rater reliability analysis

Spring 2002 Participation in the Value of Children Study (Research Project carried out by Prof. Dr. Cigdem Kagitcibasi, Koc University, and Prof. Dr. Bilge Ataca, Bogazici University) Interviewing adolescents, mothers and grandmothers from different socioeconomic backgrounds.

6. Teaching Experience

2013 Fall Semester - Present
Part-time instructor, Yeditepe University

- Courses: 'Cognitive Psychology', 'Theoretical Perspectives in Psychology'
- Graduate Course in Cognitive Science Master's Program: 'Cognitive Science'

2015 Spring Semester
Part-time instructor, Kadir Has University

- Courses: 'Cognitive Psychology'

2013 Spring & Fall Semester
Part-time instructor, Işık University

- Courses: 'Language and Concept Development' & 'Systems in Psychology'

September 2005 – August 2008 and September-2009- August 2012
Teaching Assistant, Istanbul Bilgi University

- Teaching Assistant of 'Social Psychology', 'Historical and Modern Perspectives in Psychology', 'Cognitive Psychology', 'Child Psychology', 'Evolutionary Psychology', 'Learning' Courses
  Responsible for lecturing the weekly review & discussion sessions, preparing and grading exams and assignments.
- Teaching Assistant of 'Experimental Psychology' Course
  Responsible for supervising and grading research projects
- Coordinator of 'Senior Project Thesis' Course
  Responsible for lecturing about various topics (such as how to write literature reviews and proposals, APA style, plagiarism, research designs, and research ethics), and providing guidance to students during their research process.

7. Scientific and Professional Membership

- International Association for the Study of Child Language

8. Awards and Honours

- Graduate Courses Performance Award. Middle East Technical University, Graduate School of Informatics, 2009.

- Dean's High Honor List (ranking first among psychology graduates). Bogazici University, Faculty of Arts and Sciences, Spring 2004.

9. Reviewer Activities

- Cognition

TEZ FOTOKOPİ İZİN FORMU

ENSTİTÜ

Fen Bilimleri Enstitüsü [ ]

Sosyal Bilimler Enstitüsü [ ]

Uygulamalı Matematik Enstitüsü [ ]

Enformatik Enstitüsü [X]

Deniz Bilimleri Enstitüsü [ ]

YAZARIN

Soyadı : Ögel Balaban

Adı : Hale

Bölümü : Bilişsel Bilimler

TEZİN ADI (İngilizce) : The development of narrative skills in Turkish-speaking children: A complexity approach

TEZİN TÜRÜ : Yüksek Lisans [ ] Doktora [X]

1. Tezimin tamamı dünya çapında erişime açılsın ve kaynak gösterilmek şartıyla tezimin bir kısmı veya tamamının fotokopisi alınsın. [ ]

2. Tezimin tamamı yalnızca Orta Doğu Teknik Üniversitesi kullancılarının erişimine açılsın. (Bu seçenekle tezinizin fotokopisi ya da elektronik kopyası Kütüphane aracılığı ile ODTÜ dışına dağıtılmayacaktır.) [ ]

3. Tezim bir (1) yıl süreyle erişime kapalı olsun. (Bu seçenekle tezinizin fotokopisi ya da elektronik kopyası Kütüphane aracılığı ile ODTÜ dışına dağıtılmayacaktır.) [X]

Yazarın imzası ..... Tarih .....