TURKISH AS A GRAMMATICALIZED LANGUAGE: THE EFFECT OF FACTIVITY ALTERNATION AND CERTAINTY ON THEORY OF MIND UNDERSTANDING

A Master's Thesis

by

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To My Family

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ABSTRACT

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The majority of studies investigating the relation between language and socio-cognitive understanding have been designed for and carried out with participants from Western cultures (Milligan et al., 2007). Recently, there is emerging interest in studying the relation between cultural-linguistic nuances and social understanding (Choi, 2006; Matsui, Yamamoto & McCagg, 2006). Many linguistic features found in languages such as Japanese, Korean, or Turkish are integral to the syntactic complexity of these languages and express epistemic stances towards reality or others' propositions. The current thesis included two studies investigating adult native Turkish speakers' sensitivity to the certainty of propositions based on grammatical structure and whether their sensitivity is related to their theory of mind

abilities. The results showed that Turkish speakers are sensitive to (a) factivity alternation, meaning they display different levels of epistemic certainty based on the grammatical framing of the verb *to know* (Studies 1 & 2) (b) morphological certainty markers (Study 2). However, participants' sensitivity to epistemic certainty was unrelated to ToM abilities as assessed by the Faux Pas task (Study 1 & 2), and epistemic bias as assessed by the Contamination Task (Study 1). The results are discussed with their implications, especially for future work with younger samples.

Keywords: Theory of Mind, Social Cognition, Language, Factivity Alternation, Certainty.

ÖZET

GRAMERLEŞMİŞ BİR DİL OLARAK TÜRKÇE: OLGUSALLIK DEĞİŞİMİNİN VE KESİNLİK İFADELERİNİN ZİHİN KURAMI BECERİSİNE ETKİSİ

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Dil ve sosyo-bilişsel beceriler arasındaki ilişkiyi araştıran çalışmaların çoğu, Batı kültürlerinden katılımcılar için tasarlanmış ve yürütülmüştür (Milligan ve diğerleri, 2007). Son zamanlarda, kültürel-dilsel nüanslar ve sosyal anlayış arasındaki ilişkiyi incelemeye yönelik çalışmalar yapılmaya başlanmıştır (Choi, 2006; Matsui, Yamamoto & McCagg, 2006). Japonca, Korece veya Türkçe gibi dillerde bulunan birçok dilsel özellik, bu dillerin sözdizimsel karmaşıklığının ayrılmaz bir parçasıdır ve gerçekliğe veya başkalarının önermelerine yönelik epistemik duruşları ifade eder. Mevcut tez, anadili Türkçe olan yetişkinlerin, dilbilgisel yapıya dayalı önermelerin kesinliğine karşı duyarlılıklarını ve bu duyarlılıklarının Zihin Kuramı (ZK) becerileriyle ilişkili olup olmadığını araştıran iki çalışmayı içermektedir. Sonuçlar, Türkçe konuşanların (a) olgusallık değişimine, yani *bilmek* fiilinin dilbilgisel çerçevesine dayalı olarak farklı düzeylerde epistemik kesinlik sergilemesine (Çalışmalar 1 & 2) (b) morfolojik kesinlik

bildirme eklerine duyarlı olduklarını göstermiştir (Çalışma 2). Bununla birlikte, katılımcıların epistemik kesinliğe duyarlılıkları ile Faux Pas görevi tarafından değerlendirilen ZK becerileri (Çalışma 1 & 2) ve epistemik önyargıları (Çalışma 1) arasında ilişki bulunmamıştır. Sonuçların, özellikle daha genç bireylerle yapılacak gelecekteki çalışmalara katkısı tartışılmıştır.

Anahtar kelimeler: Zihin Kuramı, Sosyal Biliş, Dil, Olgusallık Değişimi, Kesinlik.

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CHAPTER 1

INTRODUCTION

Human beings seek to make sense of their and others' beliefs, desires, intentions, knowledge, and subsequent actions, and they attribute mental states to themselves and others. This ability is often referred to by the literature as "theory of mind" (ToM), first defined by Premack and Woodruff (1978). This ability constitutes a critical component of our social toolbox and allows for the successful navigation of our daily social interactions. This ability helps us make sense of other people's behaviors by taking into account what they perceive, know, and believe. It assists in understanding the reasons and intentions that underlie one's behaviors, thoughts, or beliefs. To acknowledge that one's mental states could differ from those of others enables individuals to establish successful communication (Youmans & Bourgeois, 2010; Singer, 2006).

The current study investigates whether Turkish adults' sensitivity to differentiate between factive and non-factive uses of epistemic words and certainty expressions in terms of degrees of certainty is related to their theory of mind abilities. There is no study investigating this relation in psychology literature. We investigated whether

adults appreciate the subtle differences in epistemological certainty and whether their sensitivity to these differences correlates with their theory of mind scores.

In what follows, I first reviewed the literature of ToM with children. Next, I went into the adult literature of ToM. Next, I talked about grammatical expressions of epistemological certainty in Turkish. Finally, I explained the current study.

1.1 ToM: Assessment in Children, Developmental Trajectory

In the literature, children's ToM abilities have been assessed most often via false belief tasks (e.g., unexpected contents, change of location). The ability to understand another individual's false belief has become the "litmus test" for ToM abilities. The first version of the false belief task (i.e., change of location task) was developed by Perner and Wimmer (1985). In this task, character A sees an object in a particular location and leaves the room. The other character, B, comes and moves the object to another location and leaves the scene. Later, when the first character returns to the scene, the child is asked where this character would find the object or where the character thinks the object is. In this task, the child is expected to understand character A's mental state regarding the object's location. Consequently, successful performance requires an understanding that the character would look in the wrong location because that is where she thinks the object is. Control questions that ask where the object was before the relocation and the object's current location are asked to ensure that children's comprehension of the story is not responsible for their failure at the task. A meta-analysis that included 178 studies showed that most

children (i.e., 76%) pass this false belief task at 4 ½ years of age (Wellman, Cross, & Watson, 2001).

The change of location task focuses on understanding a 3rd person's false belief. It requires that children either simultaneously represent or switch between two perspectives, one belonging to self and the other to the 3rd person. However, in daily life, we find ourselves in situations with multiple 3rd persons who may have conflicting mental states (e.g., conflicting motivations, emotions, beliefs). The ability to coordinate or simultaneously represent more than one 3rd person perspective is termed second-order ToM. Tasks that measure second-order ToM ability have shown that children succeed between 6 and 9 years of age, depending on the complexity of the task they are assessed with (Perner & Wimmer, 1985; Sullivan, Zaitchik, & Tager-Flusberg, 1994).

False belief understanding (first- and second-order) are significant milestones in the development of ToM abilities. However, researchers acknowledge that false belief does not, by itself, constitute ToM competence (Keysar, Lin, & Bar, 2003). Bach and colleagues (2000) state that ToM has a complex structure that develops in different difficulty levels in each developmental stage. Some of the abilities that ToM encompasses are: the ability to make attribution of emotions, desires, intentions, and beliefs about several 3rd persons, to understand irony and sarcasm, and to understand how an innocent statement could be perceived as rude or cruel based on the context (i.e., faux pas understanding). These abilities continue to develop in middle childhood and adolescence (Valle, Massaro, Castelli, & Marchetti,

2015; Bottiroli, Cavallini, Ceccato, Vecchi, & Lecce, 2016; Söderstrand & Almkvist, 2012). In comparison to our knowledge about the early stages of ToM development, relatively little is known about the development of ToM in typical adolescents and adults. In daily life, an adult can get into social interaction in which they need to understand irony, faux pas, or detect lies and attribute emotions, desires, and beliefs. Therefore, studying adult ToM reasoning is a crucial issue to understand the development of ToM beyond childhood (Miller, 2012).

1.2 ToM Understanding in Adults

Measuring ToM competence in adults has proven to be challenging (Cavallini, Lecce, Bottiroli, Palladino, & Pagnin, 2013; Castelli, Baglio, Blasi, Alberoni, Falini, Liverta-Sempio, Nemni, & Marchetti, 2010; Keightley, Winocur, Burianova, Hongwanishkul, & Grady, 2006). Studies that compared children's performance on process-oriented measures (reaction times) have shown that adults are faster than children in responding to false belief tasks (Apperly, Warren, Andrews, Grant, & Todd, 2011). While reaction times may serve to differentiate between adults' performances from those of children, process-oriented measures (e.g., looking time, anticipatory looking, mouse tracking) that use versions of false belief paradigms have failed to show a differentiation within neurotypical adults (Kulke & Hinrichs, 2021).

Behavioral measures of ToM for adolescents and adults include various measures that target different components of social understanding. One widely used example

is the '*Reading Mind in the Eyes Test*' (RMET) (Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001) which was developed to assess the ability to label facial emotion displays. Another example is the Faux Pas Task (Baron-Cohen, O'Riordan, Jones, Stone, & Plaisted, 1999), which aims to assess the ability to understand how utterances can be understood differently than how they were intended based on non-shared context. Another measure is the Theory of Mind Assessment Test (T.h.o.m.a.s) (Bosco, Colle, Fazio, Bono, Ruberti, & Tirassa, 2009) is a self-report scale designed to measure several dimensions of ToM such as first versus third person, first- versus second-order, egocentric versus allocentric. Finally, another widely used behavioral measure of ToM with adults is the Strange Stories task (Happe, 1994). Through vignettes, this task measures whether individuals can correctly understand sophisticated interpersonal contexts such as situations containing lie, white lie, bluff, double bluff, joke, irony, and figure of speech. These tools have been used to evaluate adult ToM abilities and have been well-validated across different cultures and languages.

There is a scarcity of research that investigates the variability in ToM competence of neurotypical adults. Most of the tasks reviewed in this paper have been developed to study neuro-atypical adult populations that show significant problems in their social cognitive reasoning (e.g., adults with schizophrenia). However, some information relevant to the purposes of the current study can be deduced as these studies use healthy adult control groups.

A consistent challenge in the literature has been developing a reliable and valid ToM task that would show variability in adults. Such a task needs to be comprehensive enough to tap at the complex levels of socio-cognitive reasoning instead of focusing on one narrow ToM component (e.g., emotion recognition). In addition, the task should target socio-cognitive reasoning rather than other cognitive abilities. For example, the Yoni task (Shamay-Tsoory & Aharon-Peretz, 2007) measured ToM competence through adults' reaction times and accuracy to simple visual displays of an emoji face whose eyes were looking at one of four corners of the display. The four corners had different visual stimuli, all belonging to the same category (e.g., food). The adult's task is to decide which of the four items fit with the verbal cue (e.g., Yoni likes …) and the visual cue (i.e., where Yoni is looking). The Yoni test showed variability in adults' performance; however, success in the task could also be explained by simple associations (i.e., gaze and object). In fact, a control trial where the eyes of the emoji were always centered did not produce comparable results.

Another task that has been widely used, especially with individuals on the autism spectrum, is Happé's (1994) Strange Stories task. In this task, individuals are asked to make meaning of socially awkward, tricky, or complex situations. While the task differentiates between neuro-atypical and typical adults, it does not show performance variability in the neurotypical group. Namely, a ceiling effect is observed where neurotypical adults' proper justifications to stories were scored 23.7 on average out of 24 (Happé, 1994).

A promising task that shows variability in adult performance is the Short-Story Task (Dodell-Feder, Lincoln, Coulson, & Hooker, 2013). This task provides participants with a fictional story (Hemingway, 2003) that focuses on the interaction between a couple. The story is rich with first-order and second-order mental states. The participants are asked questions about the story, and their answers are coded for both "implicit" and "explicit" ToM reasoning. The reader should be cautioned that the way in which Dodell-Feder et al. (2013) use these terms is different than how they have been applied in the infant ToM literature. These researchers have termed spontaneous mentions of mental states as implicit and probed mentions as explicit ToM. However, this distinction is somewhat artificial and does not align with the literature. It should also be noted that the coding scheme did not distinguish between cognitive and affective; first-order and second-order mental state attributions. Even so, the task revealed variations in adults' performances.

Another task that shows variability in neurotypical adults is the "Reading the mind in the eyes task". The task requires individuals to identify the emotion presented in different clippings of pictures that show the eye region of the face. Despite its widespread usage, this task has been heavily criticized for low internal coherence, and unidimensionality in measuring ToM (Olderbak, Wilhelm, Olaru, Geiger, Brenneman, & Roberts, 2015; Voracek & Dressler, 2006).

One advantage of working with adults is the freedom to ask reflective questions about their behavior and thoughts. Although this is widely used in clinical and social psychology research, this practice is less prevalent with cognitive or socio-cognitive

skills. Regardless, the T.h.o.m.a.s (Bosco et al., 2009) is such a measure that utilizes a semi-structured open-question interview. It is a broad assessment that aims to measure multiple ToM components like first-order, second-order, third-order, egocentric vs. allocentric reasoning, and a variety of mental state content. Participants are given a self-report questionnaire, and they are asked to report their reflections in daily life situations. However, the self-report nature of the measure does not allow for understanding whether individuals assess their own reflective socio-cognitive abilities accurately.

The task used in both experiments of this study is the Faux Pas Task (Baron-Cohen et al., 1999). This task focuses on individuals' ability to understand situations where a lack of contextual information leads one character to say something inappropriate, offensive or rude. The task presents individuals with 20 short stories that involve social interaction. Individuals are asked whether any of the characters in the story said something inappropriate and to explain why it was inappropriate. Sensitivity to faux pas is measured through whether the participants realize the difference between the speaker and the listener's perspectives and whether they assess the emotional impact of the speaker's words (Baron-Cohen et al., 1999). In other words, faux pas understanding requires combining the representation of two mental states, which are the cognitive component (understanding that the speaker does not know what he should not say or she does not act deliberately) and the affective component (empathetic understanding of the listener's feelings such as humiliation or sadness) (Bach, Happe, Fleminger, & Powell, 2000; Stone, Baron-Cohen, & Knight, 1998; Gallagher & Frith 2003). Bottiroli and colleagues (2016) used the Faux Pas Task

with young and older adults. They found age differences in the affective component but not in the cognitive component. Another study that lent support to the suitability of its use with adult populations was done with Swedish adults (Söderstrand & Almkvist, 2012). The participants obtained a mean score of 49.2 (*SD* = 8.38) out of 60 and displayed acceptable distribution. The control stories of the Faux Pas Task produced a ceiling effect. The findings show that adults showed uniformly good performance when the situation did not contain faux pas but showed variability in their ability to detect and interpret situations that involved faux pas. In the current study, the Faux Pas Task was used to measure adults' ToM abilities. The reasons for this decision include the finding that there is no ceiling effect and its focus on sophisticated social interactions that include perspectival conflict.

