The Psychometric Properties of the Children's Social Understanding Scale-Short Form

among Children with Autism Spectrum Disorder

by

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# STATEMENT OF AUTHORSHIP

This thesis does not comprise any material that has been accepted for an award or any other degree or diploma in any university or institution. To the best of the candidate's knowledge, it is affirmed that the thesis does not compromise any material previously published or written by another person with the exception of where due references are made.


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**ABSTRACT**

Researchers have examined theory of mind (ToM) via individual assessments, depending on participants' behavioral performance. Recently, Tahiroğlu and colleagues developed a parent-report, the Children's Social Understanding Scale (CSUS), to assess fine-tuned individual differences in children's ToM. The CSUS has been found reliable and valid in measuring ToM of typically developing preschool-aged children in North America (Tahiroğlu et al., 2014) and Turkey (Tahiroğlu & Yağmurlu, 2014). Another group where ToM has been widely examined is individuals with Autism Spectrum Disorder (ASD) who have varying degrees of difficulty in understanding others' mental states. However, using individual assessments to measure ToM can be problematic in ASD, since the behavioral tasks are complex, have significant linguistic and cognitive demands, and are not good at revealing nuanced individual differences. In the present study, we examined the psychometric properties of the short form of the CSUS in ToM assessment of children with ASD in Turkey. The participants were 106 children with ASD ($M_{age}$ = 12.06 years, $SD$ = 2.91) and their parents. Children's ToM was measured via the CSUS and behavioral assessments: one low-verbal and one first-order ToM task. Their ASD severity level, receptive language, nonverbal intelligence, emotion recognition, and social competence were also measured to analyze the validity of the CSUS. Reliability analysis revealed very high internal consistency for the CSUS. The CSUS score was negatively associated with children's ASD severity level and positively associated with low-verbal ToM performance, receptive language, nonverbal intelligence, and social competence. When children's ASD severity level and receptive language were controlled, the associations among the CSUS score and behaviorally measured ToM scores were non-significant. Hierarchical regression analysis was also used to test the predictive value of children's ASD severity level, receptive language, nonverbal intelligence, emotion recognition, and social competence on their CSUS score. The results revealed that better

receptive language and higher social competence were significantly associated with higher CSUS score. The findings showed that the CSUS is a reliable and valid tool in measuring ToM of children with ASD in Turkey.

*Keywords*: Children's Social Understanding Scale, theory of mind, parent report, psychometric properties, autism

# ÖZET

Araştırmacılar zihin kuramı düzeyini genellikle performansa dayalı bireysel değerlendirmelerle ölçmektedirler. Yakın zamanda, Tahiroğlu ve arkadaşları çocukların zihin kuramındaki bireysel farklılıkları ölçmek amacıyla, ebeveynler tarafından doldurulmak üzere Çocukların Sosyal Anlayış Ölçeği'ni (ÇSAÖ; Children's Social Understanding Scale) geliştirmişlerdir. ÇSAÖ'nün, tipik gelişimi olan okul-öncesi çocukların zihin kuramını değerlendirmede Kuzey Amerika'da (Tahiroğlu ve ark., 2014) ve Türkiye'de (Tahiroğlu ve Yağmurlu, 2014) geçerli ve güvenilir bir ölçek olduğu bulunmuştur. Zihin kuramının en çok incelendiği bir başka grup ise başkalarının zihinsel temsillerini anlamakta zorluk yaşayan Otizm Spektrum Bozukluğu tanısı almış kişilerdir. Fakat otizmli bireylerin zihin kuramını ölçmek amacıyla bireysel değerlendirmelerin kullanılması problemli olabilmektedir çünkü bireysel değerlendirmeler genellikle anlaşılması zor ve sözel yükü fazla olan uygulamalardır. Bu çalışma, ÇSAÖ'nün kısa formunun Türkiye'deki otizmli çocukların zihin kuramının değerlendirilmesinde bir ölçüm aracı olarak kullanılabilirliğini incelemektedir. Çalışmamız 106 otizmli çocuk (Ort. = 12.06 yaş, SS = 2.91) ve ebeveynleriyle yapılmıştır. Çocukların zihin kuramı ÇSAÖ ve bireysel değerlendirmelerle ölçülmüştür. Zihin kuramının bireysel değerlendirmelerinde bir tane sözel yükü az ve bir tane birinci-düzey zihin kuramı testi kullanılmıştır. ÇSAÖ'nün geçerliliğini değerlendirmek amacıyla çocukların otizm tanısının şiddeti, alıcı dili, sözel olmayan zekası, duygu anlama becerileri ve sosyal-yeterliği ölçülmüştür. Güvenirlik çalışmaları ÇSAÖ puanının çok yüksek iç tutarlılığa sahip olduğunu göstermiştir. ÇSAÖ puanının çocukların otizm tanısının şiddeti ile negatif yönde; sözel yükü az zihin kuramı performansı, alıcı dili, sözel olmayan zekası ve sosyal-yeterliğiyle pozitif yönde ilişkili olduğu görülmüştür. Çocukların otizm tanısının şiddeti ve alıcı dili kontrol edildiğinde ÇSAÖ puanı ve zihin kuramı performansları arasında anlamlı bir ilişkinin olmadığı bulunmuştur. Çocukların otizm tanısının şiddetinin, alıcı dilinin, sözel olmayan zekasının, duygu anlama

becerilerinin ve sosyal-yeterliğinin ÇSAÖ puanına etkisi hiyerarşik regresyon analizleri ile test edilmiştir. Sonuçlar iyi alıcı dil ve yüksek sosyal-yeterliğin ÇSAÖ puanını anlamlı şekilde yordadığını göstermiştir. Tüm bu bulgular, ÇSAÖ'nün Türkiye'deki otizmli çocukların zihin kuramının ölçülmesinde kullanılabilecek geçerli ve güvenilir bir araç olduğunu göstermiştir.

*Anahtar kelimeler:* Çocukların Sosyal Anlayış Ölçeği, zihin kuramı, ebeveyn bildirimi, psikometrik özellikler, otizm

# DEDICATION

*To my beloved family…*

# ACKNOWLEDGEMENTS

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**Chapter 1**

**INTRODUCTION**

Theory of mind (ToM) refers to the ability of mental state understanding of oneself and others to predict and explain behavior (Wellman, 1990), and has been predominantly measured via individual assessments which depend on participants' behavioral performance (e.g., Muris et al, 1999; Wimmer & Perner, 1983). Recently, Tahiroğlu and colleagues (2014) developed a parent-report measure of children's ToM, the Children's Social Understanding Scale (CSUS), to expand the available ToM assessment tools. The researchers found the CSUS as a reliable and valid measure of individual differences in typically developing children's ToM in North America. Tahiroğlu and Yağmurlu (2014) found that the CSUS has good psychometric properties in assessing ToM of typically developing preschool-aged children in Turkey. In a pilot study, Tahiroğlu et al. (2014) also found that the CSUS has good discriminative validity in measuring ToM differences of North American middle school-aged children with Autism Spectrum Disorder (ASD) and age-matched typically developing children.

ToM in atypical populations has been most extensively examined with individuals diagnosed with ASD (Wellman & Peterson, 2013). ASD is characterized by impairment in social interaction and communication (American Psychiatric Association [APA], 2013). Literature has revealed that individuals with ASD have deficits in ToM at different levels and these deficits are related to their key impairment in social domain (Tager-Flusberg, 2007). Similar to typically developing children, ToM of children with ASD has been mostly assessed via behavioral measures (Wellman, 2012). Although behavioral measures give rich information about ToM of both typical and atypical populations (Astington, 2001), they can have some problems. It is suggested that these tasks are generally complex, have linguistic and cognitive demands, and are

not good at revealing nuanced individual differences in ToM (Bloom & German, 2001; San José Cáceres, Keren, Booth, & Happé, 2014; Tahiroğlu et al., 2014; Wellman, Cross, & Watson, 2001). Yet, these problems are more critical in ASD, since the linguistic and nonsocial cognitive demands of ToM tasks are suggested to influence ToM performance of individuals with ASD more than typically developing children (Tager-Flusberg, 2007). Therefore, it is possible that the CSUS could also be used among individuals with ASD. Even though the CSUS has good psychometric properties in assessing ToM of preschool-aged typically developing children (Tahiroğlu et al., 2014; Tahiroğlu & Yağmurlu, 2014) and good discriminative validity in assessing ToM differences of children with ASD and typical development (Tahiroğlu et al., 2014), its reliability and validity have not been investigated for children with ASD in a large sample. The present study examined the psychometric properties of the CSUS in measuring individual differences in ToM of children with ASD in Turkey.

**Chapter 2**

**LITERATURE REVIEW**

**1.1 Parent Report: The Children's Social Understanding Scale**

The CSUS was developed by Tahiroğlu et al. (2014) to expand the available ToM assessment tools with the value of one additional informant type, the parents. There are two versions of the scale (full and short versions) that include items about whether the child uses mental-state terms (e.g., Uses words that express uncertainty [e.g., "We might go to the park"; "Maybe my shoes are outside"]) and behaves in ways that reflect ToM (e.g., Is good at directing people's attention [e.g., points at things to get others to look at them]). The scale assesses different aspects of ToM such as understanding of belief, knowledge, perception, desire, intention, and emotion. Since parents have higher chance to observe their children in various contexts over long periods of time, it is argued that the CSUS provides greater ecological validity compared to behavioral measures.

The CSUS has been found as a reliable and valid tool of individual differences in ToM of typically developing preschool-aged children in North America (Tahiroğlu et al., 2014) and in Turkey (Tahiroğlu & Yağmurlu, 2014). The psychometric studies indicated good internal consistencies for full and short forms of the scale ($\alpha$s ranging from .81 to .94 among typically developing North American children [Tahiroğlu et al., 2014], $\alpha$ = .78 among typically developing Turkish children [Tahiroğlu & Yağmurlu, 2014]) and a strong short-term test-retest reliability ($r$s = .88, $p$s < .01 [Tahiroğlu et al., 2014]). Analyses revealed significant relations of the CSUS score with behaviorally measured ToM and other cognitive skills (i.e., working memory and planning in the North American sample; and social competency and receptive language in the Turkish sample). These findings indicated the convergent and construct validity of the scale in

North America (Tahiroğlu et al., 2014) and Turkey (Tahiroğlu & Yağmurlu, 2014). In addition, Tahiroğlu et al. (2014) examined the discriminative validity of the CSUS in assessing ToM differences of children with ASD ($n = 15$) and typically developing children ($n = 18$) in a pilot study. When age and intelligence were controlled, typically developing North American children were rated by parents as having higher ToM than children with ASD (equivalent in age, ranging from 10 to 16 years). The CSUS score also predicted the severity of autistic traits. Thus, the scale was found as a valid tool in the pilot study conducted with atypical sample. Yet, the psychometric properties of the CSUS in measuring ToM of children with ASD have not been examined in a large sample, which is the goal of the current study.

**1.2 Theory of Mind in Children with Autism Spectrum Disorder**

The 'theory of mind' hypothesis of ASD, which was first proposed in the mid-1980s, assumes that deficits in ToM give rise to major symptoms of ASD (Baron-Cohen, Leslie, & Frith, 1985). In their study, Baron-Cohen et al. (1985), for the first time, hypothesized that individuals with ASD lack ToM. They examined false belief understanding (FBU) ability in children with ASD (age range: 6-16 years), with Down syndrome (age range: 6.3-17 years), and with typical development (age range: 3-5 years), and found that only 20% of children with ASD passed the FBU task, while this number was 85% for both children with Down syndrome and typically developing children.

Most of the typically developing children acquire full-fledged ToM by the age of 4 years (Perner, Ruffman, & Leekam, 1994; Yirmiya, Erel, Shaked, & Solomonica-Levi, 1998). Yet, there are significant differences in ToM development of children with ASD. Children with ASD show major deficits in ToM, especially in FBU, contrary to children with typical development, intellectual disabilities, special language delay, and Down syndrome (Happé, 1995; Wellman, 2014; Yirmiya et al., 1998). Similarly, studies with Turkish children have demonstrated that

Turkish children with ASD have major deficits in ToM as well and show delayed development contrary to typically developing Turkish children (Aslan & Şahin, 2015; Keçeli-Kaysılı, 2013) who pass ToM tasks by the age of 4 years (Keçeli-Kaysılı & Acarlar, 2011; Yagmurlu, Berument, & Celimli, 2005). While typically developing children pass ToM task at the verbal mental age of 4, it takes more years (e.g., verbal mental age: 9.2 years) to succeed in ToM tasks for children with ASD (Happé, 1995; Keçeli-Kaysılı, 2013; Yirmiya et al., 1998). More specifically, high functioning children with ASD develop ToM in the same order as typically developing children (e.g., desires understood before beliefs), but at a later chronological and (verbal) mental age (Happé & Frith, 1996; Hoogenhout & Malcolm-Smith, 2014). On the other hand, low functioning children with ASD deviate from the order; they are more likely to develop ToM in a not-orderly fashion via showing developmental regressions, unevenness (Burack & Volkmar, 1992), or fluctuations (Hoogenhout & Malcolm-Smith, 2014).

Similar to the studies with typically developing children, research on ToM of children with ASD has been dominated by individual assessments (Wellman, 2012). Yet, the use of individual assessments is suggested to have some problems for children with ASD and typical development (Bloom & German, 2001; San José Cáceres et al., 2014; Wellman et al., 2001). One of the suggested problems is that most of the ToM tasks, especially FBU tasks are, in general, complex tasks and rely heavily on language and cognitive abilities of children with ASD and typical development (Astington & Jenkins, 1999; San José Cáceres et al., 2014; Milligan, Astington, & Dack, 2007; Tager-Flusberg, 2007). The meta-analysis of almost 200 studies with typically developing children revealed largely varied FBU tasks across the studies (Wellman et al., 2001). Some of the variations were about the type of questions in terms of whether to judge behavior or thoughts and verbal load of the stories and questions. When researchers used easier ToM tasks or eliminated or reduced limitations of the tasks, the participants' performances were found to be

enhanced. Similarly, the linguistic and cognitive demands of the FBU tasks influence ToM performances of children with ASD (Van Herwegen, Dimitriou, & Rundblad, 2013). Even when these tasks do not require a verbal response, participants with ASD and typical development have to handle the linguistic and cognitive complexity of ToM tasks (San José Cáceres et al., 2014). They have to memorize the instructions, understand the contents of the stories, and process the questions in order to give appropriate answers (Astington & Jenkins, 1999). This situation binds ToM performances to verbal and cognitive abilities of children (San José Cáceres et al., 2014) and makes it harder to use ToM tasks among all children with ASD, especially among children with low-functioning ASD, since they have little or no verbal ability and severe cognitive deficits (Colle, Baron-Cohen, & Hill, 2007).

Another suggested problem of ToM tasks is that in ToM literature, the performances in behaviorally measured ToM tasks, in general, do not show high correspondence with performances of children with ASD and typical development in real-life situations that require social understanding (Begeer, Malle, Nieuwland, & Keysar, 2010; Tahiroğlu et al., 2014). Some ToM studies have achieved ecological validity via naturalistic techniques such as using pictures or videos, taking reports, or observing everyday behaviors of the participants (Begeer et al., 2010; Kleinman, Marciano, & Ault, 2001; Spek, Scholte, & Berckelaer-Onnes, 2010). The use of naturalistic techniques has advantages over experimental measures, since the reports and observations reflect the behavior of participants in their natural context and do not depend on the specific demands of tasks such as language or being in an unfamiliar setting with a researcher (Peskin & Ardino, 2003). Although studies with naturalistic observations or reports are highly informative, these measures rely on spontaneous behaviors which are, by their very nature, infrequent, anecdotal, and free of control unlike experimental measures.

The other suggested problem is the focus of research on the FBU of children with ASD and typical development (Baron-Cohen, 2000; Bauminger & Kasari, 1999; Wellman, 2012). The largest ToM data in ASD and typical development has been provided by the experiments using FBU tasks (Astington, 2001; Bauminger & Kasari, 1999; Joseph & Tager-Flusberg, 2004; Wellman et al., 2001). Yet, the FBU tasks assess children's only belief understanding and are generally pass/fail tasks (Tahiroğlu et al., 2014). Thus, they limit the variance of individual differences. For example, the reliabilities of FBU tasks within and across studies conducted with typically developing children (e.g., Hughes et al., 2000) and children with ASD (e.g., Grant, Grayson, & Boucher, 2001; Hutchins, Prelock, & Chase, 2008) extensively varied, ranging from poor to very high agreement. Also, the FBU tasks are not enough to address highly complex nature of ToM (Astington, 2001; Wellman, 2012). ToM encompasses multiple concepts other than false belief such as understanding knowledge, desire, and intention. Thus, researchers have recognized the limitation of using either a single task or one dimension of ToM, and thus attempted to solve the problem via assessing and aggregating scores of tasks tapping different mental states to address different aspects of ToM (e.g., Baron-Cohen, Jolliffe, Mortimore, & Robertson, 1997; Muris et al, 1999; Peterson, Wellman, & Liu, 2005). Yet, the use of multiple ToM tasks is not always practical, especially when assessing other developmental capacities in addition to ToM, since it increases the cognitive burden over participants (Tahiroğlu et al., 2014).

Although individual assessments have been criticized to have some problems in measuring ToM of children with ASD and typical development, these problems are more critical for children with ASD (Tager-Flusberg, 2007). It is argued that typically developing children use their both social insight and general cognitive skills to answer the questions in ToM tasks. On the other hand, children with ASD are suggested to rely on language and other nonsocial cognitive processes more than their social insight in ToM tasks. Thus, their ToM performances are more

sensitive to the complexity and linguistic and cognitive demands of ToM tasks (Tager-Flusberg, 2007; Van Herwegen et al., 2013). Due to the suggested problems of individual assessments, the use of the CSUS could be beneficial in assessing ToM of children with ASD.

**Chapter 3**

**PRESENT STUDY**

The CSUS has been found reliable and valid in measuring ToM of typically developing preschool-aged children (Tahiroğlu et al., 2014; Tahiroğlu & Yağmurlu, 2014). Yet, these studies were conducted only with typically developing young children. One study examined the discriminative validity of the CSUS in measuring ToM differences of children with ASD and typical development (Tahiroğlu et al., 2014). Yet, the psychometric properties of the CSUS have not been investigated in a large sample of individuals with ASD. Literature has revealed that individuals with ASD have major deficits in ToM (e.g., Baron-Cohen et al., 1985; Happé, 1995; Wellman, 2014) which has been frequently assessed via behavioral measures (Baron-Cohen, 2000). Yet, similar to typically developing children, the use of behavioral measures can be problematic in ASD, because these tasks are complex, have linguistic and cognitive demands, and are not good at revealing nuanced individual differences (Astington & Jenkins, 1999; Tahiroğlu et al., 2014). In addition, these problems are more crucial for children with ASD, since their performances are more sensitive to the linguistic and cognitive demands of ToM tasks in comparison to typically developing children. In the present study, we investigated the psychometric properties of the CSUS in assessing ToM of children with ASD in Turkey.

Based on the strong psychometric properties found in the previous studies with typically developing children (Tahiroğlu et al., 2014; Tahiroğlu & Yağmurlu, 2014), the scale was expected to show high internal consistency in the ASD sample. In order to measure the convergent validity of the CSUS, we investigated the associations of the CSUS score with behaviorally measured ToM performances. We used two tasks to assess participants' behavioral ToM performances. Since FBU tasks have been the most widely used ToM measures in the

studies (Bauminger & Kasari, 1999; Joseph & Tager-Flusberg, 2004), we used one first-order

ToM task, the unexpected change task. Also, most of the FBU tasks are argued to be complex

and have significant linguistic demands (San José Cáceres et al., 2014; Milligan et al., 2007).

Thus, in the present study, we also used one low-verbal ToM task using thought bubbles. In line

with the findings of the studies conducted with the CSUS (Tahiroğlu et al., 2014; Tahiroğlu &

Yağmurlu, 2014), the CSUS score was hypothesized to be positively associated with behavioral

ToM performances of children with ASD on both first-order and low-verbal ToM tasks.

As an evidence for the construct validity of the CSUS, the scale was expected to be

associated with children's ASD severity level, receptive language, nonverbal intelligence,

emotion recognition, and social competence, all of which have been found to have a link to ToM

of children with ASD. Since individuals with ASD show deficits in understanding others' mental

states at different levels (Tager-Flusberg, 2003) and functioning level of children influences their

pattern of ToM development (Hoogenhout & Malcolm-Smith, 2014), a negative association

between the CSUS score and ASD severity level was expected.