One of the most intriguing findings in the ToM literature with children has been children's propensity for systematic errors. Some researchers have argued that these errors are due to children's limitations with executive functions (Carlson, Claxton, & Moses, 2015), while others have seen the reason for these errors as first and foremost conceptual in nature (Wellman, 2014). With neurotypical adults, the concern is no longer conceptual development. However, executive functions still play a role since the biases that operate in childhood are also prevalent in adulthood. One such bias is the realist bias identified by Mitchell and colleagues (1996) and documented through the "M*ental Contamination Task*". This bias suggests that adults' knowledge of reality can contaminate their judgments regarding others' beliefs about reality. The realist bias is similar to the "Hindsight bias" by which individuals' judgments

regarding past, present or related contexts are affected by the present reality (Fischhoff, 1975; Fischhoff & Beyth, 1975).

Research that focuses on biases in false belief reasoning investigates adults' logical inferences and possible errors in false belief tasks. Adults could make bias-driven mistakes in false belief tasks due to two reasons (Mitchell, Robinson, Isaacs, & Nye., 1996; Wilson & Brekke, 1994): "failure to apply logical inferences" or "mental contamination".

Mitchell and colleagues (1996) investigated the effect of contamination of reality truthfulness on adults' and children's belief judgments. They recruited a group of older adolescents and young adults as well as children aged between 4 to 6 years old. The story "Mary John Paradigm" is adapted from Perner and Wimmer (1985) and is given to participants in three different versions. The participants were asked to make judgments about a story characters' thinking process. The first one is "No Belief, False-message" (NBFM), in which Susan, without any prior knowledge, is told something false only known to participants. The second one is "False belief, True-message" (FBTM), in which another character informs Susan, who has a false belief about the true state of affairs. The third one is "True Belief, False-message" (TBFM), in which Susan, who has a true belief, is told contradictory and false information. In both the FBTM and TBFM conditions, the participants are asked to judge whether Susan would believe the information given to her. In reality, since Susan does not know the truth value of the message, whether the participant knows it to be true or false should have no effect. However, the results showed that adult

participants judged that Susan would believe the message if they knew it was true as compared to if they knew it was false. That was taken as an indication of the "realist bias".

1.3 The relation between ToM and language

Language is one of the most stable and cross-culturally stable correlate and predictor of ToM abilities (Carpendale & Lewis, 2004; Milligan, Astington, & Dack, 2007). Moreover, studies have shown that all major components of language (vocabulary, grammar, and pragmatics) are related to ToM competence. There is, however diversity in the views on why and how language supports ToM abilities. For instance, Astington and Baird (2005) propose that children construct the conceptual infrastructure of social understanding by using epistemic information stated in social interactional contexts. Others propose that language plays a constitutive role in the construction of epistemic concepts through social interactions (Carpendale & Lewis, 2004; Nelson, 2007). However, others place primary emphasis on the syntactic features of language. Children's ability to comprehend sentential complements has been found to be positively correlated with ToM reasoning in both typical and atypical samples (e.g., de Villiers & Pyers, 2002). It is important to note that language seems to be holistically related to ToM abilities, meaning even in training studies that show the importance of vocabulary or syntactic abilities, conditions that combine these features results in more substantial improvement (Lohmann & Tomasello, 2003).

In contrast to the literature with children, the relation between adults' language abilities and ToM is seldom studied. Furthermore, the existing studies show results that are contrary to the findings from the child literature. For instance, in a study with adults with impaired language abilities. Apperly and his colleagues (2006) found that individuals with semantic knowledge and grammar knowledge impairments show diminished abilities neither in mental state comprehension nor in ToM abilities. Apperly and colleagues (2006) concluded that grammar might be an essential factor in the *construction* of belief reasoning, hence the relationship is observable in children but not in adults.

Nevertheless, language may still play a critical role in adults' false belief. Newton and deVilliers (2007) showed that adults who were asked to repeat the linguistic stimuli they hear while watching an implicit ToM task display showed significantly worse performance than other adults who were asked to echo the taps they hear. Although this study highlights the critical importance of language for ToM reasoning, it does not show which components of language (semantics or syntax) are essential for belief reasoning. Following these conflicting results in the limited literature with adults, the current study examined both the effect of semantic and morphosyntactic components of language on healthy adults' ToM reasoning. The current study features native Turkish speakers and investigates whether speakers' evaluation of subtle markers (i.e., morphosyntactic) of epistemic content in addition to their evaluation of mental state language that serves to express epistemic factivity (i.e., *to think, to know*) is related to their ToM abilities.

1.4 Language as a cultural medium for epistemic content expression

Language is defined as "the principal method of human communication, consisting of words used in a structured and conventional way and conveyed by speech, writing, or gesture" ("Language", 2021). Below the more superficial differences between languages, such as sounds, or different labels for objects and actions, language reflects cultural history and a community's members' ways of thinking about the world. Culture specificity is observed most commonly when one culture's language has a label that another lacks (e.g., absence of "kismet" in the English language, hence the loan word). However, culture specificity can also be observed in more structural facets of language, such as syntax.

Regarding the relation between language and social understanding, it would be necessary to review cultural studies dealing with cultural-linguistic specificity and socio-cognitive abilities. In the literature, three major features (i.e., semantics, syntax, and pragmatics) have been studied in relation to the development of social understanding (Milligan et al., 2007). However, most studies have been designed for and carried out with participants from Western cultures. This has resulted in neglecting possible culture-specific linguistic nuances of non-Western cultures (and their languages). Recently, there is emerging interest in studying the relation between cultural-linguistic specificity, including evidentiality or certainty markers, and social understanding (Choi, 2006; Matsui, Yamamoto & McCagg, 2006). These linguistic features found in languages such as Korean, Turkish, or Japanese are integral to the syntactic complexity of these languages and serve to express epistemic stances towards reality or others' propositions. In turn, they came to play a

constitutive role in individuals' constructions of complex epistemic states through verbally rich social interactions.

Although researchers try to unpack the effects of language, the division between semantics (e.g., mental state words), syntax (e.g., complementation), and pragmatics is far from absolute. Studies that focus on the semantics of mental states have found orderly progression in children's understanding of epistemic content from simpler to more sophisticated mental states (e.g., think, know, guess) (Johnson & Maratsos, 1977; Johnson & Wellman, 1980). Furthermore, research has consistently shown that earlier parent-child conversations, especially the usage of mental state and certainty implying words (i.e., modulations of assertion), predict later development of children's ToM abilities (Ruffman, Slade, & Crowe, 2002; for meta-analyses, see Devine & Hughes, 2018; Tompkins, Benigno, Lee & Wright, 2018). These studies have been generally taken to indicate that acquiring the underlying semantics concepts is instrumental to children's development of social understanding skills (for a different view, see Ilgaz & Allen, 2020). In terms of syntax, the acquisition of complementation structures in both typical (de Villiers & Pyers, 2002) and deaf children has been found to be related to ToM abilities (Schick, de Villiers, de Villiers, & Hoffmeister, 2007). This type of grammatical structure allows for explicit representation of a proposition (e.g., a belief) to be nested within another's proposition (e.g., an individual's assertion). However, it is important to note once again that intervention studies that served to pit one component of language (mental state language) to another (complementation) have shown that the strongest effect was found in conditions that included both features of language.

Pragmatics is studied less often in research, possibly because it is by definition inseparable from semantics, syntax, and the conversational context. The child needs to follow the mental state utterances presented in a framework of syntactic rules that vary by the pragmatics of communication. To give an example, “I know that my mom is at home”, and “I think my mom is at home” both highlight an epistemic stance towards reality. However, these stances are not identical. Children learn when to use which epistemic label with which syntactic construction through verbal communication in socially meaningful contexts (i.e., storytelling, conversations, reminiscing) (Nelson, 2005).

1.5 Factivity Alternation as an epistemic feature of language

The first study in this thesis investigates the relation between adults’ evaluation of epistemic expressions and their ToM abilities with native Turkish speakers. The Turkish language is particularly relevant for this study as it is rich in both semantic and syntactic features that express epistemic nuances. An example of nuance is the feature of Turkish that allows for *factivity alternation*. This is the phenomenon where the same verb (e.g., to know) displays both factive (i.e., truth expressing) and non-factive (i.e., non-truth expressing) meanings depending on the syntax of the language (e.g., complementation) (Özyıldız 2016). Turkish is a highly grammaticalized language in which different syntactic constructions marks factive versus non-factive uses of the verb *know*. This is different than English, where *know*

is used to express factive propositions. In other words, in English, a speaker chooses to use *to know* only with propositions that match the true state of affairs.

In the current study, adults' knowledge of the nuance of how the syntactic construction involving the verb *know* varies in the truth assertion of a proposition was hypothesized to indicate their sensitivity to how affairs of the mind are discussed in their cultural community. As Astington (2001) argued, features of languages do not compete but complete each other in social understanding development. Next, I focused on the limited literature that investigates a somewhat a feature found in some languages in which grammaticalized markers of specific languages are significantly related to children's improved social understanding abilities.

1.5.1 Factivity alternation in Turkish

In Turkish, *to know* can be used, resulting in different semantic values in sentences. *To know* is only used when the proposition is true in reality in English. In contrast, *to know* can be used in a not true proposition and true in Turkish. That is, as Özyıldız (2016) showed that *–bil* (corresponds to *know* in English) could have both factive and nonfactive meanings. Examples (1) and (2) are given below. There are attitude reports constructed with the verb of *bil-* (*know* in English) that equally attribute to Deniz the belief that Ayşe made the cake. The reports differ in syntactic forms, which results in factive meaning (1) and non-factive meaning (2). In contrast to

factive reports, non-factive reports are non-veridical, which are signaling the falsity of the attitude proposition.

(1) Deniz keki [Ayşe-nin yap-tığ-ı-nı] biliyor. “Deniz knows that Ayşe made the cake”

Özyıldız called this way of the use of bil- (know) as “nominalization bil- or as factive know” (F). Factive know is compatible with reality. In this example, one can infer that the cake is made by Ayşe in reality, and Deniz knows it.

(2) Context: Hülya made the cake, but …

Deniz [Ayşe yaptı diye] biliyor. “Deniz thinks that Ayşe made the cake.”

Özyıldız (2016) called this way of use of *bil-* (know) as “diye bil- or as non-factive know” (F). Non-factive know is not compatible with reality. In this example, one can infer that the cake is not made by Ayşe, but Deniz knows in that way. Therefore, Deniz’s belief is false. We called this non-factive know as “grammatical non-factive know” in the current study. Because, we have also found the ungrammatical version of non-factive in which the morpheme *–diye* is removed but it retains the meaning of non-factive know. The example of ungrammatical non-factive know is given below (3).

(3) Context: Hülya made the cake, but…

Deniz [Ayşe yap-tı] biliyor. “Deniz thinks that Ayşe made.”

Like grammatical version, ungrammatical non-factive know is also not compatible with reality. In this example, one can also infer that Deniz’s belief is false. We included both grammatical and ungrammatical non-factives in the current study. These examples show us that belief propositions in Turkish do not necessarily have to be true. We can derive the opposite meanings even though we use the same

epistemic word (i.e., *know*) in both sentences (1 vs. 2 & 3). Factivity alternation is studied in linguistics and found in different languages like in Hungarian, Greek, and Catalan (Abrusan, 2011); in Korean (Moulton, 2009). However, as far as our knowledge, factivity alternation in the language has been studied with neither adults nor children. In this study, adults are being asked to evaluate the likely truth of propositions that use factive and non-factive know. We expected there would be differences in adults' evaluation of likely truth of propositions that use factive know and non-factive know. Participants would rate propositions embedded in factive grammatical structures to be more truthful as compared to propositions embedded in grammatical and ungrammatical non-factive structures. While no study looks at conventionalized uses of ungrammatical versions of what we deem to be non-factive versions of structures that use the verb *to know*, we expect propositions embedded in these types of structures to be rated lower in truth value to propositions embedded in grammatical factives and possibly even lower than propositions embedded in grammatical non-factives. Finally, we expected that individuals who are more sensitive to these syntactic features (factive and non-factive) will be a more apt theory of mind reasoner in Turkish. Sensitivity to factivity alternation is calculated as the difference score between factive and non-factive use of *to know*. The higher the difference score indicates higher sensitivity.

1.6 Expression of Certainty as Epistemic Features of Languages

People express their certainties or evidence in their daily life concerning their propositions by considering reality within their linguistic forms (Aikhenvald, 2004).

As described above, some languages include markers when expressing certainty regarding knowledge and beliefs. As Aikhenvald (2004) indicated, many languages use grammaticalized markers to indicate *certainty* by adding suffixes at the end of the words. This practice is used in addition to the non-grammaticalized usage of verbs such as *think* and *know*.

Evidence for the relation of certainty and social understanding is also found in languages where certainty can be expressed via morphosyntactic units. Choi (1995) found that Korean-speaking children could make meaning of certainty markers at three years of age. It was also suggested that the early acquisition of certainty markers enables Korean children to acknowledge the degree of truth-value propositions. Overall, this limited literature supports the assertion that the acquisition of epistemic markers is a component of the development of how minds are expressed and discussed in a community which lends supports to the aims of the current study. In a parallel study with Turkish-speaking children, Aksu-Koç and Alici (2000) studied evidential markers with children. Evidential markers are used by Turkish speakers to provide evidence for their statements when referring to past events (Aksu-Koç, 1988). With those markers, speakers indicate their experiences about past events that happened either through direct or indirect experiences. Turkish speakers use a direct evidential marker, *-DI*, to state past events with direct experience (e.g., seeing); they use an indirect evidential marker, -mIş to state past events with indirect experience (e.g., hearing). With those direct and indirect evidential markers, the listener has an idea about the speaker's psychological state (e.g., perception, belief, knowledge) about a given event, and also the listener might

appreciate one's certainty about his or her statement. For example, when the speaker uses direct evidential marker –*DI* (e.g., Bardak kırıl-*DI* "*The glass was broken*"), the listener appreciates that the speaker saw the event and she could be highly certain about her statement. However, when the speaker constructs the same sentence with an indirect evidential marker –mIş, the listener appreciates that the speaker might have heard the event from somebody else in which one may not be completely sure about the veridicality of the event. Therefore, evidential markers could inform about certainty as well as direct versus indirect experiences. In their study, Aksu-Koç and Alici (2000) have found that their understanding of evidential markers regarding others' beliefs was correlated with their social understanding abilities. They suggested that those children who understand evidential markers' semantic functions could grasp others' mental states at earlier ages. The findings from Aksu-Koç and Alici's study provides evidence for the relation between features of language that serve to express epistemic content in one culture and that community's members' development of social understanding.

Another piece of evidence comes from a cross-cultural study with Japanese- and German- native children. Matsui, Rakoczy, Miura, and Tomasello (2009) conducted a cross-cultural study in which Japanese children were given ToM tasks with a grammaticalized common in their language system while German children were given tasks with a lexical version. This study revealed that Japanese-speaking children showed significant improvements in the tasks when the verbal stimuli included certainty markers. These two cultural studies suggest the importance of early acquired grammatically embedded rules in children's socio-cognitive abilities.

Certainty regarding a proposition or an assertion is one component of understanding others' epistemic reality.