Studies on ToM of individuals with ASD have been generally done with older age groups

due to the delayed ToM development (Wellman, 2014). Therefore, we collected data from

school-aged children and adolescents with ASD. Literature demonstrated stronger relation

between ToM of individuals with ASD and their (verbal) mental age than chronological age

(Happé, 1995; Yirmiya et al., 1998). Thus, we measured children's receptive language and

nonverbal intelligence. The CSUS score was predicted to be positively correlated with children's

receptive language and nonverbal intelligence. Also, we expected a non-significant association

between children's CSUS score and chronological age.

People are sensitive to facial expressions and discriminate a number of simple emotions

from their birth (Peterson, 2003). Unlike typically developing children, children with ASD are

known to have difficulty in recognizing emotions from the expressions of others (Baron-Cohen, 1995; Golan, Baron-Cohen, & Golan, 2008; Uljarevic & Hamilton, 2013). Their interpersonal-connection problems are suggested to be caused from their lack of biologically-based and normally innate capacity to perceive and understand emotional expressions (Baron-Cohen, 1988; Hobson, 1989). Literature has demonstrated that their difficulty in emotion recognition is linked with their ToM deficits (Baron-Cohen, 1991; Baron-Cohen et al., 1997; Brent, Rios, Happé, & Charman, 2004; Heerey, Keltner, & Capps, 2003). Thus, the CSUS score was predicted to be positively related to the emotion recognition from facial expressions.

Children with ASD show deficits in social communication and interactions which are evident in ASD from an early age (APA, 2013; Feng, Lo, Tsai, & Cartledge, 2008; Waugh & Peskin, 2015). Children with ASD generally engage in less social conversation, sharing behaviors, and peer relations as well as more stigmatizing behaviors such as being insensitive, self-centered, socially disinterested, and detached in conversations (Bauminger et al., 2008; Klin & Volkmar, 2000; Tager-Flusberg, 2003; Waugh & Peskin, 2015). Although verbal abilities of high functioning children with ASD help them to mask their challenges during preschool years, their deficits in social awareness, communication, and interaction become obvious during elementary school years and continue into adulthood (Koegel, Ashbaugh, Koegel, Detar, & Regester, 2013). The real-life social problems of children with ASD have also been found to relate to their ToM deficits (e.g., Frith, Happé, & Siddons, 1994; Peterson, Slaughter, & Paynter, 2007; Tager-Flusberg, 2003). Contrary to children with learning disability and typical development, only children with ASD who perform better on FBU tasks show more social insight in the adaptation to everyday life (Frith et al., 1994). Children with ASD who have better FBU communicate in an effective way (Duck, 1989) and are judged as more socially mature and engaging in peer relations by their teachers (Frith et al., 1994; Peterson et al., 2007; Tager-

Flusberg, 2003). Thus, we expected a positive association between children's social competence and the CSUS score.

In addition, we investigated the associations between the CSUS score and behavioral ToM performances via controlling for children's ASD severity level and receptive language. We controlled the ASD severity level in order to eliminate its potential influence on parents' evaluation of their children's ToM. Since children's ToM performances have been found to be closely linked to their verbal ability more than their intellectual level and chronological age (Happé, 1994; 1995), we also controlled children's receptive language. The correlations among the CSUS score and behavioral ToM performances were predicted to remain significant after the ASD severity level and receptive language of children were controlled. Finally, we tested the predictive value of the variables on children's CSUS score. All of the variables were hypothesized to explain a large proportion of the CSUS score.

**Chapter 4**

**METHOD**

## 3.1 Participants

The data were collected from 106 Turkish children with a diagnosis of ASD and their parents (103 mothers, 3 fathers). All children were diagnosed with ASD by a child psychiatrist or a child neurologist based on DSM-IV-TR criteria (APA, 2000). Children without the diagnosis of severe intellectual disability, with linguistic capacity to communicate, and who were attending a special education center were recruited for the study. The age of the children in the sample ranged between 8.00 and 17.11 years ($M$ = 12.06 years, $SD$ = 2.91) (see Table 1 for descriptive statistics). There were 87 boys and 19 girls in the sample. The ratio was 4.5:1 for boys compared to girls in a way that reflects the ratio of sex in ASD population (Christensen et al., 2016). The age of boys ($M$ = 12.04 years, $SD$ = 2.91) and girls ($M$ = 12.11 years, $SD$ = 3.01) did not differ significantly ($F$ (1, 104) = .01, $p$ = .93). Ninety-seven children (91.5%) came from intact families; 26 children (24.5%) were singletons.

The age range of the mothers varied between 28 and 58 years ($M$ = 41.22 years, $SD$ = 6.06). The age range of fathers varied between 31 and 59 years ($M$ = 45.77 years, $SD$ = 6.24). The demographic information indicated diverse educational backgrounds and work experiences for parents. Fifty-one mothers (49.0%) and 54 fathers (51.9%) had at least a high school diploma. Also, 83 mothers (78.3%) were not employed outside home, whereas 76 fathers (71.7%) had a full-time job.

## 3.2 Measures

We used the Children's Social Understanding Scale (CSUS) to measure children's ToM. To examine the convergent validity of the scale, we also administered behavioral ToM tasks.

Child's receptive language, nonverbal intelligence, and emotion recognition were measured with individual assessments. Also, parents completed a background information form (see Appendix A) and a set of questionnaires that measure their child's ASD severity level and social competence.

### 3.2.1 The Children's Social Understanding Scale (CSUS; Tahiroğlu et al., 2014)

Turkish adaptation of the short version of the CSUS (18 items; Tahiroğlu & Yağmurlu, 2014) was administered to parents (see Appendix B). The items of the CSUS assess a range of skills and behaviors related to child's understanding of belief, knowledge, perception, desire, intention, and emotion. Parents rated child's ToM on a 4-level Likert scale (from 1 = *'never'* to 4 = *'always'*). Also, they were provided with an option of *'don't know'* if they had no idea about the behavior asked in the question. The ToM score of the CSUS was computed by averaging the scores across the items.

### 3.2.2 Theory of mind tasks

Children's behavioral ToM performances were assessed via one low-verbal and one first-order ToM task, measuring children's FBU. The low-verbal ToM task had low level of verbal load (Woolfe, Want, & Siegal, 2002) and was used with Turkish children who had hearing problems (Alayli & Yagmurlu, 2014, April). The task consisted of one example and two experimental scenarios (see Appendix C1). In the example scenario, there were two pictures of a boy, one depicting the boy near a dog and the other is a depiction of the boy thinking about a dog by the use of thought bubbles. Children were asked to show the picture of the boy thinking about a dog. The example scenario was administered to make sure that children understood that 'thought bubble' stood for thinking, and only those children who showed the correct picture in the example scenario were given two experimental scenarios, each of which was illustrated with three pictures. In the first experimental scenario, children were shown a picture of a boy who

thinks he has caught a fish. In this picture, there are reeds as an obstruction item which covers the caught item. Then, the picture without the obstruction item was shown to children depicting the boy while catching a boot. In the other experimental scenario, children were shown a picture of a girl who thinks she sees a tall boy over a fence, the obstruction item. Then, children were shown the picture of the girl while seeing a small boy standing on a box. At the end of each experimental scenario, children were shown a separate picture of the central character with a blank thought bubble above his/her head and four small pictures, two of which are distractor pictures irrelevant to the story, under the head. Children were asked to show what the character was thinking (Belief question) and the actual object/situation concealed by the item (Reality question). Children got 1 point for each experimental scenario for their correct answers to both the belief and reality questions. Thus, children's low-verbal ToM scores ranged from 0 to 2, with higher scores indicating better low-verbal ToM performance.

The Unexpected Change task (Wimmer & Perner, 1983) was given to measure children's first-order ToM. The Turkish version of the task was adapted by Yagmurlu et al. (2005) (see Appendix C2). Two dolls (given Turkish names: Ali and Zeynep), two boxes (blue and yellow), and a small ball were used. In the task, Ali leaves his ball in the blue box, before going to the garden. In his absence, Zeynep removes the ball and places it in the yellow box. After children heard the story and passed the control questions ("Where did Ali put the ball?" and "Where did Zeynep put the ball?", each of which were asked right after the placements of the ball), they were asked 3 experimental questions: "Does Ali know where the ball is or does he not know where it is?" (Knowledge Question), "Where does Ali think the ball is?" (Think Question), and "Where will Ali look for the ball?" (Belief Question). Then, children were asked two memory questions ("Where is the ball now?" and "Where was it before?"). If children could not pass the control and memory questions, they got a score of 0. If children correctly answered all the control and

memory questions, their first-order ToM was scored on the think and belief questions. The knowledge question was not scored, since children were confused about the notions of 'knowing' and 'not knowing'. They were given a score of 0 for wrong answer and 1 for correct answer on each experimental question. Their experimental scores were summed, where the values ranged from 0 to 2 with higher scores indicating better first-order ToM performance.

### 3.2.3 Severity of ASD symptoms

To assess the severity of ASD symptoms, the Turkish form (Yılmaz-Irmak, Tekinsav-Sütçü, Aydın, & Sorias, 2007) of the Autism Behavior Checklist (ABC; Krug, Arick, & Almond, 1980) was administered to parents (see Appendix D). The checklist has 57 items, measuring symptoms in five areas, which are sensory stimuli (9 items; e.g., "Seems not to hear, so that a hearing lost is suspected"), relating (12 items; e.g. "Has no social smile"), body and object use (12 items; e.g., "Gets involved in complicated rituals such as lining things up, etc."), language (13 items; e.g., "Has pronoun reversal"), and social self-help (11 items; e.g., "Severe temper tantrums and/or frequent minor tantrums"). Parents marked the items which were present in their children. The items are weighted between the scores of 1 and 4 according to the power of the items to differentiate individuals with ASD from those with other developmental disorders. The items were then summed to obtain a total score of ASD likelihood. Higher scores indicated the presence of more behaviors consistent with ASD and thus, higher ASD severity. The total score of the scale had very high internal consistency ($\alpha = .90$).

Although the checklist is one of the widely used screening device, there are some inconsistencies regarding its psychometric properties (Miranda-Linné & Melin, 1997). In the original study (Krug et al., 1980), a total raw score of 68 was used as a cut-off score to indicate the probability level of the diagnosis of ASD. On the contrary, some studies demonstrated that this cut-off score was very high and caused no classification of a large proportion of individuals

with ASD (e.g., Eaves, Campbell, & Chambers, 2000; Marteleto & Pedromonico, 2005; Miranda-Linné & Melin, 1997). These studies used lower cut-off scores ranging from 44 to 53 for the diagnosis. The true positives of the checklist in terms of the sensitivity level of the scale on diagnosing children was not perfect. The scale has diagnosed children who were supposed to be diagnosed with ASD with the percentages ranging between 50% and 92.1% (e.g., Eaves & Milner, 1993; Marteleto & Pedromonico, 2005; Sevin, Matson, Coe, Fee, & Sevin, 1991). Due to these problems and the fact that all the children in the sample were diagnosed with ASD, no cut-off score was used in this study. Instead, the scores were treated continuously to indicate the ASD severity level. The score of 0 reflected the lowest severity level rather than no diagnosis of ASD in our study.