Empirical evidence for the gradual development of the appreciation of certainty vocabulary and the relation between certainty and ToM has also been documented in languages where certainty is expressed solely via lexical markers. Some studies examined the relationship between acquiring lexical mental state verbs implying relative certainty (e.g., think, know and guess) within false belief tasks (Johnson & Maratsos, 1977; Moore, Bryant & Furrow, 1989). The results showed that children took knowledge as a more reliable indicator of an object's location. Four- and 5-year-old children comprehend the different implications of verbs to false belief tasks. Moore, Pure, and Furrow (1990) conducted another study with a modal expression of certainty. The unexpected location task was constructed with different modal verbs (must, might, and could) and modal adjuncts (probably, possibly, and maybe). The results indicated that 4-year-old and older children found the hidden object based on these different linguistic formulations. They also found that children understand that some certainty modals imply high certainty (must or probably). In contrast, some indicate less certainty (might, possibly, maybe), resulting in the best performance in high certainty conditions. Therefore, in languages where certainty is expressed via lexical markers, understanding certainty represents a component of social understanding development.

It is possible that in language communities where epistemic content is expressed both morphosyntactically and lexically (e.g., Japanese, Korean, Turkish),

appreciation of certainty via subtle linguistic cues (i.e., morphosyntactic markers) may provide researchers with a way of measuring social cognitive abilities in both children and adults. The current study is a first step in investigating this phenomenon in adults, where constructing reliable measures of ToM understanding is challenging. In addition, working with competent and typical adults who are proficient in their cultures' ways of thinking and talking about minds would represent a good starting point for further studies with children. Therefore, this research is the first to study the relationship between social understanding skills and the ability to distinguish Turkish specific factivity alternation by marker changes in the adult population and certainty markers indicating different certainty levels.

1.6.1 Expressions of Certainty in Turkish

In Turkish, there are morphologic markers indicating possibility and probability. There are many suffixes indicating uncertainty in Turkish: *-(y)Abil, -A/Ir, -Dır, -mAlı/mEli* (Kerimoğlu, 2010). In Turkish, those suffixes are added at the end of the verbs and they affect the semantics of sentences. Those morphological markers are used to indicate probability, possibility, assumption, or prediction. However, they might be expressing different degrees of certainty. That is, speakers may select which suffix to use based on their certainty. Moreover, speakers may indicate their assessment of the strong or the weak possibility of an event or an idea with specific suffixes. Therefore, we divided markers based on the literature into two categories. One is evidence-based markers. Those markers express that the speaker's proposition is based on strong circumstantial evidence. The second one is a marker

expressing speculative possibility. This marker is also called the "Speaker-generated possibility" marker by Göksel and Kerslake (2005). By using this marker, the speaker expresses a judgment about the possibility of an event occurring.

1.6.1.1 Evidence-Based Certainty Markers

-Dır. This morphological marker is used to indicate possibility and assumption (Kerimoğlu, 2010). Göksel and Kerslake (2005) evaluate *–Dır* similar to markers which report assumption and hypothesis.

Daha önce bu yemekten ye-miş-iz-dir. "*We have eaten this meal before*."

Bugün haber ver-ecek-ler-dir. "*They will announce today*."

-mEli/ -mAlı. This marker expresses a possibility of past or present event in a sense that there is robust circumstantial evidence (Kerimoğlu, 2010)

Kapı kapalı, dışarda olmalılar. "*The door's closed; they must be outside*."

-(A/I)r. Assumptions are given with aorist *-(A/I)r* generally expresses future time assumptions. They indicate specific planned or predetermined unforeseen events (Kerimoğlu, 2010)

Mehmet erken uyu-r. sleep early. "*Mehmet will (probably) sleep early."*

1.6.1.2 Speculative Possibility Marker

-(y)Abil. This morphological marker is used to indicate speculative possibility. The speculative possibility has a meaning of judgment about the probability of an event occurring and expressing prediction (Kerimoğlu, 2010).

Annem yarın gelebilir/gelmeyebilir. "*My mother may come/may not come tomorrow*"

While *-Dır, -(A/I)r, -mEli/-mAlı* suffixes express an inference drawn about the state from strong circumstantial evidence, *-(y)Abil* suffixes does not imply evidence but a speculative possibility.

1.6.1.3 Lexical Markers Expressing Certainty

In addition to certainty markers given by literature, we also include other morphosyntactic markers used frequently in Turkish *ben-ce* (*in my opinion* in English) and mental state expression *to think*. These expressions also indicate the speaker's certainty about his or her belief. The verb *to think* (*düşün-* in Turkish) has been using in the assessment of children's ToM. Therefore, we would like to compare the certainty degree of *to think* when used in epistemic propositions with the certainty markers in Turkish mentioned above. The mental state expression *to think* is called as "No Certainty Marker" condition (NCM) in this study. We expected that as a result of comparisons between those certainty suffixes and lexical markers, we would have an idea about native Turkish speakers' evaluation of certainty expressions.

1.7 The Current Study

The current study holds that social understanding abilities like the theory of mind develop within people's social interaction in their daily lives. Language features that have developed and existed in the culture have unique markers and unique syntactic, morphological, and pragmatic features playing a role in establishing social interactions. Therefore, language specificity is an issue to consider when working with socio-cognitive concepts.

This thesis is composed of two studies done with adults. Our primary reason to study with adults is that children grow up in a specific culture and try to be part of the community by adopting adult-like manifestations, including pragmatics, semantics, and syntactic forms within the specific language system. Therefore, the result of adult studies can guide future studies done with children.

The first study investigated whether adults show sensitivity to factivity alternations and whether their sensitivity is related to their social understanding skills. We hypothesized that (a) There would be differences in adults' judgments of the truth values of factive and nonfactive structured propositions; (b) Individuals who are more sensitive to these syntactic features (factive and non-factive) would be a more apt theory of mind reasoners. In the first study, we also tested whether participants were sensitive to the non-grammatical yet conventional forms of *know*. Given that these uses are not recognized in formal Turkish grammar (yet exist in daily speech)

coupled with the fact that there was also no previous study that examined this condition rendered our investigation exploratory. We expected participants to rate these uses similar to grammatical non-factives, but possibly rated even lower in truth value.

The second study in this thesis investigated whether the variability in participants' judgments about certainty for different Turkish markers is related to ToM scores. While *-Dır, -(A/I)r, -mEli/-mAlı* suffixes express an inference drawn about the state from strong circumstantial evidence, *-(y)Abil* suffixes does not imply evidence but a speculative possibility. We assumed that the speakers could be highly confident about their statements when their statements indicate higher certainty and also their inferences seems to be based on strong evidence. Therefore, we expected that adults would make similar confidence judgments for statements that use suffixes implying circumstantial *evidence-based inference* (i.e., *-Dır, -(A/I)r, –mEli/ -mAlı*). In cases of speculative possibility inference without an evidential base (i.e., *-(y)Abil*), adults would indicate less certainty. Hence, (a) In line with Göksel and Kerslake's (2005) conceptualization, we expected participants to rate statements that use certainty markers expressing evidence-based inference (*-(A/I)r, -Dır* and *–mEli/-mAlı*) higher in the strength of the speaker's confidence as compared to the statements constructed with certainty marker expressing speculative possibility (*-(y)Abil*). In addition, we expected participants to rate statements that use each certainty markers categorized within evidence-based inference similarly. We have also conducted exploratory analyses for comparisons of the lexical markers *düşün-* (*to think*) (NCM) and *ben-ce* with other certainty markers. Finally, we expected relation between the ToM

abilities and the difference in confidence level scores of statements that use evidence-based suffixes and speculative possibility suffixes.

CHAPTER 2

STUDY 1

In Turkish linguistics literature, there are two uses of *to know* whose factivity is alternated with some syntactic changes. This study investigated whether Turkish adults are sensitive to factivity alternation in daily life situations and whether their sensitivity to factivity alternation is related to their social understanding skills. The study was carried out through an online survey, where adults judge the truth values of epistemological propositions that use factive and non-factive verbs and complete theory of mind tasks.

2.1 Method

2.1.1 Participants

One-hundred and ninety-nine Turkish-speaking adults participated in the online survey created through Qualtrics. Ninety-nine participants who did not complete the study 100% were excluded. Data provided by one hundred and nine adult participants were included in the analysis. Participants' age range 18 to 53 years, *M* = 27.14, *SD* = 7.12. Participants were recruited through announcements made on social media websites (e.g., Facebook, Instagram) and through a snowball sampling

method where the participants were encouraged to share the announcement with their own networks. With this method, sufficient participants from diverse ages were reached. All individuals could participate in the study when they agreed to participate by clicking on the "I agree" button under the consent form on the first page of the survey. The ones who clicked on the "I disagree" button were directed to the end of the survey without seeing survey questions.

2.1.2 Procedure

Participants participated in the study through sharing Qualtrics links on social media websites such as Facebook and Instagram. They were provided a very brief explanation of the study and the consent form. When they agreed to participate, they were presented with the survey questions. They were reminded that there were no right or wrong answers and that the study is conducted to see native Turkish speakers' evaluation of propositions with syntactic changes. There were presented a total number of 30 propositions structured with three types of factivity (10 each) uses of *to know* in Turkish. They were asked to rate the likely truth of each epistemological proposition on a continuous scale ranging from 0 to 100. After completing the language part of the survey, the participants were given two separate advanced ToM tasks. They were first given the Mental Contamination task (Mitchell et al., 1996) in which the participants were given a story with three different conditions, and they were required to make judgments about a story characters' thinking process. The order of the story versions and the answer options was randomized for each participant. After completing the Mental Contamination Task,

participants were given another ToM task, Faux Pas Task. In this task, there are ten faux pas stories in which the speaker says something that the listener may not want to hear or be inadvertently offended by. There were ten control stories mixed with faux pas stories. Participants were asked eight questions for each story, two of which were comprehension questions. The order of the stories was randomized for all participants. The participants were able to skip any question that they did not want to answer or quit the study whenever they wished to. In the end, they were debriefed about the aim of the study and if they wished, they could give their e-mail addresses in order to be informed about the results of the study. Qualtrics recorded their answers automatically. Answers were downloaded and edited by the experimenter herself and no other unauthorized person was able to reach the answers. The whole procedure and all materials were approved by Bilkent Ethics Committee. The survey took approximately 30-40 minutes to complete.

2.1.3 Materials

2.1.3.1 Factivity alternation task

In the factivity alternation task, adults were presented with the voice recordings epistemic propositions. In addition, the propositions were also available in written format for the participants while they were listening to recordings. They first listened to the recordings then indicated the likely truth of propositions on a continuum. One end of the continuum indicated that the proposition was most definitely false (point 0 in the continuum scale), while the direction indicated that the proposition was most probably true (point 100 in the continuum scale). There were two types of factivity

alternation test items. The first one was non-factive know, described by Özyıldız (2016) as “diye bil- or as non-factive know”. Non-factive know has both grammatical and ungrammatical versions. For example, the ungrammatical version “Ali, Ayşe'yi evde biliyor” and the grammatical version “Ali, Ayşe evde diye biliyor.” Both corresponded “Ali thinks that Ayşe is at home” in English. In Turkish, *know* can be used instead of *think* in Turkish to indicate one could have a not true belief. After reading propositions, participants were asked what seems to be the case in reality (e.g., In reality, Ayşe is at home or not). They rated the possibility of the truthfulness of the proposition on the continuum scale ranging from 0 to 100. The meaning of this use of bil- (know) was that Ali has a false belief that he falsely thinks that Ayşe is at home. Therefore, the expected answer was closer to the end of the continuum that stated “Ayşe evde değildir” (Ayşe is not home). The second one was factive know, described by Özyıldız (2016) as “nominalization bil- or as factive know”. For example, “Ali Ayşe’ nin evde olduğunu biliyor.” corresponds, “Ali knows that Ayşe is at home” in English. The use of *know* (*bil-* in Turkish) is the same in both English and Turkish languages. That is, in this example, Ali has a true belief about Ayşe’s being at home. The meaning of this use of *bil-* (*know*) was that Ali truly believes that Ayşe is at home. Therefore, the expected answer was “Ayşe evdedir” (Ayşe is at home). In the second example, it would be possible to infer that Ali has evidence regarding Ayşe’s correct whereabouts. There were 30 propositions to be answered by participants. Each proposition topic was not given in both uses of *to know*, instead, they were attained to one type of use. (See Appendix A for the task).

2.1.3.2 Faux Pas Task

To measure adults' advanced theory of mind abilities, we used The Faux Pas task for adults (Stone et al., 1998; Gregory, Lough, Stone, Erzinclioglu, Martin, Baron-Cohen, & Hodges, 2002) which was originally developed for children between 9 and 11 (Baron-Cohen et al., 1999). In this task, there were ten faux pas stories in which the speaker says something inadvertently that the listener may not want to hear or be offended by and there were ten control stories mixed with faux pas stories. Participants were asked eight questions for each story two of which were comprehension questions specific to each story (7^{th} and 8^{th}): (1) Faux Pas Detection Question: Biri söylememesi gereken bir şey veya garip bir şey söyledi mi? (Did anyone say something they should not have said, or something awkward?) (2) Faux Pas Detection Question: Kim söylememesi gereken ya da garip bir şey söyledi? (Who said something they should not have said, or something awkward?) (3) Understanding Inappropriateness Qs: Neden söylememesi gerekirdi ya da bu söylediği neden garipti? (Why should she/he not have said it, or why was it awkward?) (4) Intention Qs: Neden söylediğini düşünüyorsunuz? (Why do you think he/she said it?) (5) Belief Qs: A kişisi B durumunu biliyor muydu/ aklında mıydı? (Did A know/realize that B?) (6) Empathy Qs: Sizce A kişisi nasıl hissetti? (How do you think person A felt?). The adult version of the Faux Pas Task (Stone et al., 1998; Gregory et al., 2002) was adapted to Turkish culture. Names of story characters, places, and some contexts were changed to be adapted to Turkish cultural contexts. The task was given to participants through the online survey platform “Qualtrics”. Participants’ answers were carefully coded according to the coding protocol of the adult version of the test (Stone et al., 1998; Gregory et al., 2002).

For faux pas stories, participants got 1 point for each question answered correctly. Firstly, their answers to two control questions were checked to see whether they comprehend the story or not. If they gave an incorrect response to at least one of the control questions, they got zero (0) for that story. If they gave a correct response to both control questions, their answers to the other six questions were scored. When they answered “yes” to the first detection question (“Did anyone say something they shouldn't have said?”), they got 1 point and then they were enabled to see other questions; if they chose “no”, they got 0 points and then they were skipped to control questions without seeing any other questions. To get 1 point for the second detection question (“Who said something they shouldn't have said?”), they needed to give any answer that identifies the correct person who made a faux pas in the story, in which names are not necessary. To get 1 point from the third question (Understanding Inappropriateness Qs: “Why shouldn't they have said it?”), any reasonable answer that mentioned faux pas was needed. This question was scored 0 when respondents’ answers were offensive or irrelevant which did not reflect an understanding of faux pas. To get 1 point from the fourth question (Intention Qs: “Why did they say it?" or "Why do you think they said it?”), respondents’ answers were needed to indicate that they understood one of the story characters did not know something or did not act on it deliberately. This question was scored 0 if the respondent seemed to indicate that the story character said inappropriate things deliberately. To get 1 point from the fifth question (Belief Qs: “Did X know that Y?”), respondents needed to indicate that the story character did not know or did not realize his inappropriate statement. This question was scored 0 if the respondent’s answer did not reflect the story

character's knowledge and beliefs. To get 1 point from the sixth question (Empathy Qs: "How did X feel?"), respondents needed to mention story appropriate emotions such as the feeling of hurt, anger, embarrassment, or disappointment. This question was scored 0 if their answers are obviously inappropriate. As mentioned above, the respondents had to answer control questions correctly in order for their other questions to be scored.

In control stories, where there was no faux pas situation, if respondents correctly identified the lack of a faux pas, they only got to answer control questions. In other words, they weren't asked questions that probed the faux pas sitation. They automatically received 1 point for all faux pas question if they also gave correct answers to the two control questions.

To calculate the total summary scores of stories including both faux pas and control ones, first, we summed up a number of the correct answers to control questions which are called "Correct Control Qs-FP Stories" which ended up with a perfect score of 20. It is important to note that if respondents made errors on at least one of the control questions of a story, all their responses were crossed out for that story. Second, we summed up the number of the correct answers to the first detection question and second detection question for both faux pas stories and control stories separately. That summed up detection scores were divided by score of "Correct Control Qs", then we ended up with the final score ranged between 0 to 1. This final score is called "Faux Pas Detection Score". Thirdly, we summed up the score on the 3rd question (Understanding Inappropriateness Qs) for both faux pas and control

stories, which ended up with a perfect score of 20. Then summed up 3rd question scores were divided by again “Correct Control Qs”, ended up with the final score (called Understanding Inappropriateness Score) ranged between 0 to 1. The same calculation was applied for scoring the “Intention”, “Belief” and “Empathy” questions of both faux pas and control stories. At the end of the scoring, we got 5 scores ranged between 0 to 1 (i.e., *Detection Score, Understanding Inappropriateness Score, Intention Score, Belief Score,* and *Empathy Score*). We took an average of those scores (sum of 5 scores divided by 5) and we got “Aggregated Faux Pas Score”.

2.1.3.3 Contamination Task

To investigate adults’ contamination of reality truthfulness on belief judgments, called “realist bias”, the Contamination Task (Mitchell et al., 1996) was used (See Appendix C for the task). The participants were given a story with three different conditions, and they were required to make judgments about a story characters' thinking process. In this task, the story “Mary John Paradigm” was originally adapted from Perner and Wimmer (1985) and was given to participants in three different versions. In these stories, there are two friends named Susan and Mary. The first one is “No Belief, False-message” (NBFM), in which Susan, without any prior knowledge, is told something false only known to participants. The question that participants were asked is “Mary dondurmacının nerede olduğunu düşünüyor? (Where does Mary think the ice cream shop is?). The second one is “False belief, True-message (FBTM)”, in which Susan with a prior belief that is known to be false

by the participants is told something true in reality but contradicted her prior belief. The third one is “True Belief False-message (TBFM)”, in which Susan, with a prior belief that is known to be true by the participants. She is told something false in reality, which also contradicted her initial belief. In FBTM and TBFM, the participants were asked to indicate where Mary thinks the ice cream shop is. The stories were given as audio recording and written format. Then, the participants were asked to choose one of the multiple-choice options given to them. Multiple-choice options were the places mentioned in the stories. We created two types of variables for two different analyses of the Contamination Task. For logistic regression analysis, we had two categorizations “Pass versus Fail”. Participants who gave correct answers (answers without bias) to all stories were categorized as “Passed”; whereas participants who gave at least one biased answer to any stories were categorized as “Failed”. For regression analysis, we calculated a number of correct answers. For example, a respondent who chose correct answers to all stories got 3 points, whereas another respondent who chose correct answers to one of the three stories got 1 point.

2.2 Results

2.2.1 Analysis Plan

The first study investigated three research questions. The first is whether Turkish adults’ evaluation of the likely truth of propositions that use factive and non-factive verbs differ from each other. In addition, we also investigated whether the difference exists between grammatical non-factive and ungrammatical non-factive verbs.

Adults were being asked to evaluate the likely truth of propositions that use factive and non-factive verbs on the continuum scale of probability ranged between 0 to 100. In order to investigate first and additional research questions, a Repeated-Measure ANOVA was conducted. For the ANOVA, the dependent variable was the ratings of likely truth of propositions and independent variables were three uses of to know in epistemic expressions (factive, grammatical non-factive, and ungrammatical non-factive). As a result of ANOVA analysis, we conducted a pairwise comparison test to investigate one-by-one comparisons of likely truth evaluations of three uses of to know.

The second research question was whether adults' Faux Pas scores were predicted by their sensitivity to factivity alternation. We got their sensitivity to factivity alternation scores by substracting their evaluation of factive propositions from non-factive propositions. That is, we created their difference scores between likely truth ratings for factive and non-factive propositions. How big the rated difference score between factive and non-factive uses of *to know* indicates a higher sensitivity to factivity alternation. We then calculated their aggregated Faux Pas scores. In order to investigate the second research question, we conducted a Linear Regression analysis. In Linear Regression analysis, the dependent variable was participants' aggregated Faux Pas scores and the independent variable was sensitivity to faux pas scores.

The third research question was whether adult contamination biases were predicted by their sensitivity to factivity alternation. In order to investigate the third research

question, two separate analyses were conducted. One is Linear regression analysis, in which the dependent variable was the number of correct answers to the Contamination Task and the independent variable was sensitivity to factivity alternation scores. The second one is Logistic Regression, in which the dependent variable was a categorical variable. The categorical variable was composed of two categories attained to participants: Pass versus Fail.

2.2.2 Factive Versus Nonfactive Truth Value Judgments

To test the hypothesis of whether there are differences in adults' judgments of the likely truth of factive and nonfactive (grammatical and ungrammatical) propositions, participants were asked to report what is the probability of the situation given in propositions to be true in reality (e.g., In reality, Ayşe is at home or not). A Repeated-Measure ANOVA revealed that there were significant differences in adults' judgments of likely truth values of factive and nonfactive (grammatical and ungrammatical) propositions $F(2, 212) = 170.52$, $\eta^2 = .43$. To investigate one-by-one comparisons, we conducted pairwise comparison test in which factive proposition was compared to the both nonfactive grammatical and nonfactive ungrammatical propositions was statistically significant ($t[317] = 13.31$, $p < .001$; $t[317] = 13.62$, $p < .001$ respectively). Participants reported lower percentage scores for nonfactive grammatical ($M = 58.68$; $SD = 17.38$) and for nonfactive ungrammatical propositions ($M = 57.94$; $SD = 20.22$) than factive propositions ($M = 89.49$; $SD = 12.54$). These results suggest that grammatical factive versions were rated as having higher likely truth values compared to the grammatical and ungrammatical non-

factives. As shown in Figure 1, there was a dramatic increase in truth values arising from nonfactive versions to factive versions (see Figure 1).

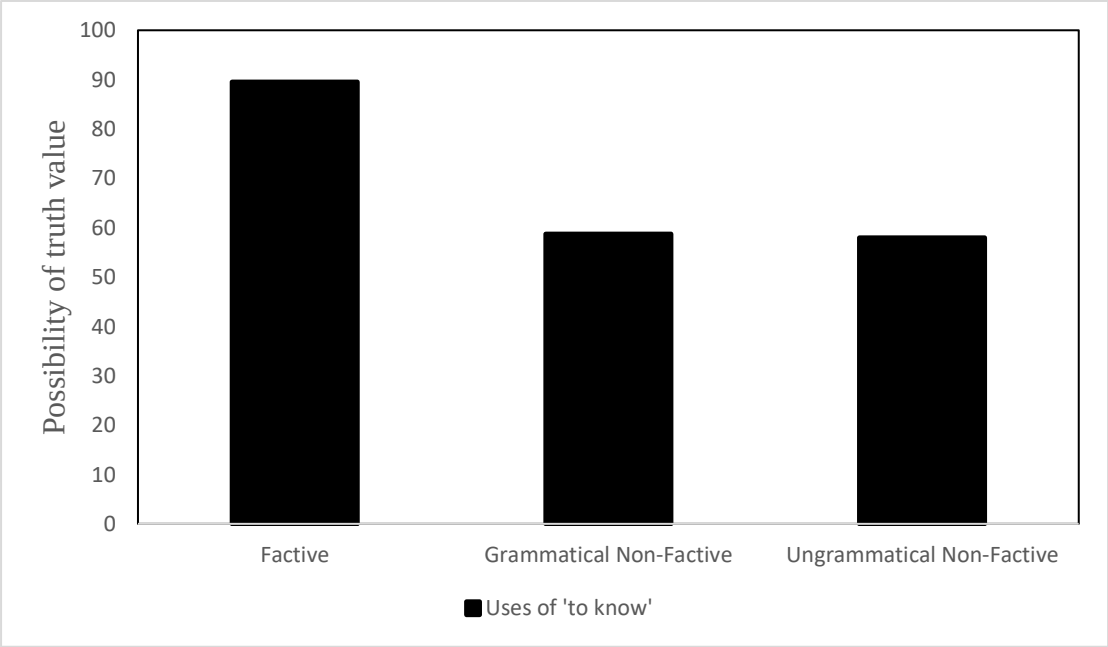

Figure 1. Possibility of truth value judgments of epistemological propositions in each three conditions.

When we looked at whether there was a difference between rated truth values of nonfactive versions (grammatical versus ungrammatical), there was no difference between grammatical and ungrammatical versions of judgments for nonfactive propositions (t[317] = 0.31, p = .95).

2.2.3 The relation between Sensitivity to Factivity and ToM as assessed by Faux Pas

Sensitivity to factivity alternation scores was calculated by substracting evaluation of likely truth of factive propositions from an average of grammatical and

ungrammatical non-factive propositions. That is, we created their difference scores between likely truth ratings for factive and non-factive propositions.

A linear regression analysis to examine whether participants' aggregate Faux Pas scores were predicted by how much they are sensitive to factivity alternation revealed that the regression model was not statistically significant $F(1,106) = 0.02$, $p = .90$, adjusted $R^2 = -.009$. The results showed that adults' sensitivity to factivity alternation did not predict their theory of mind abilities as assessed by the Faux Pas Task.

2.2.4 Contamination Task "Realist Bias"

According to the findings of Mitchell and colleagues (1996), to say that a person has a realist bias, that person's choices should indicate that the listener would not believe false message when she holds true belief and the listener would believe the true message when holding a false belief. Participants were asked to choose one of the given two options signaling places where she thinks the ice-cream man is for each of the three stories. If participants chose the place where the speaker in the story thinks the ice cream man is (in that case, they confirmed that the listener believed the message of the speaker), those individuals were attained to the "Believe" group. If participants chose the place where the listener in the story thinks the ice cream man is (in that case, they confirmed that the listener did not believe the message of the speaker), those individuals were attained to the "Not Believe" group. Figure 2 shows, as expected, that participants were strongly inclined to judge that a listener who had no prior belief (NBFM) would believe a false message. Similarly, the

participants were also strongly inclined to judge that a listener who had a false belief (FBTM) would believe a true message. In contrast, participants frequently judged that the message would be ignored when a listener had true belief.

A Repeated-Measure ANOVA revealed that there were statistically significant differences in number of participants of "Believe" versus "Not Believe" groups between three conditions $F(2, 216) = 87.08$, $\eta^2 = .32$. The results were consistent with the findings of Mitchell and colleagues (1996) which indicated that adults have "realist bias".

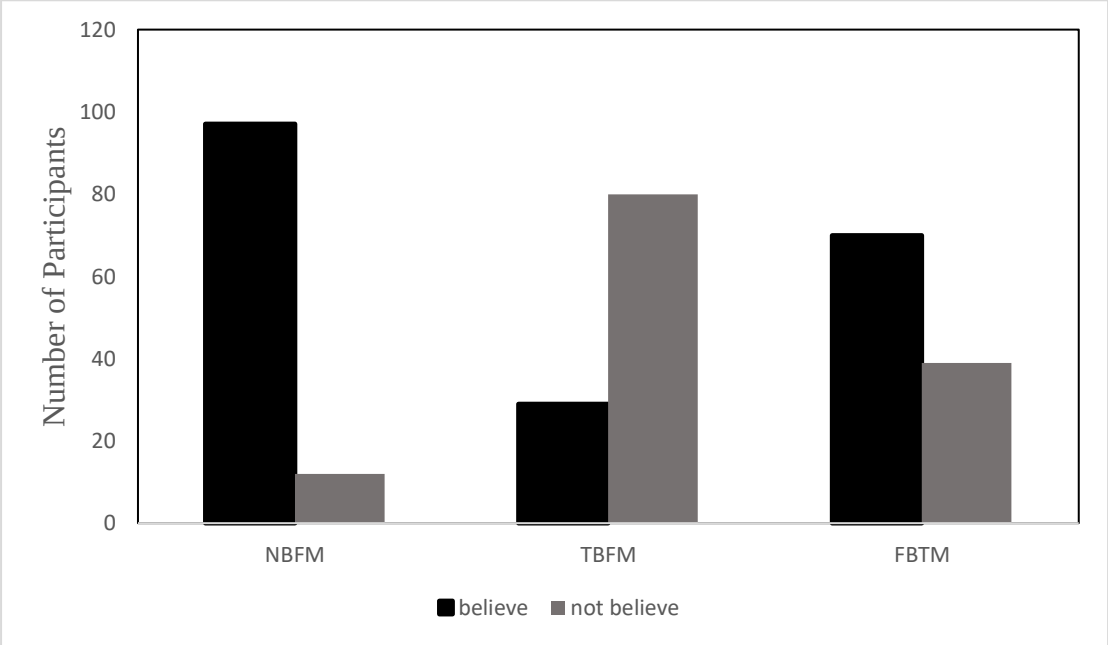

Figure 2. Number of participants judged that a listener would believe a message in each of three conditions

A post-hoc comparison test in which participants' responses to the NBFM condition compared to both the TBFM and the FBTM conditions were statistically significant ($t[323] = 12.11$, $p < .001$; $t[323] = 4.48$, $p < .001$ respectively). Also, participants'

responses to TBFM condition compared to FBTM condition were statistically significant (t[323] = -7.63, p < .001).

2.2.5 The relation between Factivity Alternation Difference Scores and ToM as indicated by the Contamination Task

To investigate the relation between sensitivity to factivity alternation and performances on Contamination Task, two separate analyses were conducted. Because we had two different final scores of Contamination Task. First score was categorical variable which is required to be conducted with Logistic Regression analysis. Second score was numeric variable which could be conductected with Linear Regression analysis.