### 3.2.4 Social competence

The 'social competence' subscale of the Turkish form (Corapci, Aksan, Arslan-Yalcin, & Yagmurlu, 2010) of the Social Competence and Behavior Evaluation Scale-30 (SCBE-30; LaFreniere, & Dumas, 1996) was used to measure children's social competence (see Appendix E). One item was omitted due to its inappropriateness for children with ASD ("Takes pleasure in own accomplishments"). Thus, 9 items about the social competence during children's general peer- and adult/parent-interactions (e.g., "Cooperate with other children in group activities") were used. Parents rated the frequency of the behaviors on a 4-point Likert scale (from 1 = *'never'* to 4 = *'always'*). The total score was computed by averaging the scores and higher scores on this scale indicated higher social competence. The internal consistency of the subscale was found to be good ($\alpha = .77$).

### 3.2.5 Receptive language

Children's receptive language was measured by the Receptive Language subtest of the Turkish Expressive and Receptive Language Test (TIFALDI-RT; Berument & Güven, 2013) (see

Appendix F). The task contains 104 items and starts with two example items and continues with the item determined according to the age of children. There are four pictures on each page and children were instructed to show the picture of the target word that was told by the experimenter. Children received 1 point for each correct answer and the total score was computed via summing up all the points. The available norms are not representative of the performance of Turkish children with ASD. Thus, the raw scores were used in the present study, higher scores indicating better receptive language ability.

It is a reliable and valid language test which was developed originally for typically developing Turkish children aged from 2 to 12 years and frequently used in Turkey (e.g., Etel & Yagmurlu, 2015; Korucu, Selcuk, & Harma, 2016). Even though its standardization studies did not include children with ASD or children older than the age of 12 years, it was the only up-to-date language task in Turkish and equivalent for the Peabody Picture-Vocabulary Test (PPVT; Etel & Yagmurlu, 2015). Thus, the task was used in the present study. Yet, after the example questions, instead of starting with the word designated according to the age of children, the word designated to the category one year below the age was asked in this study.

### 3.2.6 Nonverbal intelligence

Children's nonverbal intelligence was assessed via the Raven Colored Progressive Matrices (Raven, 1938) (see Appendix G). The task contains 36 figures with different colored patterns and six possible pieces, only one of which can fill the blank space in the figure and complete the pattern. The figures of the task are designed with the order of increasing difficulty. Children were instructed to show the piece completing the figure. They were given a score of 0 for wrong answer and 1 for correct answer. Their scores were summed to compute total nonverbal intelligence score. The values ranged from 0 to 36, higher scores indicating higher nonverbal intelligence.

### 3.2.7 Emotion recognition

The Faces Test with full-face photographs of the facial expressions were used to assess children's emotion recognition skills (Baron-Cohen, Wheelwright, & Joliffe, 1997). Six black-and-white photographs that involve a female individual with the expression of basic emotions were shown on paper (see Appendix H). These emotions were happiness, sadness, surprise, anger, fear, and disgust (Ekman, 1992). In the task, children were asked to choose the correct emotion between two options written under the pictures. All the children received 1 point for correct answer and 0 for wrong answer to each photograph. The total score was computed via summing up the scores. Thus, the scores ranged from 0 to 6 and higher scores indicated better emotion recognition skills.

## 3.3 Procedure

Data collection started upon receiving the approval of the university research ethics board. The data were collected between the dates of 12.01.2015 and 26.03.2016. The participants were recruited through 20 special education centers in Istanbul, Turkey. Parents who gave written informed consent were asked to complete the background information form and questionnaires.

When parents completed the forms and questionnaires, children were visited at special education centers for individual assessments. After receiving the assent of child, child was given the tasks in the following order: Emotion recognition task, the low-verbal ToM task, the first-order ToM task, receptive language task, and nonverbal intelligence task. This order was chosen according to demanding level of the tasks from the easiest task to the complex task. These tasks were administered in a separate and quiet room where no-one else was present. The administration of the tasks approximately lasted for 50 minutes in one session. When children got

distracted or lost the motivation to continue during the administration, we gave a short break until

children felt ready to continue.

Table 1

*Descriptive Statistics and One-way Analysis of Variance of Variables by Sex (N =106)*

| Variables | M | SD | Min | Max | F |
|---|---|---|---|---|---|
| Demographic variables | | | | | |
| Child's age (years) | 12.06 | 2.91 | 8.00 | 17.11 | .02 |
| Number of siblings | 1.02 | .83 | 0 | 3 | .01 |
| Maternal education (1-10) | 4.88 | 2.76 | 1 | 10 | .75 |
| Paternal education (1-10) | 5.23 | 2.90 | 1 | 10 | .42 |
| Child's ToM | | | | | |
| CSUS-ToM total score (1-4) | 2.31 | .66 | 1.17 | 3.83 | .43 |
| Low-verbal ToM (0-2) | 1.25 | .81 | 0 | 2 | 7.72** |
| First-order ToM (0-2) | .78 | .87 | 0 | 2 | 2.02 |
| Receptive language (0-104) | 72.44 | 24.82 | 3 | 102 | 1.65 |
| Nonverbal intelligence (0-36) | 20.20 | 10.20 | 0 | 36 | .88 |
| Autism severity (0-157) | 36.08 | 26.85 | 0 | 121 | .55 |
| Emotion recognition (0-6) | 4.20 | 1.16 | 1 | 6 | 1.60 |
| Social competence (1-4) | 2.49 | .58 | 1 | 4 | .02 |

**$p \le .01$.

**Chapter 5**

**RESULTS**

## 4.1 Preliminary Analyses for Theory of Mind

The reliability analysis revealed that the CSUS had very high internal consistency ($\alpha = .91$).

All of the children passed the example scenario on the low-verbal ToM task. Eighty-one children (76.4%) passed the belief and reality questions, thus passed the low-verbal ToM task. In the first-order ToM task, 52 children (49.1%) passed the experiment questions in addition to the control and memory questions. Among the children who did not pass the task, only one child (.9%) did not pass the control questions and 32 children (30.2%) failed on the memory questions. Children with ASD performed better on the low-verbal ToM task ($M = 1.25$, $SD = .81$) than on the first-order ToM task ($M = .78$, $SD = .87$), $t(105) = 4.82$, $p < .001$.

While boys ($M = 1.34$, $SD = .78$) performed better on the low-verbal ToM task than girls ($M = .79$, $SD = .85$), $F(1, 104) = 7.72$, $p = .006$; no significant sex differences were observed in other variables (see Table 1).

## 4.2 Correlation and Hierarchical Regression Analyses

The CSUS score was positively related to children's low-verbal ToM performance (see Table 2). On the other hand, children's CSUS score and first-order ToM performance were not significantly associated.

Children's age, maternal education, and paternal education were not significantly correlated with the CSUS score or behavioral ToM performances. The CSUS score was positively related to children's receptive language, nonverbal intelligence, and social competence, but was negatively associated with ASD severity. The association between the CSUS score and emotion recognition turned into non-significant after Bonferroni's correction ($p = .007$). Children's low-verbal ToM

performance was positively related to their receptive language, nonverbal intelligence, emotion-recognition, and first-order ToM performance. Children's first-order ToM performance was positively related to their receptive language and its association with nonverbal intelligence turned into non-significant after Bonferroni's correction.

The associations among the CSUS score and behavioral ToM performances were also examined via controlling for the children's ASD severity level and receptive language to investigate whether parents' evaluation of their children's ToM was influenced from the children's ASD severity level and verbal comprehension ability. The findings indicated that the associations between the CSUS score and behavioral ToM performances were non-significant (see Table 3). Also, the association between the low-verbal ToM and first-order ToM performances was marginally significant ($p = .05$).

Hierarchical regression analyses were further conducted to investigate the individual contribution of social factors (i.e., emotion recognition and social competence) on the CSUS score when the variables indicating functioning level of children (i.e., ASD severity level, receptive language, and nonverbal intelligence) were taken into account.

In the first step of the regression analysis, children's ASD severity level, receptive language, and nonverbal intelligence were entered into the regression equation. In the second step, children's emotion recognition and social competence were introduced to the equation. In the first step, factors indicating functioning level of children explained only 28% of the variance in children's CSUS score. There was a significant change in $R^2$ in the consecutive step when emotion recognition and social competence were added to the model. When all the variables were in the equation, better receptive language and higher social competence significantly predicted better CSUS score (see Table 4). The previously significant role of ASD severity level became non-significant when social factors were added to the model, while the significant role of

receptive language remained intact. In total, all the variables explained 43% of the variance in the

CSUS score.

Table 2

*Zero-order Correlations* ($N = 106$)

| | CSUS-ToM total score | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Low-verbal ToM | .34*, ** | - | | | | | | | | |
| 2. First-order ToM | .16 | .32*, ** | - | | | | | | | |
| 3. Receptive language | .44*,** | .49*, ** | .34*, ** | - | | | | | | |
| 4. Nonverbal intelligence | .31*,** | .37*, ** | .23* | .69*, ** | - | | | | | |
| 5. Autism severity | -.39*, ** | -.10 | .10 | -.15 | -.04 | - | | | | |
| 6. Emotion recognition | .26* | .29*, ** | .11 | .26* | .15 | -.23* | - | | | |
| 7. Social competence | .60*, ** | .17 | .05 | .29*, ** | .14 | -.46*, ** | .26* | - | | |
| 8. Child's age | -.08 | -.13 | .03 | -.11 | -.01 | .12 | -.12 | .01 | - | |
| 9. Maternal education | .07 | -.06 | .03 | .21 | .17 | -.18 | -.10 | .01 | .01 | - |
| 10. Paternal education | -.05 | .03 | -.05 | .11 | .03 | -.12 | -.13 | -.04 | .01 | .66*, ** |

*$p < .05$. **$p$ corrected after Bonferroni's $p < .005$.

Table 3

*Partial Correlations among ToM Scores Controlling for Child's ASD Severity and Receptive Language (N = 106)*

| | CSUS-ToM total score | 1 |
|---|---|---|
| 1. Low-verbal ToM | .16 | - |
| 2. First-order ToM | .07 | .19+ |

+$p$ = .05.

Table 4

*Summary of Hierarchical Regression Analysis for Variables Predicting Child's CSUS Score ($N = 106$)*

| Variables | Step 1 | | | Step 2 | | |
|---|---|---|---|---|---|---|
| | *B* | *SE B* | *Beta* | *B* | *SE B* | *Beta* |
| Receptive language | .01 | .01 | .35** | .01 | .01 | .23* |
| Nonverbal intelligence | .01 | .01 | .06 | .01 | .01 | .08 |
| Autism severity | -.01 | .01 | -.33*** | -.01 | .01 | -.14 |
| Emotion recognition | | | | .03 | .05 | .04 |
| Social competence | | | | .52 | .10 | .46*** |
| $R^2$ (adjusted) | .30 (.28) | | | .46 (.43) | | |
| *F* for change in $R^2$ | 14.55*** | | | 14.41*** | | |

$*p < .05.$ $**p \leq .01.$ $***p \leq .001.$

**Chapter 6**

**DISCUSSION**

In the present study, we examined the reliability and validity of the CSUS in measuring individual differences in ToM of Turkish children with ASD. Our findings revealed strong psychometric properties of the CSUS among children with ASD in Turkey.

In line with the studies on the psychometric properties of the CSUS (Tahiroğlu et al., 2014; Tahiroğlu & Yağmurlu, 2014), we computed a total ToM score from the CSUS. The reliability analysis revealed very high internal consistency for the CSUS. The items in the CSUS altogether reflected the ToM of children with ASD. Although the internal consistency of the CSUS was very high, the scale had items reflecting ToM of preschool-aged children rather than older children (e.g., "Is good at playing "hide and seek" [e.g., is hard to find, doesn't make give-away noises]"). The data was collected from school-aged children and adolescents. Due to their age but not ToM deficits, the items tapping behavioral manifestations of ToM might be generally not reflecting behaviors of school-aged children and adolescents. Thus, some wording modifications and alteration of examples might be done to assess ToM of (older) children with ASD.

The FBU tasks have been the most widely used ToM measures in typical development and ASD studies (Joseph & Tager-Flusberg, 2004; Wellman et al., 2001). Despite the frequent use of FBU tasks, most of them have been criticized to be highly complex and to rely heavily on linguistic capacities of children (Astington & Jenkins, 1999; San José Cáceres et al., 2014; Milligan et al., 2007). In order to address FBU without complex linguistic demands, some researchers developed nonverbal or low-verbal ToM tasks (e.g., Woolfe et al., 2002). In this study, as a strength, we used one first-order ToM and one low-verbal ToM task to assess participants' ToM performances. Our findings showed that children with ASD performed better

on the low-verbal ToM task than on the first-order ToM task. Furthermore, children's CSUS score was associated with their low-verbal ToM, rather than first-order ToM, performance. Thus, the use of low-verbal ToM tasks might be more appropriate than first-order ToM tasks in ASD studies. The ToM performances of children with ASD are dependent on the tasks administered (Van Herwegen et al., 2013). Low-verbal ToM tasks are much purer forms of ToM in comparison to first-order ToM tasks which depend also on children's other abilities such as linguistic capacities (Colle et al., 2007; Peterson et al., 2007). Thus, our findings support the literature on the complexity of first-order ToM tasks (Astington & Jenkins, 1999; San José Cáceres et al., 2014; Milligan et al., 2007) and usefulness of low-verbal ToM tasks in ASD (Colle et al., 2007). These findings might also indicate that the CSUS and low-verbal ToM tasks assess ToM of children with ASD better than first-order ToM tasks. Thus, the association between the CSUS score and low-verbal ToM performance reflected the convergent validity of the CSUS and the ecological validity of the low-verbal ToM task in ASD.

In this study, we measured children's receptive language and nonverbal intelligence. As an evidence of the construct validity of the CSUS, we found that the CSUS score and behavioral ToM performances were positively associated with children's receptive language, supporting the link between children's verbal skills and their ToM (Happé, 1995; Milligan et al., 2007; Wellman, 2014; Yirmiya et al., 1998). This means that to pass ToM tasks or to be evaluated by parents as having better ToM, children should have higher verbal skills (Frith et al., 1994). The associations also did not change according to the ToM tools used in this study. Also, the CSUS and low-verbal ToM performance were significantly related to children's nonverbal intelligence. The relation between the nonverbal intelligence and first-order ToM performance turned into non-significant after Bonferroni's correction. These correlation analyses also support the literature on the link between children's intelligence level and ToM (Happé, 1995) and the

appropriateness of the use of low-verbal ToM tasks in ASD rather than first-order tasks. In contrast to the studies of Tahiroğlu et al. (2014) and Tahiroğlu and Yağmurlu (2014), none of the CSUS scores and ToM performances were significantly correlated with children's chronological age. Literature has shown that there is a closer link of children's ToM with language and intelligence rather than chronological age in ASD (Happé, 1995; Yirmiya et al., 1998). Therefore, our findings support the literature on the relations of children's language and intelligence to ToM rather than chronological age.

In addition, as a preliminary analysis, we examined children's comprehension of abstract words since children with ASD are also known to have difficulty in understanding abstractions (Eskes, Bryson, & McCormick, 1990). We computed abstract word knowledge of children with ASD via the same task of receptive language (TIFALDI) for this study with 8 abstract words (i.e., alone, power, danger, penalty, disaster, glory, productivity, and opposite). The emotion words (i.e., happiness, shyness, and twitter) were not included to assess abstract word knowledge. We attempted to examine the unique associations of these children's CSUS score with their comprehension of words in general and abstract words only. Although the number of abstract words was limited in this study, children's abstract word knowledge was found to be positively associated with the CSUS score ($r = .44$, $p < .001$) and behaviorally measured ToM performances ($r = .39$, $p < .001$ for low-verbal ToM; $r = .40$, $p < .001$ for first-order ToM). Although we measured only comprehension as language abilities of children, there are other aspects of language which could be related to ToM of children. For instance, research on language acquisition of children with ASD has primarily focused on production (Swensen, Kelley, Fein, & Naigles, 2007). Children with ASD have been reported to comprehend more words than they produced (e.g., Geller, 1998; Charman, Drew, Baird, & Baird, 2003) and especially encounter more consistent difficulties in pragmatic abilities such as responding to questions, sharing and

requesting information (e.g., Tager-Flusberg, 1996), and producing narratives (e.g., Kelley, Paul, Fein, & Naigles, 2006). These communication problems are related to children's ToM (Kelley et al., 2006). Thus, future studies might investigate the relation between ToM and language abilities of children in a more comprehensive way.

Literature on ASD has demonstrated that children with better ToM easily recognize basic emotions (Baron-Cohen, 1988), and show more interest in social interactions (Frith et al., 1994; Peterson et al., 2007; Tager-Flusberg, 2003). More specifically, children with ASD are known to have difficulty in recognizing emotions from the expressions of others (Baron-Cohen, 1995; Golan et al., 2008; Uljarevic & Hamilton, 2013) and this difficulty is linked with their ToM deficits (Baron-Cohen, 1991; Brent et al., 2004; Heerey et al., 2003). Moreover, children with ASD show deficits in social communication and interactions such as less social conversation, sharing behaviors, and peer relations as well as more stigmatizing behaviors (Bauminger et al., 2008; Waugh & Peskin, 2015). These real-life social problems are linked to their ToM deficits (e.g., Frith et al., 1994; Peterson et al., 2007). In line with the ASD literature, the CSUS score was positively correlated with children's social competence, indicating the construct validity of the CSUS. Yet, the association between the CSUS score and emotion recognition was non-significant after Bonferroni's correction. The reason for such a non-significant relation could be the characteristics of the task used to measure children's emotion recognition. Although research has yielded that children with ASD do not differ from children with intellectual disability and with typical development in understanding emotions caused by situations and desires, only the children with ASD have severe deficits in understanding emotions caused by beliefs (Baron-Cohen, 1991). Yet, in this study, we only measured children's emotion recognition from facial expressions and did not presented the expressions within a context. This kind of difference might

give rise to the non-significant association. In future research, an extensive investigation on the association between emotion recognition and the CSUS should be done.

Research on ToM has investigated the association between ASD severity and ToM via classic group comparison design such as comparison between high functioning ASD and low functioning ASD (Joseph & Tager-Flusberg, 2004). However, this kind of comparison does not give information about the influence of ASD severity within groups. In this study, as a strength, we investigated the ASD severity level of children without such a group classification. Whereas the CSUS score was negatively related to ASD severity level of children, none of the behavioral ToM performances were significantly associated with ASD severity level. The reason for the non-significant association could be the distribution of severity level among the participants with ASD. The distribution of the severity level of children was positively skewed, reflecting that most of the children were at the abler end in the present study. In other words, there was no dramatic difference among children's severity level contrary to comparison group studies. If this is the case, the association of ASD severity level with the CSUS score might demonstrate the precision of the CSUS in investigating the nuanced individual differences in ToM of children with ASD. Although the differences of the ASD severity level of children were minor, the CSUS showed an association between ToM and ASD severity level which was not found with behavioral ToM performances. This could be the evidence of the sensitivity of the CSUS in measuring individual differences in ToM in comparison to behavioral measures.

In order to eliminate the potential influence of the children's ASD severity level and language abilities on parents' evaluation of their children's ToM, we examined the associations among the CSUS score and behavioral ToM performances via controlling for children's ASD severity level and receptive language. When we controlled children's ASD severity level and receptive language, all the associations became non-significant. This shows that parents cannot

evaluate their children's ToM without being influenced from children's ASD severity level and receptive language. These findings also support the literature on the influence of language abilities (Happé, 1995; Yirmiya et al., 1998) and ASD severity (Hoogenhout & Malcolm-Smith, 2014; Tager-Flusberg, 2003) on children's ToM. In this study, we also tested the predictive value of children's ASD severity level, receptive language, nonverbal intelligence, emotion recognition, and social competence on the CSUS score via hierarchical regression analysis. This analysis revealed that children's receptive language and social competence predicted their CSUS score. This finding also supports the literature on the association of children's ToM with language abilities (Happé, 1995; Yirmiya et al., 1998) and social competence (Frith et al., 1994; Peterson et al., 2007). Language abilities of children with ASD are closely related to their deficits in pragmatic realm which is essential in social communication and interaction (Kelley et al., 2006). Children with better language abilities comprehend more sentences and produce more words and meaningful sentences with more causal connectives in order to start and sustain social interactions. This kind of abilities might also assist ToM of the children with ASD because these children experience more social conversations, sharing behaviors, and peer relations. Thus, their effective communication abilities might influence parents' evaluation about their children's ToM.