2.2.5.1 Analysis on Pass versus Fail Scores

A logistic regression analysis was conducted to investigate whether there is a relationship between contamination scores based on whether they failed at least one of the versions or success at all tasks and factivity alternation sensitivity. The predictor variable, the sensitivity of factivity alternation (difference scores of factive and nonfactive average scores), in the logistic regression was not found to significantly contribute to the model. The unstandardized Beta weight for the Constant; B = (-1.73), SE = 0.50, p < .001. The unstandardized Beta weight for the predictor variable: B = 0.01, SE = 0.01, p = .18.

2.2.5.2 Analysis on Number of Correct Answers

A regression analysis to investigate whether there is a relationship between contamination scores based on how many versions of contamination people passed (0,1,2 and 3) responses and factivity alternation sensitivity was conducted. The predictor variable, the sensitivity of factivity alternation (difference scores of factive and nonfactive average scores), in the regression was not found to significantly contribute to the model. A linear regression analysis to examine whether participants' number of correct answers to three stories of Contamination Task were predicted by how much they are sensitive to factivity alternation revealed that the regression model was not statistically significant $F(1,32) = 0.41$, $p = .53$, adjusted $R^2 = -.018$. The results showed that adults' sensitivity to factivity alternation did not predict their theory of mind abilities as assessed by the Faux Pas Task.

2.2.6 Summary of Results and Discussion

The results of Study 1 informed us about Turkish-speaking adults' judgments of the epistemological propositions structured with different use of *to know* in Turkish. According to the results of repeated measure analysis, there is a factivity alternation, which means that the semantic structure of propositions could change when grammatical changes are applied. The results indicate that proposition structured with factive know is more likely to be true in reality than nonfactive format. Therefore, factive use of *to know* was found to imply true belief while nonfactive use of to know was found to express uncertainty about the truth. While in English the verb *to know* cannot be used when stating one's false belief regarding situations, as

result indicated that in Turkish, to know can be used in a different structure when expressing false belief as well as true belief. Moreover, we could not find any difference between non-factive grammatical and ungrammatical uses of *to know*.

CHAPTER 3

STUDY 2

According to the linguistics literature, certainty markers could express different degrees of certainty. This study was designed to first investigate adults' evaluation of certainty expressions and the relation between their sensitivity to the differential levels of certainty communicated via these expressions and their ToM abilities. Study 1 showed that adults are sensitive to factivity alternation, however, their sensitivity to factivity alternation was not related to their ToM abilities. In the current study, we included factivity alternation conditions in a bid to replicate the previous results. In addition, based on the answers to Faux Pas stories in the first study, we further adapted some of the stories that seemed to be interpreted slightly differently. Therefore, Study 2 was also designed to replicate the findings of Study 1. As with Study 1, Study 2 aimed to contribute to the literature on adults' ToM understanding and whether subtle culture-specific linguistic relations could be identified. Taken together, these studies were aimed at providing a starting point to further investigate this issue in developing samples (e.g., early, middle childhood).

3.1 Method

3.1.1 Participants

Individuals who did not take part in the first study were able to participate in this study. Three hundred and fifty-eight Turkish-speaking adults participated in the online survey created through Qualtrics. Only one-hundred and thirty-six participants who complete the study 100% were included in the analysis. Participants' age range 18 to 50 years, $M = 25.69$, $SD = 4.91$. Participants were recruited through announcements made on social media websites (e.g., Facebook, Instagram) and through a snowball sampling method as used in the first study. All individuals could participate in the study when they agreed to participate by clicking on the "I agree" button under the consent form on the first page of the survey. The ones who clicked on the "I disagree" button were directed to the end of the survey without seeing survey questions.

3.1.2 Procedure

Participants were recruited through sharing Qualtrics links on social media websites such as Facebook and Instagram. They were provided a very brief explanation of the study and the consent form. When they agreed to participate, they were presented with the survey questions. They were reminded that there were no right or wrong answers and that the study was being conducted to investigate Turkish native adults' judgments of propositions and their possible relation to socio-cognitive abilities. Participants were presented with 18 propositions either containing morphosyntactic certainty markers (i.e. *ben-ce, -Dır, -(A/I)r, –mEli/ -mAlı*) or no marker but mental state expression (i.e., *to think*) called No Certainty Marker condition (NCM). After

each proposition participants were asked to rate how certain they deemed the character to be in his/her assertion. In addition to these participants also rated one stimuli sentence belonging to each of the three factivity alternation conditions (i.e., Grammatical Factive, Grammatical Non-factive, Ungrammatical Non-factive). After completing the certainty and factivity alternation part of the study, participants were given the Faux Pas Task which included 10 faux pas stories and 10 control stories. The whole procedure and all of the materials were reviewed and approved by Bilkent Ethics Committee. Survey took approximately 30-40 minutes to complete.

3.1.3 Materials

3.1.3.1 Factivity alternation task

The task used in the first study was used in the second study by reducing the number of propositions. The reason to include the same task in the second study is to reanalyze factivity alternation sensitivity with the modified Faux Pas Task. There were 3 propositions to be answered by participants.

3.1.3.2 Certainty Marker Task

In the certainty task, adults were presented 18 propositions either containing morphosyntactic certainty markers (i.e. *ben-ce, -Dır, -(A/I)r, –mEli/ -mAlı*) or no marker but mental state expression (i.e., *to think*) called No Certainty Marker condition (NCM). Each certainty marker condition has 3 items. They were asked to indicate how confident the speaker about his statement is on a 0 to 100 ranged continuum scale. One end of the continuum indicated that the speaker is not sure at

all (point 0 in the continuum scale), while the direction indicated that the speaker is sure (point 100 in continuum scale) (See Appendix D for the task).

3.1.3.3 Faux Pas Task

To measure adults' advanced theory of mind abilities, we used the Faux Pas Task that we used in Study 1 with minor changes (See Appendix B for the task). A detailed look at the participants' responses in the Faux Pas Task during the first study showed that some participants seemed to be interpreting one story (i.e., Story 2-Story about curtains) differently.

The original version of this story is as follows: Jill had just moved into a new flat. Jill went shopping and bought some new curtains for her bedroom. When she had just finished decorating the flat, her best friend, Lisa, came over. Jill gave her a tour of the flat and asked, "How do you like my bedroom?". "Those curtains are horrible," Lisa said. "I hope you're going to get some new ones!"

Unlike some Western countries where window dressing comes with the house, in Turkey, the custom is for tenants to arrange for their own window dressings. The majority of our participants seemed to find it odd that someone would comment so openly and unfavorably about a feature of a house that clearly reflected their friend's taste. For this reason, we changed this story to contain the same scenario but with a feature of the house that the friend in the story would not assume was reflective of the target character's taste (i.e., bathroom tiles). In addition, small edits were made to

the Turkish translation to make sure the stories contained believable, colloquial, and conventional ways of interaction between Turkish speakers.

3.2 Results

3.2.1 Analysis Plan

The second study aims to replicate the findings of Study 1 and investigate three research questions. The first research question is whether adults rate certainty markers expressing evidence-based inference (i.e., *-Dır, -(A/I)r, –mEli/ -mAlı*) higher in the strength of the speaker's confidence as compared to the certainty marker expressing speculative possibility (*-(y)Abil*). We have also conducted exploratory analyses for comparisons of the lexical markers *düşün-* (*to think*) (NCM) and *ben-ce* with other certainty markers. We gave participants statements that use different certainty markers (i.e., *düşün-, ben-ce, -Dır, -(A/I)r, –mEli/ -mAlı and -(y)Abil*). They evaluated the strength of the speaker's confidence of statements that use those certainty markers on the continuum scale of confidence ranged between 0 to 100. In order to investigate the first research question, a Repeated-Measure ANOVA was conducted. For the ANOVA, the dependent variable was the participants' evaluation of the strength of the speaker's confidence and independent variables were certainty markers used in statements (*düşün-, ben-ce, -Dır, -(A/I)r, –mEli/ -mAlı and -(y)Abil).* As a result of ANOVA analysis, we conducted a Pairwise Comparison Test to investigate one-by-one comparisons of certainty markers.

The second research question is whether adults rate each of the statements that use certainty markers categorized within evidence-based inferences (i.e., *-Dır, -(A/I)r, –mEli/ -mAlı*) similarly. In order to investigate the second research question, we conducted a Pairwise Comparison test to see if any certainty markers differ from each other or not.

The third research question is whether participants' sensitivity to confidence levels of certainty markers. We calculated their sensitivity to confidence levels of certainty markers by subtracting the confidence level score of the highest-rated marker from the lowest-rated marker. That is, we created difference scores between the highest-rated marker and lowest-rated marker. How big the rated difference score between markers indicates a higher sensitivity to confidence levels of certainty markers. We then calculated aggregate Faux Pas scores. this is related to their Faux Pas scores. In order to investigate the third research question, we conducted a Linear Regression analysis. In Linear Regression analysis, the dependent variable was participants' aggregate Faux Pas scores and the independent variable was sensitivity to confidence levels of certainty markers.

3.2.2 Adults' Performances on Factivity Alternation Task

To test the hypothesis of whether there are differences in adults' judgments of the truth values of factive and nonfactive (grammatical and ungrammatical) structured propositions, participants were asked to report what seems to be the case in reality (e.g., In reality, Ayşe is at home or not). They rated the truth value of the proposition

on the continuum scale ranging from 0 to 100. A Repeated-Measure ANOVA revealed that there were significant differences in adults' judgments of likely truth values of factive and nonfactive (grammatical and ungrammatical) propositions $F(2, 270) = 100.56$, $\eta^2 = .21$. To investigate one-by-one comparisons, we conducted pairwise comparison test in which factive proposition was compared to the both nonfactive grammatical and nonfactive ungrammatical propositions was statistically significant ($t[270] = -12.53$, $p < .001$; $t[270] = -12.02$, $p < .001$ respectively). However, there was no difference between the grammatical and ungrammatical versions of nonfactive propositions ($t[270] = -0.50$, $p = .87$). Participants reported lower percentage scores for nonfactive grammatical ($M = 59.08$; $SD = 21.40$) and for nonfactive ungrammatical propositions ($M = 60.01$; $SD = 20.25$) than factive propositions ($M = 82.10$; $SD = 19.70$). These results suggest that grammatical factive versions were rated as having higher likely truth values compared to the grammatical and ungrammatical non-factives.

3.2.3 The relation between Factivity Alternation Difference Scores and ToM as assessed by Faux Pas

Sensitivity to factivity alternation scores was calculated by substracting evaluation of likely truth of factive propositions from an average of grammatical and ungrammatical non-factive propositions. That is, we created their difference scores between likely truth ratings for factive and non-factive propositions.

A linear regression analysis to examine whether participants' aggregate Faux Pas scores were predicted by how much they are sensitive to factivity alternation

revealed that the regression model was not statistically significant $F(1,134) = 0.69$, $p = .40$, adjusted $R^2 = -.002$. The results replicated the findings of Study 1 that adults' sensitivity to factivity alternation does not have an influence on their theory of mind abilities. Means and standard deviations for component scores of Faux Pas Task are summarized in Table 1.

Table 1. Descriptive Statistics

	N	Min	Max	Mean	Std. Dev.
Age	134	18	50	25.66	4.910
Detection	135	0.50	1.00	0.83	0.12
Understanding Inappropriateness	135	0.50	1.00	0.80	0.13
Intention	135	0.46	1.00	0.74	0.13
Belief	135	0.44	1.00	0.79	0.12
Empathy	135	0.39	1.00	0.79	0.14
Faux Pas Aggregate	135	0.47	1.00	0.79	0.12
Valid N (listwise)	134				

3.2.4 Adults' Performances on the Certainty Markers Task

To test the hypothesis that there are differences between certainty markers (i.e., NCM *(düşün-), ben-ce, -Dır, -(A/I)r, –mEli/ -mAlı,* and *-(y)Abil*) in terms of the strength of speakers' confidence in the soundness of statements, participants were asked to rate propositions structured with different certainty markers. They rated their evaluations of how certain they deemed the speaker to be on a continuous scale

ranging from 0 to 100 with 0 as not certain at all, and 100 as absolutely certain. A repeated-measure ANOVA revealed that there were significant differences in evaluation of strength of speaker's confidence for different markers (i.e. NCM, bence, *-Dır, -(A/I)r, –mEli/ -mAlı, (y)Abil*), $F(5, 670) = 98.58$, $\eta^2 = .22$). Specifically, as shown in Table 2, participants reported certainty markers expressing evidence-based inference [*-(A/I)r* (*M* = 76.48; *SD* = 13.75), *-Dır* (*M* = 64.97; *SD* = 14.80) and "*–mEli/ -mAlı*" (*M* = 63.12; *SD* = 14.34)] higher in the strength of the speaker's confidence scale meaning that the speaker is strongly confident in her statement compared to certainty marker expressing speculative possibility [-(y)Abil (*M* = 49.25; *SD* = 14.07)]. The table also shows that NCM (*düşün-*) and *ben-ce* markers were also higher than *-(y)Abil* (*M* = 62.68; *SD* = 16.99; *M* = 63.09; *SD* = 16.43 respectively).

Table 2. Means and standard deviations of certainty levels of certainty markers

Certainty Markers	Mean	Std. Deviation
NCM (*düşün-*)	62.68	16.99
ben-ce	63.09	16.43
-(A/I)r	76.48	13.73
-Dır	64.97	14.80
mEli/ -mAlı	63.12	14.34
-(y)Abil	49.25	14.07

Note. N = 135 (n = 135 for each condition*)*

To test the next hypothesis about whether adults would make similar confidence judgments for morphosyntactic features that imply circumstantial evidence-based inference (i.e., NCM (*düşün-*), *ben-ce, -Dır, -(A/I)*r, *–mEli/ -mAlı*), a Pairwise Comparison test was conducted (see Table 3). The results showed that NCM (*düşün-*), *ben-ce, -Dır,* and *–mEli/ -mAlı* did not differ from each other but from *-(A/I)r* and *-(y)Abil* significantly. Overall the results showed that confidence judgment is significantly higher with *-(A/I)r* than NCM (*düşün-*), *ben-ce, -Dır* and *–mEli/ -mAlı* which are also significantly higher from. (see Table 3).

Table 3. Post hoc comparisons of participants' ratings of certainty markers

	NCM	*ben-ce*	*-(A/I)r*	*-Dır*	*mEli/ -mAlı*	*-(y)Abil*
NCM	1	0.40	13.80***	2.29	0.43	13.44***
ben-ce		1	13.40*	1.89	0.03	13.84***
-(A/I)r			1	11.51***	13.37***	27.24***
-Dır				1	1.86	15.73***
mEli/ -mAlı					1	13.87***
-(y)Abil						1

Note. Post-hoc comparisons using Tukey's HSD.