Parent reports could be filled in a varying manner by parents such as overestimating their children's abilities or exaggerating their children's deficits (Tahiroğlu et al., 2014). Therefore, we suggest the use of the CSUS as a complement to ToM tasks in ASD. Yet, the only use of the CSUS could be beneficial in ASD, as well. Over the years, research on ASD has focused on individuals with mild deficits such as Asperger's syndrome and high functioning ASD rather than individuals with severe deficits like low functioning ASD (Boucher, Mayes, & Bigham, 2008). Symptoms of ASD are not in the pure form among individuals with low functioning ASD, since severe impairments in their language and intellectual abilities co-occurs with their ASD

symptoms. This situation makes it harder to study in low functioning ASD and to understand the

dynamics of core impairments among these children via individual assessments. Thus, as an

alternative, parents could be given the CSUS to evaluate their children's ToM. This could fill the

gap about the ToM of individuals with low functioning ASD. Due to their severe language

deficits, some wording modifications and alteration of examples should also be done especially

for the items assessing children's use of mental state words.

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**APPENDICES**

**Appendix A**

**Background Information**

Anketi doldurduğunuz tarih: Gün_____     Ay_____     Yıl_____

<u>Çalışmaya Katılan Çocuk ile İlgili Genel Sorular:</u>

1. Çocuğun adı ve soyadı: _____

2. Çocuğun doğum tarihi: Gün_____     Ay_____     Yıl_____

3. Çocuğun cinsiyeti (lütfen işaretleyiniz): Erkek____        Kız____

<u>Çocuğun Aldığı Eğitim ve Bakımın Cinsi:</u>

4. Çocuğunuz okula gidiyor mu?  **Evet  /  Hayır**

5. Çocuğunuz özel eğitime devam ediyor mu?  **Evet  /  Hayır**

6. Evde çocuğunuz ile ilgilenen bir bakıcı/yardımcı var mı? **Evet (Türk uyruklu/Yabancı uyruklu) /**

**Hayır**

7. Evde konuşulan dil veya diller nedir? _____

8. Çocuğun evde <u>sürekli</u> beraber yaşadığı <u>tüm bireyleri</u> (anne, baba, kardeşler, nine, dede, teyze,

amca vb.) lütfen sıralayınız:

|   | Çocukla olan yakınlığı | Yaş |
|---|---|---|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |

<u>Çocuğun Gelişimi ile İlgili Genel Sorular:</u>

1. Akraba evliliği mi?  **Evet  (1. derece/ 2. derece) / Hayır**

2. Doğum şekli nedir?  **Normal  / Sezaryen**

3. Normal doğum ise vakum veya forseps kullanıldı mı, doğumda sırasında başka bir zorluk yaşandı

   mı (ör: kordon dolanması, oksijensiz kalma?)  ve doğumdan sonra bebeğe bir müdahale gerekti mi?

   **Evet** (lütfen belirtiniz) / **Hayır** _____

4. Doğum beklenen zamanda mı gerçekleşti?  **Evet  / Hayır** _____

5. Çocuğunuzun doğum kilosu nedir? _____

6. Çocuğunuz emeklemeye kaç yaşında başladı? _____

7. Çocuğunuz yürümeye kaç yaşında başladı? _____

8. Çocuğunuz konuşmaya kaç yaşında başladı? _____

9. Çocuğunuz tuvalet eğitimini tamamladı mı?  **Evet  (Kaç Yaşında: ____) / Hayır**

10. Çocuğunuzun tanısı konmuş ciddi bir rahatsızlığı (menenjit, epilepsi, kalp, tiroid gibi) ya da

    otizm dışında herhangi bir gelişimsel sorunu var mı? Lütfen isimleriyle belirtiniz.

    _____

11. Çocuğunuzun şu ana kadar düzenli olarak aldığı ve psikiyatristi tarafından verilen ilaçlar

    nelerdir?

    _____

12. Çocuğunuzun üstün yetenekleri var mı? Varsa neler? (Güçlü hafıza, müzikal yetenek, yap-boz,

    4 işlem, okuma-yazmayı kendi kendine öğrenme, el becerisi gibi ince motor becerileri vb.)

    _____

### Çocuğun Annesi ve Babası ile İlgili Genel Sorular:

1. Annenin doğum tarihi:  Gün_____    Ay_____    Yıl_____

2. Annenin mesleği: _____  (işsiz ise, lütfen her zamanki mesleğini yazınız)

3. Anne şu anda çalışıyor mu?

| Evet (Yarı-zamanlı, haftada 20-25 saat) | Evet (Tam zamanlı, haftada 40 saat) | Hayır |
|---|---|---|
| 1 | 2 | 3 |

4. Annenin şu anki medeni hali

| Evli | Boşanmış veya dul |
|---|---|
| 1 | 2 |

5. Babasının doğum tarihi:  Gün_____   Ay_____   Yıl_____

6. Babanın mesleği: _____(işsiz ise, lütfen her zamanki mesleğini

yazınız)

7. Baba şu anda çalışıyor mu?

| Evet (Yarı-zamanlı, haftada 45 saatten az ) | Evet (Tam zamanlı, haftada 45 saat) | Hayır |
|---|---|---|
| 1 | 2 | 3 |

8. Babanın şu anki medeni hali

| Evli | Boşanmış veya dul |
|---|---|
| 1 | 2 |

9.  Anne ve babanın eğitimi (geldiği en yüksek düzey; lütfen hem anne hem de baba için

işaretleyiniz.)

|  | Anne | Baba |  | Anne | Baba |
|---|---|---|---|---|---|
| İlkokuldan terk | 1 | 1 | Lise mezunu | 6 | 6 |
| İlkokul mezunu | 2 | 2 | Yüksekokul mezunu (2 yıllık) | 7 | 7 |
| Ortaokuldan | 3 | 3 | Üniversiteden terk | 8 | 8 |
| Ortaokul | 4 | 4 | Üniversite mezunu (4 yıllık) | 9 | 9 |
| Liseden terk | 5 | 5 | Uzmanlık derecesi var (yüksek lisans, doktora gibi) | 10 | 10 |

10. Ailede aşağıdaki durum veya hastalıklardan varsa lütfen x işareti koyunuz.

|  | Kardeşler | Anne tarafı | Baba tarafı |
|---|---|---|---|
| Kekeleme |  |  |  |
| Konuşma gecikmesi |  |  |  |
| Öğrenme güçlüğü (Disleksi) |  |  |  |

| | | | |
|---|---|---|---|
| Otizm | | | |
| Dikkat eksikliği ve hiperaktivite | | | |
| Depresyon | | | |
| Bipolar bozukluk | | | |
| Anksiyete/Kaygı bozukluğu | | | |
| Obsesif-kompulsif bozukluk | | | |
| Şizofreni | | | |
| Tik bozukluğu | | | |
| Nörolojik hastalık (epilepsi vb.) | | | |
| Bağışıklık sistemi hastalığı (romatoit artrit | | | |
| Fiziksel engel (körlük, sağırlık, ortopedik | | | |

**Appendix B**

**The Children's Social Understanding Scale (CSUS)**

Aşağıda, çocukların günlük düşünce ve davranışlarını anlatan bazı ifadeler bulunmaktadır. Lütfen çocuğunuzun bu düşünce ve davranışları ne sıklıkta yaptığını işaretleyiniz. Eğer soruda yer alan ifade ile ilgili gerçekten hiçbir fikriniz yoksa "Bilmiyorum" (B) şıkkını işaretleyebilirsiniz. Ancak çok gerekli değilse bu şıkkı tercih etmeyiniz.

| Çocuğum… | Asla | Bazen | Sık sık | Her zaman | Bilmiyorum |
|---|---|---|---|---|---|
| 1. İnsanların istediği veya sevdiği şeylerin farklılıkları hakkında konuşur. Örneğin: "Sen çay seversin, ama ben meyve suyu severim." der. | 1 | 2 | 3 | 4 | B |
| 2. Belirsizlik anlatan kelimeler kullanır. Örneğin: "Belki oyuncağım odamdadır.", "Ayakkabılarım dışarıda olabilir." der. | 1 | 2 | 3 | 4 | B |
| 3. Uzman kişilerin diğer insanlara göre kendi alanlarında daha bilgili olduklarının farkındadır. Örneğin: Doktorların hastalıkları tedavi etmede diğer insanlardan daha bilgili olduklarını anlar. | 1 | 2 | 3 | 4 | B |
| 4. Ciddi misiniz, yoksa yalnızca şaka mı yapıyorsunuz, anlamakta zorluk çeker. | 1 | 2 | 3 | 4 | B |
| 5. Saklambaç oyununda iyidir. Örneğin: İyi saklanır; saklanınca yerini belli edebilecek sesler çıkarmaz, onu bulmak zor olur. | 1 | 2 | 3 | 4 | B |
| 6. Kendi düşüncelerinin zamanla nasıl değiştiği hakkında konuşur. Örneğin: "Eskiden bu çizgi filmin korkunç olduğunu düşünürdüm ama şimdi komik olduğunu düşünüyorum." der. | 1 | 2 | 3 | 4 | B |
| 7. İnsanların yanlış düşünceleri hakkında konuşur. Örneğin: "Annem geliyor sanmıştım ama aslında gelen babammış." der. | 1 | 2 | 3 | 4 | B |
| 8. Birini bilerek incitmenin, onu yanlışlıkla incitmekten daha kötü olduğunu anlar. | 1 | 2 | 3 | 4 | B |
| 9. İstemediği bir hediye alınca, onu veren kişinin duygularını incitmemek için hediyeyi sevmiş gibi yapar. | 1 | 2 | 3 | 4 | B |
| 10. Telefonla konuşurken karşıdaki kişi onu gerçekten görebiliyormuş gibi davranır. Örneğin: Telefonla konuşurken karşısındakinin onun kıyafetini görebildiğini düşünür. | 1 | 2 | 3 | 4 | B |

| | | | | | |
|---|---|---|---|---|---|
| 11. Farklı insanların aynı şey hakkında farklı duyguları olabileceğini anlar. Örneğin: "Aras köpek sever ama Defne köpekten korkar." der. | 1 | 2 | 3 | 4 | B |
| 12. Başkalarının isteklerini dikkate alır. Örneğin: Oyun oynarken sırasını bekler, oyuncakları paylaşır, hangi oyunu oynayacakları hakkında diğer çocuklarla uzlaşır. | 1 | 2 | 3 | 4 | B |
| 13. Bir şeyin nasıl göründüğü ve aslında ne olduğu arasındaki fark hakkında konuşur. Örneğin: "Bu bir şekere benziyor ama aslında bir boncuk." der. | 1 | 2 | 3 | 4 | B |
| 14. Çelişen duygular hakkında konuşur. Örneğin: "Tatile gideceğim için mutluyum ama arkadaşlarımdan ayrılacağım için üzgünüm." der. | 1 | 2 | 3 | 4 | B |
| 15. İnsanların dikkatini bir şeye çekmekte iyidir. Örneğin: İnsanların bir şeye bakmasını sağlamak için o şeye işaret eder. | 1 | 2 | 3 | 4 | B |
| 16. Amaçlanan şey ve ortaya çıkan sonuç arasındaki fark hakkında konuşur. Örneğin: "Babam kapıyı açmayı denedi ama kapı kilitliydi, açamadı." der. | 1 | 2 | 3 | 4 | B |
| 17. Yalan söylemenin diğer insanları yanıltabileceğini anlar. | 1 | 2 | 3 | 4 | B |
| 18. İnsanların ne istediği ile gerçekte ne elde ettiği arasındaki fark hakkında konuşur. Örneğin: "Rüya hediye olarak bir köpek yavrusu istemişti ama bir kedi yavrusu aldı." der. | 1 | 2 | 3 | 4 | B |

**Appendix C1**

**Theory of Mind Tasks**

**Low-Verbal ToM-Script**

**Example: Dog**

Bak bir çocuk ve bir köpek.

Bak çocuk bir köpeği düşünüyor.

*(İki resim çocuğun önüne karıştırılarak dizilir.)* Şimdi göster bakalım, bunlardan hangisinde

çocuk köpeği düşünüyor?

**Story 1: Fish**

Çocuk balık tuttuğunu düşünüyor.

Bak bir balık.

Bak bir bot.
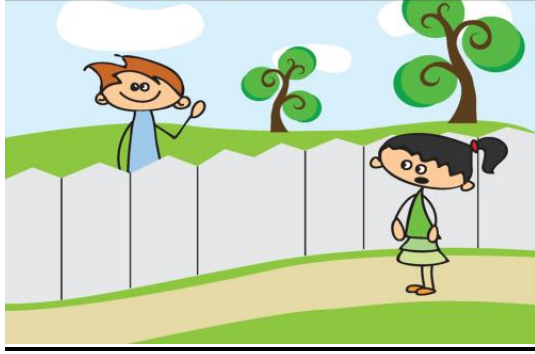
Buraya hangisi gelecek? Çocuk oltada ne olduğunu düşünüyordu? Oltada gerçekte ne vardı?
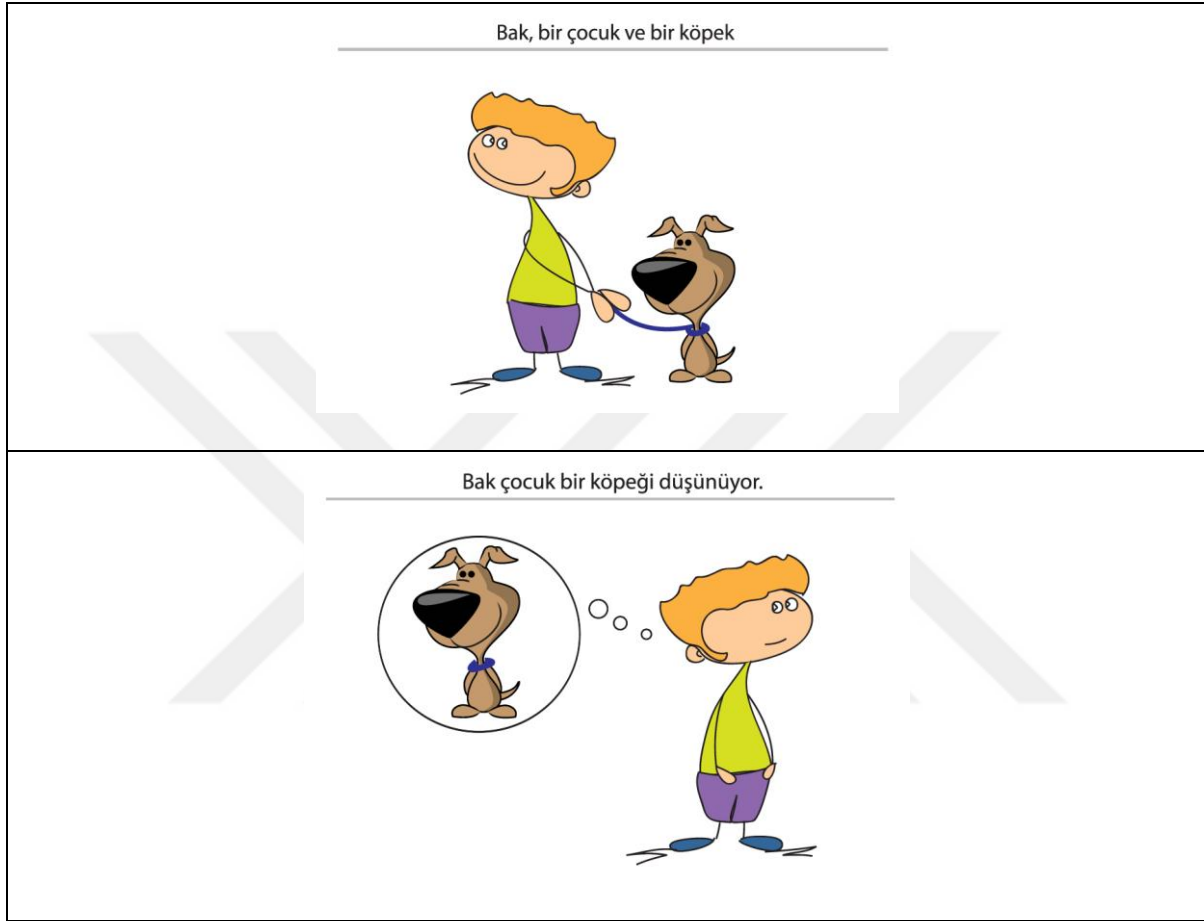
**Story 2: Fence**
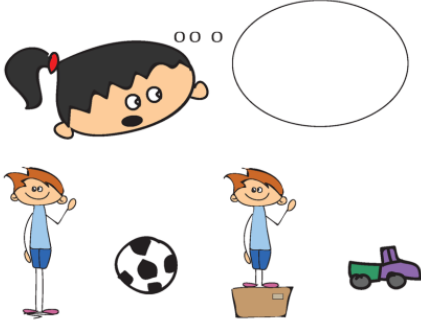
Kız orada uzun bir çocuğun olduğunu düşünüyor.

Bak uzun bir çocuk.

Bak kısa bir çocuk.

Buraya hangisi gelecek? Kız çitin arkasında kim olduğunu düşünüyordu? Gerçekte hangisi vardı?
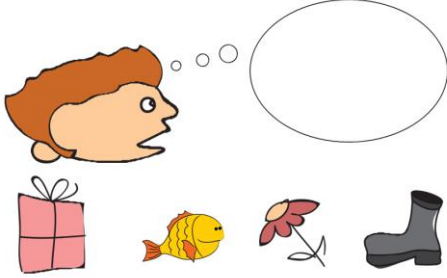
**Low-verbal ToM-Pictures**

**<u>Example: Dog</u>**



Bak, bir çocuk ve bir köpek

Bak çocuk bir köpeği düşünüyor.

## Story 1: Fish

## Story 2: Fence

**Appendix C2**

**Theory of Mind Tasks**

**First-order ToM (Unexpected Change Task)-Script**

Şimdi de seninle oyuncaklarla bir oyun oynayacağız. Beni dikkatle dinle, anlaştık mı?

*(Bebekler teker teker gösterilir ve teker teker isimleri söylenir)* Bak bu Ali. Bu Zeynep, bak Zeynep'in uzun sarı saçları var. Bu da Ayşe, Ayşe'nin de kısa kahverengi saçları var *(Bebekler gösterilirken kızların ayırt edici özellikleri vurgulanmalıdır).*

*(Çocuğun isimleri öğrenip öğrenmediği kontrol edilir)* Bunun adı neymiş? Peki, bu bebeğin adı neymiş? *(Ali, Zeynep, Ayşe teker teker gösterilerek sorulur)*

Bak bir de topumuz ve kutularımız var burada... İki kutumuz var, biri mavi, biri de sarı. Bak... *(göstererek)* Bu mavi kutu, bu da sarı kutu. İkisinin de içi boş. *(Her bir kutu gösterilirken, kapağı açılır ve içinin boş olduğu çocuğa gösterilir.)*

Göster bana bakalım şimdi... Sarı kutu hangisi? Peki, mavi kutu hangisi?

*(Çocuk bu sorulara doğru cevap verdiği zaman: "Aferin sana gibi moral yükseltici geribildirimler verilir)*

İki de kartonumuz var burada. Biri yeşil, biri kahverengi. Yeşil olan bahçe, kahverengi olan da evin içi.

Haydi, şimdi hikayemize başlayalım... Beni çok iyi dinle simdi, oldu mu?

Ali'nin bir topu var. Ali topuyla oynamayı çok seviyor. Bir gün evdeyken Ali topuyla oynamak istiyor. Topu alıyor; topla oynuyor, oynuyor *(bebek ufak ufak hareket ettirilir)*. Sonra da topunu mavi kutunun içine koyuyor ve bahçeye çıkıyor.

Söyle bakalım şimdi X *(test edilen çocuğun ismi)...*

Ali topunu nereye koydu? *(Cevabı kağıda yazın.)*

*Çocuk doğru cevap verirse devam edilir. Yanlış cevap verirse: "Hımmm. Peki, o zaman gel oyunumuza tekrar başlayalım..." denir ve bu bölüm tekrarlanır. Çocuktan doğru cevap almadan devam edilmez.*

Bu arada Zeynep odaya geliyor, Ali'nin topunu mavi kutunun içinden alıyor ve oynamaya başlıyor. Zeynep topla oynuyor, oynuyor, oynuyor ve sonra da götürüp sarı kutunun içine koyuyor.