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

3.2.5 The relation between Sensitivity to Confidence Levels of Certainty Markers and ToM as assessed by Faux Pas

We calculated sensitivity to confidence levels of certainty markers by subtracting the confidence level score of the highest-rated marker from the lowest-rated marker. That is, we created difference scores between the highest-rated marker and lowest-rated marker. The results showed that the highest-rated marker was *-(A/I)r* (*M* = 76.48; *SD* = 13.75) and the lowest rated marker was *-(y)Abil* (*M* = 49.25; *SD* = 14.07). We calculated difference scores for all participants. How big the difference score between ratings of markers indicates a higher sensitivity to confidence levels of certainty markers. We then calculated aggregate Faux Pas scores. A linear regression analysis was conducted to examine whether participants' aggregate Faux

Pas scores were predicted by how much they are sensitive to confidence levels of certainty markers. This analysis revealed that the regression model was not statistically significant $F(1,133) = 1.632$, $p = .20$, adjusted $R^2 = .005$. The results showed that adults' sensitivity to confidence level of certainty markers did not explain the variance of their theory of mind abilities as assessed by the Faux Pas Task.

3.2.6 Summary of Results and Discussion

The results of Study 2 informed us about Turkish speaking adults' evaluations about certainty markers in terms of the strength of the speaker's confidence in the statements' soundness. Adults' evaluations showed that certainty markers expressing evidence-based inference (i.e *-(A/I)r*, *-Dır, -Meli/Malı*) certainty markers are higher in the strength of the speaker's confidence level compared to certainty marker expressing possibility (i.e *-(y)Abil*). According to the results of the factor analysis, Turkish-speaking adults judged. Those results informed us about Turkish-speaking adults' beliefs could not only be considered true or false, but they could also vary in degree of certainty (Moore, 1990). As studies conducted with children showed that children exhibit high performance when the degree of certainty is high (Moore et al., 1990). When certainty expressed by the speaker is high, the degree of truth value propositions of that person is bound to be high. That is, when someone expresses his mental states with high certainty level markers, other people could make sense of his actions better. In ToM tasks used with Turkish children, researchers could use some

certainty markers such as *-(A/I)r, -Dır* and the lexical word *ben-ce* which are found to be replaced with *düşün-* (NCM).

CHAPTER 4

DISCUSSION

Research indicates that language plays an essential role in the construction of social understanding abilities during childhood. In contrast to the child literature, the relation between adults' language abilities and ToM is seldom studied. The existing studies either show no relation between adults' ToM and language abilities (Apperly, 2006) or show that they are related but do not clearly state which components of language are associated with ToM ability (Newton & de Villiers, 2007). Therefore, it is not known whether the reason for the insignificance of the results is the lack of studies in this area or the lack of studying components of languages properly. The current study is important for both contributing to the limited work in this area and considering two aspects of languages mutually (semantics and morphology). In addition, all languages have their own semantic, syntactic, and morphologic features. It has been shown by recent studies that culture-specific linguistic features are important factors to be considered in investigating the relation between ToM and language (Choi, 2006; Matsui, Yamamoto & McCagg, 2006). This is especially relevant when studying agglutinative languages which are rich in both semantic and syntactic features that express linguistic nuances (i.e., Turkish, Korean, or Japanese).

Therefore, the current study also aimed to consider linguistic features of an agglutinative language (i.e., Turkish) as it focused on whether speakers' evaluation of subtle markers (i.e., morphosyntactic) of epistemic content in addition to their evaluation of mental state language that serves to express epistemic factivity (i.e., *to think, to know*) is related to their ToM abilities.

4.2 Discussion of study 1's results

As discussed in the psycholinguistics literature, factivity provided by a verb *to know* is alternated with different grammatical formulations in Turkish. In Study 1 we investigated whether adult native Turkish speakers differentiated between factive and non-factive uses of *to know* when used with propositions and whether their sensitivity to that differentiation called factivity alternation is related to their ToM abilities. The results showed that adults differentiated factive and non-factive uses as reflected in their ratings of certainty. As we expected, participants judged propositions that use factive *know* higher in terms of the possibility of truth-value compared to non-factive *know*. We can derive the opposite meanings even though we use the same epistemic word (i.e., know) in sentences with different structures (i.e., factive vs. non-factive). As a result, we learned that the epistemic verb *to know* can be used in Turkish when indicating situations both with a high and low possibility of being real, which is specific to Turkish. This contrasts with English, where the verb 'to know' is exclusively used to express factivity. We also realized that there is an ungrammatical but conventionalized non-factive *know* in addition to the grammatical non-factive *know*. We expected that ungrammatical would be rated

lower than grammatical one in terms of likely truth value. However, we could not find any significant difference between non-factive structures, which means that the non-grammatical yet conventional forms of *know* are judged similar to the grammatical version. Even though we could not find a difference between grammatical and ungrammatical ones, that also informed us that the languages are not only composed of grammatical forms but also alternatives like ungrammatical but conventionalized forms. Those ungrammatical ones are also used frequently in daily life discourses. Therefore, they are important to include in language studies.

4.2.1 Discussion of the results related to the relation between sensitivity to factivity alternation and ToM

No matter how we measure ToM abilities (either by Faux Pas understanding and realist bias), we could not find any relation between sensitivity to factivity alternation and ToM abilities. Before discussing the nonsignificant results related to ToM, it is important to note that we replicated Mitchell and colleagues' (1996) findings that when adult participants know the true state of affairs, their belief judgments regarding story characters' thoughts were contaminated by their knowledge. Because factivity alternation is also related to the truth value of epistemic states, we investigated whether there was a relation between performances on Contamination Task and sensitivity to factivity alternation. We expected that participants who could suppress their realist biases would have a higher sensitivity to factivity alternation tasks. However, even though the task worked with Turkish speakers and replicated the findinds with English speakers (Mitchell, 1996), we did

not find any relation. For the nonsignificant relation between faux pas understanding and sensitivity to factivity alternation, there could be two possible explanations. One is the fact that the relation does not exist. The second one is that this relation might not be found with adults whose language development is complete but may be found with children whose language development is ongoing.

4.3 Discussion of study 2's results

In the second study, we investigated adults' evaluation of epistemological certainty markers and their relation to ToM abilities. Because Turkish is an agglutinative language, many markers are added to the end of the verb, implying the same meaning when structured with a lexical verb. The results showed that adults judged certainty markers differently in terms of confidence levels. Specifically, while adults judged the epistemological propositions used with the *-(A/I)r* marker as having the highest certainty level compared to other markers, they judged a marker of speculative possibility, *-(y)Abil*, as having the lowest certainty degree. The other remaining markers *(i.e., NCM, ben-ce, -Dır, –mEli/ -mAlı)* were not different from each other in terms of rated confidence levels. They were all interpreted as having similar levels of certainty, which means they could be used in propositions interchangeably. Therefore, one of our most important findings is that languages could have ways of expressing epistemic information without the use of mental state language.

4.3.1 Discussion of results related to sensitivity to certainty markers and ToM

The second study also indicated that adults' sensitivity to confidence levels of certainty markers (difference score between the highest-rated certainty marker and lowest-rated certainty marker) was not found to be related to their ToM abilities. Again similar possible explanations could be given like study 1. It is possible that the hypothesized relation can only be oberseved earlier in development. However, because two studies used the Faux pas task and resulted in nonsignificant results, it is possible also to question measurement validity. Here the discussion is not specifically directed to Faux Pas, but all measurements of advanced ToM tasks. Because we got variability even though participants pointed at ceiling scores. The point is that this variability informs us about only performance differences (high versus low) in adults' ToM scores. It does not inform us about how often do those adults use ToM reasoning in their lives. Maybe examining the differences in when, in which context, how often and accurately they use ToM abilities could provide more comparable results about adults' ToM. For example, we all know arithmetics. As adults, we can all do it when four operations are given to us. What matters may not be whether we do it correctly but in which situations we use these four operations spontaneously and accurately.

4.4 Discussion of results related to studies conducted with grammaticalized languages

Although we did not find any relation between ToM and linguistic sensitivity, the results provided outstanding support for our general argument that it is important to study languages with different grammatical structures (e.g., agglutinative) of which Turkish is an example. In Western cultures where the English language is a domain, language is studied persistently based on limited aspects. For example, only mental state language like lexical verbs (i.e., know, think, belief) has been looked at. Another example is when syntactic competence and ToM relation has been studied, only a feature of complementation which is one of the important features of the English language has been studied. However, some other languages are an integration of more than one component. It creates a scaffold for ToM not only with mental state verbs but also with the grammatical structure in which they are used. For example, as seen in Study1 and Study 2, even minor changes by morphologic markers affect Turkish speakers' ratings of certainty. Studying any language within its own structures provide us a better understanding of how language helps to construct ToM.

4.5 Conclusion

An important outcome of this study was that it showed that epistemological markers at both additional morphosyntactic and lexical levels were judged differently by Turkish adults. Although we did not find a relationship between certainty ratings of neurotypical adults and ToM skills, it does not mean that we cannot find this

relationship in developing children. Our findings have documented the epistemic differences that children need to develop. We found that the lexical predicates used in tom tasks can be used interchangeably with markers as well. The findings will form a baseline for future studies and will serve as a starting point. Therefore, those features that we have found in the current study need to be known by researchers when studying languages.

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APPENDICES

APPENDIX A: FACTIVITY ALTERNATION TASK

Factive use of “to know”:

1. Ali Ayşe' nin evde olduğunu biliyor.

Ayşe’nin evde olma ihtimali nedir?

2. Ahmet, Merve’nin yazlıkta olduğunu biliyor.

Merve’nin yazlıkta olma ihtimali nedir?

3. Kerim, elmaların bozuk olduğunu biliyor.

Elmaların bozuk olma ihtimali nedir?

4.Sema, Umut’un tatilde olduğunu biliyor.

Umut’un tatilde olma ihtimali nedir?

5. Alican, Mehmet’in hasta olduğunu biliyor.

Mehmet’in hasta olma ihtimali nedir?

6. Oğulcan, eve hırsızın girdiğini biliyor.

Eve hırsızın girmiş olma ihtimali nedir?

7. Suna, Elif’in düğünü olduğunu biliyor.

Elif’in düğünü olma ihtimali nedir?

8. Sertaç, kedisinin çalılıkların arkasında olduğunu biliyor.

Kedisinin çalılıkların arkasında olma ihtimali nedir?

9. Berna, Derya’nın geleceğini biliyor.

Derya’nın gelme ihtimali nedir?

10. Beril, yemeğin iptal olduğunu biliyor.

Yemeğin iptal olma ihtimali nedir?

Nonfactive use of “to know” (Grammatical):

1. Ali, Ayşe evde diye biliyor.

Ayşe’nin evde olma ihtimali nedir?

2. Merve, Oğuz yarışı kazandı diye biliyor.

Oğuz’un yarışı kazanmış olma ihtimali nedir?

3. Anıl, şekeri dolapta diye biliyor.

Şekerin dolapta olma ihtimali nedir?

4. Kaan, cüzdanını çalındı diye biliyor.

Cüzdanının çalınma ihtimali nedir?

5. Mert, Sena bugün geç gelecek diye biliyor.

Sena’nın geç gelme ihtimali nedir?

6. İrem, dolaptaki süt bozuk diye biliyor.

Sütün bozuk olma ihtimali nedir?

7. Burak, yeni bilgisayar alındı diye biliyor.

Bilgisayarın yeni alınma ihtimali nedir?

8. Elif, Sena gitti diye biliyor.

Sena’nın gitmiş olma ihtimali nedir?

9. Hande, Uğur İstanbul’da diye biliyor.

Uğur’un İstanbul’da olma ihtimali nedir?

10. Taner, sınav sonuçları açıklandı diye biliyor.

Sınav sonuçlarının açıklanmış olma ihtimali nedir?

Nonfactive use of "to know" (Ungrammatical) :

1. Sena, Elif'i markette biliyor.

Elif'in markette olma ihtimali nedir?

2. Ahmet, kapıyı bozuk biliyor.

Kapının bozuk olma ihtimali nedir?

3. Semra, Selim'i evde biliyor.

Selim'in evde olma ihtimali nedir?

4. Melek, çamaşırları temiz biliyor.

Çamaşırların temiz olma ihtimali nedir?

5. Betül, eldivenleri dolapta biliyor.

Eldivenlerin dolapta olma ihtimali nedir?

6.Melih, köpeğin mamasını bitti biliyor.

Köpeğin mamasının bitmiş olma ihtimali nedir?

7. Can, Kerem kazandı biliyor.

Keremin kazanmış olma ihtimali nedir?

8. Canan, Yunus'u taşındı biliyor.

Yunus'un taşınmış olma ihtimali nedir?

9. Ayşe, Utku'yu çarşıda biliyor.

Utku'nun çarşıda olma ihtimali nedir?

10. Özgür, ailesini tatilde biliyor.

Ailesinin tatilde olma ihtimali nedir?

APPENDIX B: FAUX PAS TASK USED IN STUDY 1 & 2

(See Original version:

https://docs.autismresearchcentre.com/tests/FauxPas_Adult.pdf)

Stories with Faux Pas:

Story 1. Sürpriz Parti Hikayesi

Helin'in kocası onun doğum günü için sürpriz bir parti veriyordu. Helin'in arkadaşı Sena'yı da davet etti ve kendisine "Kimseye söyleme, özellikle de Helin'e." dedi. Partiden bir gün önce Helin Sena'nın yanına gitti. Sena sandalyesinin üzerinde asılı duran yeni elbisesine kahve döktü. "Ah!" dedi Sena, "Bunu partinde giyecektim!" dedi. "Ne partisi?" dedi Helin. "Hadi," dedi Sena, "Gidip lekeyi çıkarabilecek miyiz bir bakalım."

1- Biri söylememesi gereken bir şey veya garip bir şey söyledi mi?
2- Kim söylememesi gereken ya da garip bir şey söyledi?
3- Neden söylememesi gerekirdi ya da bu söylediği neden garipti?
4- Neden söylediğini düşünüyorsunuz?
5- Partinin sürpriz bir parti olduğu Sena'nın aklında mıydı?
6- Sizce Helin nasıl hissetti?
7- Hikayede sürpriz parti kimin içindi?
8- Elbiseye ne döküldü?

Story 2. Banyo Fayansı Hikayesi

Melis yeni bir daireye taşınmıştı. Daireye taşınmadan banyoyu yeniledi. Bu arada zevkine uygun fayanslar seçti. Daireye taşındığında, en yakın arkadaşı Leyla geldi. Melis ona daireyi gezdirdi ve "Daireyi beğendin mi?" diye sordu. Leyla "Daire güzel, bir tek banyo fayansları korkunç. Umarım yakın zamanda yenileyebilirsin." dedi.

1- Biri söylememesi gereken bir şey veya garip bir şey söyledi mi?
2- Kim söylememesi gereken ya da garip bir şey söyledi?
3- Neden söylememesi gerekirdi ya da bu söylediği neden garipti?
4- Neden söylediğini düşünüyorsunuz?
5- Leyla Melis'in fayansları yeni değiştirdiğini biliyor muydu?
6- Sizce Melis nasıl hissetti?
7- Hikayede Melis dairenin neresini yenilemişti?
8- Melis ne kadar süredir bu dairede yaşıyordu?

Story 3. Kısa Saçlı Küçük Kız Hikayesi

Elif, yuvarlak yüzlü ve kısa sarı saçlı üç yaşında bir kız çocuğudur. Teyzesinin evindeydi. Kapı zili çaldı ve teyzesi kapıya baktı. Gelen komşu Zehra idi. "Merhaba, uğramanız ne güzel." dedi teyzesi, Zehra "Merhaba" dedi, sonra Elif'e baktı ve "Ah, bu küçük erkek çocuğuyla tanıştığımı sanmıyorum. Adın ne senin?" dedi.

1- Biri söylememesi gereken bir şey veya garip bir şey söyledi mi?
2- Kim söylememesi gereken ya da garip bir şey söyledi?
3- Neden söylememesi gerekirdi ya da bu söylediği neden garipti?
4- Neden söylediğini düşünüyorsunuz?
5- Komşu Zehra, Elif'in kız olduğunu biliyor muydu?

6- Sizce Elif nasıl hissetti?

7- Hikayede Elif neredeydi?

8- Ziyarete kim geldi?

Story 4. Kanser Şakası Hikayesi

ABCO yazılım tasarımında yönetici olan Mert, tüm personel için bir toplantı düzenledi. Toplantıya başlamadan “Sizlere vermem gereken önemli bir haber var. Muhasebecilerimizden Halil Öz çok hasta ve şu anda yoğun bakımda." dedi. Bir yazılım mühendisi olan Ahmet toplantıya geç kalmıştı. Toplantıya katıldığında herkes sessizdi ve Halil Öz’ün hastalığıyla ilgili haberi düşünüyordu. Ahmet, "Selam dün gece harika bir şaka duydum! Ölümcül bir hastalığa yakalanan hasta, doktoruna ne demiş?" dedi. Bunun üzerine Mert "Herkes geldiğine göre toplantıya başlayalım." dedi.

1- Biri söylememesi gereken bir şey veya garip bir şey söyledi mi?

2- Kim söylememesi gereken ya da garip bir şey söyledi?

3- Neden söylememesi gerekirdi ya da bu söylediği neden garipti?

4- Neden söylediğini düşünüyorsunuz?

5- Ahmet içeri girdiğinde, muhasebecinin yoğun bakımda olduğunu biliyor muydu?

6- Sizce yönetici Mert nasıl hissetti?

7- Hikayede yönetici Mert toplantıdan önce personele ne söyledi?

8- Toplantıya kim geç geldi?

Story 5. Okuldaki Yeni Çocuk Hikayesi

Dokuz yaşında bir çocuk olan Can, yeni bir okula başladı. Okuldaki tuvalet bölmelerinden birindeydi. Okuldan iki çocuk Kerem ve Berk içeri girdi ve lavabonun başında durup konuşmaya başladılar. Kerem, "Sınıftaki yeni çocuğu tanıyor musun? Adı Can. Tuhaf görünmüyor mu sence de? Boyu da çok kısa!" dedi. O sırada Can bölmeden çıktı ve Kerem ile Berk onu gördü. Berk, "Merhaba Can! Futbol oynamaya mı gidiyorsun?" dedi.

1- Biri söylememesi gereken bir şey veya garip bir şey söyledi mi?
2- Kim söylememesi gereken ya da garip bir şey söyledi?
3- Neden söylememesi gerekirdi ya da bu söylediği neden garipti?
4- Neden söylediğini düşünüyorsunuz?
5- Kerem, Berk ile konuşurken, Can'ın bölmelerden birinde olduğunu biliyor muydu?
6- Sizce Can nasıl hissetti?
7- Hikayede, Kerem ve Berk konuşurken Can neredeydi?
8- Kerem, Can hakkında ne dedi?

Story 6. Cevizli Kek Hikayesi

Sena'nın kuzeni Mustafa, Sena'yı ziyarete geliyordu ve Sena özellikle onun için cevizli kek yaptı. Yemekten sonra Sena "Mutfakta kek var, senin için yaptım." dedi. "Mmmm," diye cevapladı Mustafa ve "Harika kokuyor! Kek çok severim tabi cevizli hariç" dedi.

1- Biri söylememesi gereken bir şey veya garip bir şey söyledi mi?
2- Kim söylememesi gereken ya da garip bir şey söyledi?
3- Neden söylememesi gerekirdi ya da bu söylediği neden garipti?
4- Neden söylediğini düşünüyorsunuz?

5- Kekin kokusunu aldığında, Mustafa bunun cevizli kek olduğunu biliyor muydu?

6- Sizce Sena nasıl hissetti?

7- Hikayede Sena ne tür bir kek yaptı?

8- Sena ve Mustafa nasıl tanışıyorlardı?

Story 7. Kristal Kase Hikayesi

Burcu, düğün hediyesi olarak arkadaşı Sevgi'ye kristal bir kase aldı. Sevgi'nin düğünü kalabalıktı dolayısıyla bir sürü hediye vardı. Yaklaşık bir yıl sonra Burcu, Sevgi'ye akşam yemeğine gitti. O gece Burcu şarap şişesini kristal kasenin üstüne düşürdü. Kristal kase de paramparça oldu. "Gerçekten üzgünüm. Kaseyi kırdım" dedi Burcu. Sevgi, "Endişelenme" dedi. "Onu zaten hiç beğenmiyordum. Biri düğün hediyesi olarak vermişti." dedi.

1- Biri söylememesi gereken bir şey veya garip bir şey söyledi mi?

2- Kim söylememesi gereken ya da garip bir şey söyledi?

3- Neden söylememesi gerekirdi ya da bu söylediği neden garipti?

4- Neden söylediğini düşünüyorsunuz?

5- Sevgi, kaseyi ona Burcu'nun verdiğini hatırlıyor muydu?

6- Sizce Burcu nasıl hissetti?

7- Hikayede, Burcu Sevgi'ye düğünü için ne verdi?

8- Kase nasıl kırıldı?

Story 8. Hikaye Yarışması Hikayesi

İlkbahar İlköğretim Okulu'nda bir hikaye yarışması vardı. Yarışmaya herkes katılabilirdi. Beşinci sınıflardan birkaç öğrenci de katıldı. Beşinci sınıf öğrencisi

Canan, yarışmaya gönderdiği hikayeyi çok beğeniyordu. Birkaç gün sonra, yarışmanın sonuçları açıklandı: Canan'ın hikayesi hiçbir ödüle layık görülmemişti. Canan'ın sınıf arkadaşı Tolga ise birincilik ödülünü kazanmıştı. Ertesi gün Canan Tolga ile bankta oturuyordu. Tolga'nın birincilik ödülüne bakıyorlardı. Tolga, "Bu yarışmayı kazanmak çok kolaydı. Yarışmadaki diğer tüm hikayeler çok kötüydü. " dedi. "Ödül plaketini nereye koyacaksın?" diye sordu Canan.

1- Biri söylememesi gereken bir şey veya garip bir şey söyledi mi?
2- Kim söylememesi gereken ya da garip bir şey söyledi?
3- Neden söylememesi gerekirdi ya da bu söylediği neden garipti?
4- Neden söylediğini düşünüyorsunuz?
5- Tolga, Canan'ın yarışmaya hikaye gönderdiğini biliyor muydu?
6- Sizce Canan nasıl hissetti?
7- Hikayede yarışmayı kim kazandı?
8- Canan'ın hikayesi bir ödül kazandı mı?

Story 9. Garsona Benzetme Hikayesi

Anıl bir lokantadaydı. Kazayla yere biraz kahve döktü. "Size yeni bir kahve getireyim" dedi garson ve bir süre ortalarda gözükmedi. Hamza, restoranda kasanın yanında durup, hesabını ödemeyi bekleyen bir müşteriydi. Anıl Hamza'nın yanına gitti ve ona "Masama kahve döktüm. Masayı temizleyebilir misin?" dedi.

1- Biri söylememesi gereken bir şey veya garip bir şey söyledi mi?
2- Kim söylememesi gereken ya da garip bir şey söyledi?
3- Neden söylememesi gerekirdi ya da bu söylediği neden garipti?
4- Neden söylediğini düşünüyorsunuz?

5- Anıl, Hamza'nın müşteri olduğunu biliyor muydu?

6- Sizce Hamza nasıl hissetti?

7- Hikayede, Hamza neden kasiyerin yanında duruyordu?

8- Anıl ne döktü?

Story 10. Avukat Hikayesi

Doğa yeni bir ofiste çalışmaya başlamıştı. Bir gün çay odasında yeni arkadaşı Samet ile konuşuyordu. Samet "Eşiniz ne iş yapıyor?" diye sordu Doğa'ya. "Kendisi avukat" diye yanıtladı Doğa. Birkaç dakika sonra Buse sinirli bir şekilde çay odasına girdi. "Az önce çok kötü bir telefon görüşmesi gerçekleştirdim. Avukatlar çok kibirli ve açgözlü insanlar. Onlara dayanamıyorum." dedi. Samet Buse'ye "Bu raporlara bir göz atmak ister misin?" diye sordu. Buse "Şimdi olmaz. Çay içmeye ihtiyacım var." diye yanıtladı.

1- Biri söylememesi gereken bir şey veya garip bir şey söyledi mi?

2- Kim söylememesi gereken ya da garip bir şey söyledi?

3- Neden söylememesi gerekirdi ya da bu söylediği neden garipti?

4- Neden söylediğini düşünüyorsunuz?

5- Buse, Doğa'nın eşinin avukat olduğunu biliyor muydu?

6- Sizce Doğa nasıl hissetti?

7- Hikayede Doğa'nın eşi ne işle uğraşıyor?

8- Doğa ve Samet nerede konuşuyorlardı?

Control Stories without Faux Pas:

Story 1. Yılbaşı Hikayesi

Fırat, arkadaşı Cem'in evinde yılbaşı partisindeydi. Cem ile konuşurken bir kadın yanlarına geldi. Kadın, Cem'in komşularından biriydi. "Merhaba" dedi sonra Fırat'a döndü ve "Tanıştığımızı sanmıyorum. Ben Selin, senin adın ne?" dedi. Fırat, "Ben de Fırat, memnun oldum." diye yanıtladı. "İçecek bir şey isteyen var mı?" diye sordu Cem.

1- Biri söylememesi gereken bir şey veya garip bir şey söyledi mi?
2- Kim söylememesi gereken ya da garip bir şey söyledi?
3- Neden söylememesi gerekirdi ya da bu söylediği neden garipti?
4- Neden söylediğini düşünüyorsunuz?
5- Fırat ve Selin birbirlerini tanıyorlar mıydı?
6- Sizce Fırat nasıl hissetti?
7- Hikayede Fırat neredeydi?
8- Yılbaşı partisine kim ev sahipliği yapıyordu?

Story 2. Gömlek Hikayesi

Selim, takım elbisesine uygun bir gömlek arıyordu. Satış elemanı ona birkaç gömlek gösterdi. Selim gömleklere baktı ve sonunda istediği renkte bir gömlek buldu. Gömleği denediğinde bedenine uygun olmadığını gördü. Satış elemanına "Maalesef, bu çok küçük oldu." dedi. Satış elemanı, "Endişelenmeyin, önümüzdeki hafta yeni bedenleri gelecek." dedi. "Harika. O zaman tekrar gelirim." dedi Selim.

1- Biri söylememesi gereken bir şey veya garip bir şey söyledi mi?
2- Kim söylememesi gereken ya da garip bir şey söyledi?
3- Neden söylememesi gerekirdi ya da bu söylediği neden garipti?
4- Neden söylediğini düşünüyorsunuz?

5- Selim gömleği denediğinde onun bedenine uygun olmadığını biliyor muydu?

6- Sizce Selim nasıl hissetti?

7- Hikayede Selim ne için alışveriş yapıyordu?

8- Neden önümüzdeki hafta geri gelecekti?

Story 3. Berber Hikayesi

Burak saçını kestirmek için berbere gitti. "Nasıl kesilmesini istersiniz?" diye sordu berber. Burak, "Şimdiki tarzımın aynısını isterim, sadece bir cm kısaltın." diye yanıtladı. Berber önden biraz düzensiz kesti, bu yüzden eşitlemek için bir cm'den daha kısa kesmek zorunda kaldı. "Korkarım ki istediğinizden biraz daha kısa oldu." dedi berber. "N'olcak, zamanla uzar." diye yanıtladı Burak.

1- Biri söylememesi gereken bir şey veya garip bir şey söyledi mi?

2- Kim söylememesi gereken ya da garip bir şey söyledi?

3- Neden söylememesi gerekirdi ya da bu söylediği neden garipti?

4- Neden söylediğini düşünüyorsunuz?

5- Burak, saçını kestirirken, berberin saçını çok kısa kestiğini biliyor muydu?

6- Sizce Burak nasıl hissetti?

7- Hikayede Burak saçının nasıl kesilmesini istedi?

8- Berber saçını nasıl kesti?

Story 4. Benzin Hikayesi

Ali, arabasına benzin doldurmak için evine giderken benzin istasyonunda durdu. Kredi kartını kasiyere uzattı. Kasiyer kartı pos cihazından geçirdi. Ve sonra

"Üzgünüm, cihaz kartınızı kabul etmiyor.” dedi. "Hay Allah! Nakit ödeyeceğim o zaman" dedi Ali ve yüz lira verdi. "Kurşunsuz benzinden aldım” dedi.

1- Biri söylememesi gereken bir şey veya garip bir şey söyledi mi?
2- Kim söylememesi gereken ya da garip bir şey söyledi?
3- Neden söylememesi gerekirdi ya da bu söylediği neden garipti?
4- Neden söylediğini düşünüyorsunuz?
5- Kartını kasiyere verdiğinde, Ali makinenin kartını almayacağını biliyor muydu?
6- Sizce Ali nasıl hissetti?
7- Hikayede, Ali yolda ne almak için durdu?
8- Neden nakit ödedi?

Story 5. Park Hikayesi

Tarık köpeği Şanslı'yı parka götürdü. Yakalaması için bir sopa fırlattı. Bir süre orada takıldıktan sonra, komşusu Ece uğradı. Birkaç dakika sohbet ettiler. Sonra Ece, "Eve mi gidiyorsun? Birlikte yürümek ister misin?" diye sordu Tarık'a. "Tabii," dedi Tarık. Köpeği Şanslı'yı çağırdı ama köpeği güvercinleri kovalamakla meşguldü ve gelmedi. "Şanslı gitmeye hazır değil gibi görünüyor. Sanırım bir süre daha kalacağız burda." dedi. "Tamam, sonra görüşürüz." dedi Ece.

1- Biri söylememesi gereken bir şey veya garip bir şey söyledi mi?
2- Kim söylememesi gereken ya da garip bir şey söyledi?
3- Neden söylememesi gerekirdi ya da bu söylediği neden garipti?
4- Neden söylediğini düşünüyorsunuz?
5- Ece onu davet ettiğinde, Tarık'ın onunla eve yürüyemeyeceğini biliyor muydu?
6- Sizce Ece nasıl hissetti?

7- Hikayede, Tarık köpeğini nereye götürmüştü?

8- Tarık neden arkadaşı Ece ile eve yürümedi?

Story 6. Tiyatro Hikayesi

Bilge geçen yılki okul tiyatrosunda başrolde oynamıştı ve bu yıl da başrolde oynamak istiyordu. Oyunculuk dersleri aldı ve baharda oyun için seçmelere katıldı. Seçmelerin açıklandığı gün, dersten önce başrolde kimin oynadığını kontrol etmeye gitti. Başrolde seçilmediğini gördü ve bunun yerine küçük bir rol verildiğini öğrendi. Bilge koridorda erkek arkadaşına rastladı ve ona ne olduğunu anlattı. "Üzgünüm, hayal kırıklığına uğramış olmalısın." dedi erkek arkadaşı. "Evet," diye yanıtladı Bilge, "Şimdi bu rolü alıp almayacağıma karar vermeliyim." dedi.

1- Biri söylememesi gereken bir şey veya garip bir şey söyledi mi?

2- Kim söylememesi gereken ya da garip bir şey söyledi?

3- Neden söylememesi gerekirdi ya da bu söylediği neden garipti?

4- Neden söylediğini düşünüyorsunuz?

5- Bilge'nin erkek arkadaşı koridorda onunla karşılaştığında, Bilge'nin başrolü alamadığını biliyor muydu?

6- Sizce Bilge nasıl hissetti?

7- Hikayede, Bilge hangi rolü aldı?

8- Önceki yıl nasıl bir rol almıştı?

Story 7. Kütüphane Hikayesi

Furkan kütüphanedeydi. Akdeniz Medeniyetleri ile ilgili istediği bir kitap buldu ve kitabı almak için kütüphane görevlisine gitti. Cüzdanına bakındığında, kütüphane

kartını evde bıraktığını gördü. Kütüphane görevlisine "Üzgünüm, kartımı evde unutmuşum" dedi. Görevli "Sorun değil," diye yanıtladı. "Bana adınızı söyleyin, eğer sistemde gözüküyorsanız, ehliyetinizi göstermeniz yeterli olur." dedi.

1- Biri söylememesi gereken bir şey veya garip bir şey söyledi mi?
2- Kim söylememesi gereken ya da garip bir şey söyledi?
3- Neden söylememesi gerekirdi ya da bu söylediği neden garipti?
4- Neden söylediğini düşünüyorsunuz?
5- Furkan kitabı almak için görevliye yaklaştığında, kütüphane kartının yanında olmadığını fark etti mi?
6- Sizce Furkan nasıl hissetti?
7- Hikayede, Furkan kütüphaneden hangi kitabı aldı?
8- Kitabı alabilecek miydi?

Story 8. Otobüs Hikayesi

Serpil otobüs durağında bekliyordu. Otobüs geç kalmıştı ve uzun süre durakta bekledi. 65 yaşındaydı ve bu kadar uzun süre ayakta durmak onu yordu. Otobüs nihayet geldi ama içi kalabalıktı ve oturacak yer kalmamıştı. Otobüsün koridorunda ayakta duran komşusu Berk'i gördü. Berk "Merhaba Serpil teyze" dedi. "Durakta uzun süre bekledin mi?" diye ekledi. Serpil "Yaklaşık 20 dakika bekledim" diye yanıtladı. Oturmakta olan genç bir adam ayağa kalktı. "Teyzecim, oturmak ister misiniz?" dedi.

1- Biri söylememesi gereken bir şey veya garip bir şey söyledi mi?
2- Kim söylememesi gereken ya da garip bir şey söyledi?
3- Neden söylememesi gerekirdi ya da bu söylediği neden garipti?

4- Neden söylediğini düşünüyorsunuz?

5- Serpil otobüse bindiğinde, Berk onun ne kadar süredir beklediğini biliyor muydu?

6- Sizce Serpil nasıl hissetti?

7- Hikayede Serpil 20 dakika boyunca ne bekliyordu?

8- Bindiğinde otobüste boş koltuk var mıydı?

Story 9. Araba Kazası Hikayesi

Erdinç yeni bir araba satın aldı. Satın aldıktan birkaç hafta sonra, komşusu Kemal'in otuz senelik külüstür arabasına hafifçe çarptı. Kendi arabası hiç hasar görmedi ve Kemal'in arabasına da pek zarar vermedi - sadece tekerleğin üzerinde bir çizik oluştu. Yine de Kemal'in evine gitti ve kapıyı çaldı. Kemal kapıyı açtığında, Erdinç, "Gerçekten üzgünüm. Arabanıza küçük bir çizik oluşturdum." dedi. Kemal dışarı çıktı ve baktı. "Endişelenme. Sorun değil" dedi.

1- Biri söylememesi gereken bir şey veya garip bir şey söyledi mi?

2- Kim söylememesi gereken ya da garip bir şey söyledi?

3- Neden söylememesi gerekirdi ya da bu söylediği neden garipti?

4- Neden söylediğini düşünüyorsunuz?

5- Erdinç, komşusu Kemal'in tepkisinin ne olacağını biliyor muydu?

6- Sizce Kemal nasıl hissetti?

7- Hikayede Erdinç, Kemal'in arabasına ne yaptı?

8- Kemal nasıl tepki verdi?

Story 10. Kasap Hikayesi

Nilgün, tavuk almak için kasaba gitti. Dükkan kalabalık ve gürültülüydü. "Organik tavuk but var mı?" diye sordu kasaba. Kasap başıyla onayladı ve Nilgün için tavuk göğsü paketlemeye başladı. Nilgün, "Afedersiniz, yanlış ifade ettim sanırım. Tavuk budu var mı diye sormuştum." dedi. "Ah, özür dilerim, elimizde kalmadı" dedi kasap.

1- Biri söylememesi gereken bir şey veya garip bir şey söyledi mi?
2- Kim söylememesi gereken ya da garip bir şey söyledi?
3- Neden söylememesi gerekirdi ya da bu söylediği neden garipti?
4- Neden söylediğini düşünüyorsunuz?
5- Kasap, Nilgün için bir tavuk sarmaya başladığında, onun tavuk budu istediğini biliyor muydu?
6- Sizce Nilgün nasıl hissetti?
7- Hikayede, Nilgün nereye gitti?
8- Kasap neden onun için tavuk göğsü sarmaya başladı?

APPENDIX C: CONTAMINATION TASK USED IN STUDY 1

Mary ve John paradigması (Perner ve Wimmer 1985):

No-Belief False Message (NBFM)

Bu hikaye, bu kasabada yaşayan John ve Mary ile ilgilidir. Bir sabah John parka gitmiştir. Parkta ayrıca karavanında bir dondurmacı da vardır. John biraz dolaştıktan sonra eve döner. John evine döndüğü sırada dondurmacı da kendi kendine "Kiliseye gideyim. Parkta dondurma alacak kimse yok; belki kilisede biraz satabilirim" der ve kiliseye gider. John evinde öğlen yemeğinden sonra ödevini yapmaktadır. Ödevlerden bir tanesini yapamadığından, yardım almak için Mary'nin evine gider. Mary kapıyı açar ve "Ben de dondurma almaya gidiyordum" der. John dondurmacının parkta olduğunu söyler.

Soru: Mary dondurmacının nerede olduğunu düşünüyor?

ENG: This story is about John and Mary who live in this town. One morning John went to the park. There is also an ice cream man in the park. John returns home after wandering around for a while. As John returned home, the ice cream maker said to himself, "Let me go to church. There is no one to buy ice cream in the park; maybe I can sell some at church" and goes to church. John does his homework after lunch at home. Unable to complete one of the assignments, he goes to Mary's house for help. Mary opens the door and says "I was going to buy ice cream too". John says the ice cream shop is in the park.

Question: Where does Mary think the ice cream man is?

True Belief False Message (TBFM)

Bu hikaye, bu kasabada yaşayan John ve Mary ile ilgilidir. Bir sabah John parka gitmiştir. Parkta ayrıca karavanında bir dondurmacı da vardır. John biraz dolaştıktan sonra eve döner. John evine döndüğü sırada dondurmacı da kendi kendine " Kiliseye gideyim. Parkta dondurma alacak kimse yok; belki kilisede biraz satabilirim" der ve kiliseye gider. Dondurmacı, kiliseye doğru gider. Yolunun üzerinde, Mary'nin evinin önünden geçer. Mary pencereden bakmaktadır ve dondurmacıyı görür. 'Nereye gidiyorsun?' diye sorar. Dondurmacı, 'Kiliseye gidiyorum. Orada daha fazla dondurma satabileceğim.' diye cevap verir. 'Seni gördüğüm iyi oldu.' der Mary. Şu anda John Mary'nin dondurmacı ile konuştuğunu bilmemektedir. John evinde öğlen yemeğinden sonra ödevini yapmaktadır. Ödevlerden bir tanesini yapamadığından, yardım almak için Mary'nin evine gider. Mary kapıyı açar ve "Ben de dondurma almaya gidiyordum" der. John dondurmacının parkta olduğunu söyler.

Soru: Mary dondurmacının nerede olduğunu düşünüyor?

ENG: This story is about John and Mary who live in this town. One morning John went to the park. There is also an ice cream man in the park. John returns home after wandering around for a while. As John returned home, the ice cream man said to himself, "Let me go to church. There is no one to buy ice cream in the park; maybe I can sell some at church" and goes to church. The ice cream maker goes to the church. On his way, he passes by Mary's house. Mary looks out the window and sees the ice cream man. "Where are you going?" he asks. The ice cream man said, 'I'm going to church. I will be able to sell more ice cream there.' 'It's good to see you,' says Mary. Currently, John does not know that Mary is talking to the ice cream man. John does his homework after lunch at home. Unable to complete one of the

assignments, he goes to Mary's house for help. Mary opens the door and says "I was going to buy ice cream too". John says the ice cream man is in the park.

Question: Where does Mary think the ice cream man is?

False Belief True Message (FBTM)

Bu hikaye, bu kasabada yaşayan John ve Mary ile ilgilidir. Bu sabah John ve Mary parkta birliktedir. Parkta ayrıca karavanında bir dondurmacı da vardır. Mary dondurma almak istemiş ancak parasını evde bırakmıştır. Bu nedenle çok üzgündür. Dondurmacı 'Üzülme, paranı alıp gelebilirsin ve dondurma satın alabilirsin, akşamüzeri parkta burada olacağım.' der. Mary 'Güzel, dondurma almak için akşamüzeri parkta olacağım. O zaman paramı unutmayacağım.' der. Böylece Mary eve gider. Şu anda John tek başına parktadır. Ansızın, dondurmacının parktan ayrılmakta olduğunu görür. 'Nereye gidiyorsun?' diye sorar John. Dondurmacı 'Kiliseye gidiyorum. Parkta dondurma alacak kimse yok; belki kilisede biraz satabilirim.' Dondurmacı, kiliseye doğru gider. John da biraz dolaştıktan sonra eve döner. John evinde öğlen yemeğinden sonra ödevini yapmaktadır. Ödevlerden bir tanesini yapamadığından, yardım almak için Mary'nin evine gider. Mary kapıyı açar ve "Ben de dondurma almaya gidiyordum" der. John dondurmacının kilisede olduğunu söyler.

Soru: Mary dondurmacının nerede olduğunu düşünüyor?

ENG: This story is about John and Mary who live in this town. This morning John and Mary are together in the park. There is also an ice cream man in the park. Mary wanted to buy ice cream but left her money at home. That's why she's very sad. The ice cream man says, 'Don't worry, you can come with your money and buy ice

cream, I'll be here in the park in the evening. Mary said, 'Good, I'll be at the park in the afternoon to buy ice cream. Then I will not forget my money.' So, Mary goes home. Currently, John is alone in the park. He suddenly sees that the ice cream parlor is leaving the park. “Where are you going?” John asks. The Ice Cream man: I'm going to church. There is no one to buy ice cream in the park; maybe I can sell some at the church.' The ice cream man goes towards the church. John returns home after wandering around a bit. John does his homework after lunch at home. Unable to complete one of the assignments, he goes to Mary's house for help. Mary opens the door and says "I was going to buy ice cream too". John says the ice cream man is in the church.

Question: Where does Mary think the ice cream man is?

APPENDIX D: CERTAINTY TASK

Lexical Mental State (No Certainty Markers Included):

1. Zeynep, Kaanın evde olduğunu düşünüyor.

   Sizce Zeynep Kaan'ın evde olduğundan ne kadar emin?

2. Aslı, kütüphanenin açık olduğunu düşünüyor.

   Sizce Aslı kütüphanenin açık olduğundan ne kadar emin?

3. Arda, kedinin susadığını düşünüyor.

   Sizce Arda kedinin susadığından ne kadar emin?

Morphological Perspectival Marker (*ben-ce*):

1. Zehra, "Bence evdeki süt bozuk." dedi.

   Sizce Zehra söyleminden ne kadar emin?

2. Cem, "Bence Kerem dışarda arkadaşlarıyla oturuyor." dedi.

   Sizce Cem söyleminden ne kadar emin?

3. Başak, "Bence eczane bugün kapalı" dedi.

   Sizce Başak söyleminden ne kadar emin?

Morphological Certainty Markers

Circumstantial Evidence-Based Inference

-(A/I)r:

1. Elif, "Kerem bugün eve erken gelir." dedi.

   Sizce Elif söyleminden ne kadar emin?

2. Arzu "Barış hastaneye arabasıyla gider" dedi.

Sizce Arzu söyleminden ne kadar emin?

3. Yavuz “Merve yarınki partiye kuzenlerini de çağırır” dedi.

   Sizce Yavuz söyleminden ne kadar emin?

-Dır:

1. Ozan, “Köpek acıkmıştır.” dedi.

   Sizce Ozan söyleminden ne kadar emin?

2. Özlem, “Enes sınavı yetiştirememiştir.” dedi.

   Sizce Özlem söyleminden ne kadar emin?

3. Burak “İrem dün akşam arkadaşlarıyla buluşmaya çıkmıştır” dedi.

   Sizce Burak söyleminden ne kadar emin?

-Meli/Malı:

1. Serap, “Evde bir kutu süt kalmış olmalı.” dedi.

   Sizce Serap söyleminden ne kadar emin?

2. Furkan, “Bu tişörtler tükenmiş olmalı.” dedi.

   Sizce Furkan söyleminden ne kadar emin?

3. Sezgi, “Annem şu an yemek yapıyor olmalı.” dedi.

   Sizce Sezgi söyleminden ne kadar emin?

Morphological Certainty Marker (Speculative Possibility)

-(y)Abil:

1. Arda, “Kedi susamış olabilir.” dedi.

Sizce Arda söyleminden ne kadar emin?

2. Büşra, “Can eve gitmiş olabilir.” dedi.

   Sizce Büşra söyleminden ne kadar emin?

3. Selma, “Kardeşim dışarı çıkmış olabilir.” dedi.

   Sizce Selma söyleminden ne kadar emin?