Zeynep topu nereye koydu? *(Cevabı kağıda yazın.)*

Sonra… Ali topuyla oynamak için odaya geri geliyor. Söyle bakalım X *(çocuğun ismi)...*

Ali topunun gerçekte nerede olduğunu biliyor mu, bilmiyor mu? *(Cevabı kağıda yazın.)*

Ali topunun nerede olduğunu düşünüyor? *(Cevabı kağıda yazın.)*

Ali geri geldiğinde topunu hangi kutuda arayacak? *(Cevabı kağıda yazın.)*

Peki X *(çocuğun ismi)*, top gerçekte nerede? *(Cevabı kağıda yazın.)*

Top daha önce neredeydi? *(Cevabı kağıda yazın.)*

Tamam, bu oyunu da bitirdik.

*(Çocuğa söylediği şeylerin doğru olup olmadığını ima edecek sözcükler kullanılmaz: Örneğin "Çok güzel... Haydi devam edelim oyunumuza..." denmez.)*

**Appendix D**

**Severity of ASD Symptoms**

**Autism Behavior Checklist (ABC)**

Aşağıda, çocuğunuzu anlatabilecek ifadeler yer almaktadır. Lütfen çocuğunuzu en iyi tanımlayan

ifadenin karşısına x işareti koyun. Eğer ifadenin çocuğunuzu tanımlamadığını düşünüyorsanız

lütfen boş bırakınız.

| | |
|---|---|
| 1.  Kendi etrafında uzun süre döner. | |
| 2.  Basit bir işi öğrenir fakat çabucak unutur. | |
| 3.  Sosyal/çevresel uyaranlara çoğu zaman dikkat etmez | |
| 4.  Basit emirleri bir kere söylendiğinde yerine getirmez (otur, buraya gel, ayağa kalk gibi). | |
| 5.  Oyuncakları uygun şekilde kullanmaz (Örneğin; tekerlekleri döndürür) | |
| 6.  Öğrenme sırasında görsel ayırt etmesi zayıftır (büyüklük, renk ya da pozisyon gibi bir özelliğe takılır kalır). | |
| 7.  Sosyal gülümsemesi yoktur. | |
| 8.  Zamirleri ters kullanır (ben yerine sen). | |
| 9.  Belirli nesneleri bırakmamak için ısrar eder. | |
| 10.  İşitmiyor gibi görünür, bu nedenle bir işitme kaybı olduğu kuşkusu uyandırır. | |
| 11.  Konuşması detone ve aritmiktir. | |
| 12.  Kendi kendine uzun süre sallanır. | |
| 13.  Kendisine uzanıldığında kollarını uzatmaz (ya da bebekken uzatmazdı). | |
| 14.  Günlük programındaki/çevredeki değişikliklere aşırı tepkiler verir. | |
| 15.  Başka insanların arasındayken çağrıldığında kendi ismine tepki vermez (Ayşe, Can, Zeynep). | |
| 16.  Kendi etrafında dönme, parmak ucunda yürüme, el çırpma gibi davranışları keserek birden bağırır ve ani hareketler yapar. | |
| 17.  Başka insanların yüz ifadelerine ve duygularına tepkisizdir. | |
| 18.  "Evet" veya "ben" sözcüklerini nadiren kullanır. | |
| 19.  Gelişimin bir alanındaki özel yetenekleri zeka geriliği kuşkusunu dışlar niteliktedir. | |
| 20.  Yer bildiren sözcükleri içeren basit emirleri yerine getirmez ("topu kutunun üstüne koy" ya da "topu kutunun içine koy" gibi). | |
| 21.  Bazen yüksek bir sese sağır olduğunu düşündürürcesine "irkilme" tepkisi göstermez. | |
| 22.  Ellerini amaçsızca sallar. | |
| 23.  Büyük öfke nöbetleri ya da sık sık küçük öfke nöbetleri geçirir. | |
| 24.  Göz temasından aktif bir şekilde kaçınır. | |
| 25.  Dokunulmaya ya da tutulmaya karşı koyar. | |

| | |
|---|---|
| 26. Bazen, çürükler, kesikler ve iğne yapılma gibi acı verici uyaranlara hiç tepki vermez. | |
| 27. Gergin ve kucaklanması güçtür (şimdi ya da bebekken). | |
| 28. Kucaklandığında pelte gibidir (sarılmaz, tutunmaz). | |
| 29. İstediği şeyleri göstererek elde eder. | |
| 30. Parmak uçlarında yürür. | |
| 31. Başkalarını ısırarak, vurarak, tekmeleyerek incitir. | |
| 32. Cümleleri defalarca tekrarlar. | |
| 33. Oyun oynarken başka çocukları taklit etmez. | |
| 34. Gözlerine parlak bir ışık tutulduğunda genellikle gözlerini kırpmaz. | |
| 35. Başına vurarak, ellerini ısırarak kendine zarar verir. | |
| 36. İhtiyaçlarının hemen yerine getirilmesini ister, bekleyemez. | |
| 37. İsmi söylenen beş nesneden daha fazlasını işaret ederek gösteremez. | |
| 38. Hiç arkadaşlık ilişkisi geliştiremez. | |
| 39. Birçok sese kulaklarını kapatır. | |
| 40. Sık sık nesneleri döndürür, çevirir ve çarpar. | |
| 41. Tuvalet eğitimine ilişkin sorunları vardır. | |
| 42. İsteklerini ve ihtiyaçlarını belirtmek için ya hiç konuşmaz ya da bir günde kendiliğinden kullandığı sözcük sayısı beşi geçmez. | |
| 43. Çoğunlukla korkar ya da çok kaygılanır. | |
| 44. Gün ışığı karşısında gözlerini kısar, kaşlarını çatar ya da gözlerini kapatır. | |
| 45. Yardımsız kendisi giyinemez. | |
| 46. Sesleri ya da sözcükleri sürekli tekrar eder. | |
| 47. Bakışları insanları "delip geçer". | |
| 48. Başkalarının cümlelerini ya da sorularını tekrarlar. | |
| 49. Çoğunlukla çevresindekilerin ve tehlikeli durumların farkında değildir. | |
| 50. Cansız şeylerle oynamayı ve zaman geçirmeyi tercih eder. | |
| 51. Çevresindeki nesnelere dokunur, koklar ve/veya tadar. | |
| 52. Yeni bir kişiyle karşılaştığında sıklıkla hiçbir görsel tepki vermez. | |
| 53. Nesneleri sıralama gibi karmaşık ritüeller içine girer. | |
| 54. Çok zarar vericidir, oyuncaklarını ve ev eşyalarını kısa zamanda kırar. | |
| 55. Gelişimsel gecikme belirtileri 30. ayda ya da daha önce ortaya çıkmıştır. | |
| 56. Gün içinde kendiliğinden, iletişimi başlatmak için kullandığı ifadelerin sayısı otuzu geçmez. | |
| 57. Uzun süreler boşluğa bakar. | |

**Appendix E**

**Social Competence**

Aşağıda, çocuğunuzun duygusal durumu ve davranışları ile ilgili ifadeler yer almaktadır. Lütfen

verilen numaralandırma sistemini göz önünde bulundurarak aşağıdaki davranışları çocuğunuzda ne

sıklıkla gözlemlediğinizi işaretleyiniz.

| | Hiçbir zaman | Bazen | Sık sık | Her zaman |
|---|---|---|---|---|
| 1. Yüz ifadesinden duyguları zor anlaşılır. | 1 | 2 | 3 | 4 |
| **2. Zor durumda olan bir yaşıtını / tanıdığını teselli eder ya da ona yardımcı olur.** | 1 | 2 | 3 | 4 |
| 3. Kolaylıkla hayal kırıklığına uğrayıp sinirlenir. | 1 | 2 | 3 | 4 |
| 4. Yaptığı iş kesintiye uğradığında kızar. | 1 | 2 | 3 | 4 |
| 5. Huysuzdur, çabuk kızıp öfkelenir. | 1 | 2 | 3 | 4 |
| **6. Gündelik işlere yardım eder (Örneğin; masa hazırlama, masa toplama).** | 1 | 2 | 3 | 4 |
| 7. Çekingen ve ürkektir. | 1 | 2 | 3 | 4 |
| 8. Üzgün, mutsuz ya da depresiftir. | 1 | 2 | 3 | 4 |
| 9. Grup içindeyken huzursuz veya içe dönüktür. | 1 | 2 | 3 | 4 |
| 10. En ufak bir şeyde bağırır ya da çığlık atar. | 1 | 2 | 3 | 4 |
| **11. Grup içinde çalışırken zorlanmaz, rahattır.** | 1 | 2 | 3 | 4 |
| 12. Hareketsizdir, katılabileceği bir aktiviteyi uzaktan seyretmeyi tercih eder. | 1 | 2 | 3 | 4 |
| **13. Anlaşmazlıklara çözüm yolu arar.** | 1 | 2 | 3 | 4 |
| 14. Gruptan ayrı, kendi başına olmayı tercih eder. | 1 | 2 | 3 | 4 |
| **15. Yaşıtlarının veya tanıdıklarının görüşlerini dikkate alır.** | 1 | 2 | 3 | 4 |
| 16. Yaşıtlarına veya tanıdıklarına vurur, onları ısırır ya da tekmeler. | 1 | 2 | 3 | 4 |
| **17. Birlikte yapılması gereken işlerde, diğer insanlarla birlikte çalışır, onlarla iş birliği yapar.** | 1 | 2 | 3 | 4 |
| 18. Yaşıtları veya tanıdıklarıyla çatışma yaşar. | 1 | 2 | 3 | 4 |
| **19. Eşyalarına iyi bakar, eşyalarının kıymetini bilir.** | 1 | 2 | 3 | 4 |
| 20. Grup faaliyetleri sırasında konuşmaz ya da faaliyetlere katılmaktan kaçınır. | 1 | 2 | 3 | 4 |
| **21. Kendinden küçüklere karşı dikkatlidir.** | 1 | 2 | 3 | 4 |
| 22. Grup içinde zor fark edilir. | 1 | 2 | 3 | 4 |
| 23. Yaşıtlarını ve tanıdıklarını istemedikleri şeyleri yapmaya zorlar. | 1 | 2 | 3 | 4 |

| | | | | |
|---|---|---|---|---|
| 24. Kızdığı zaman aile bireylerine vurur ya da evdeki eşyalara zarar verir. | 1 | 2 | 3 | 4 |
| 25. Endişeye kapılır. | 1 | 2 | 3 | 4 |
| **26. Akla yatan açıklamalar yapıldığında uzlaşmaya yanaşır.** | 1 | 2 | 3 | 4 |
| 27. Anne ve babasının önerilerine karşı çıkar. | 1 | 2 | 3 | 4 |
| 28. Cezalandırıldığında (örneğin; herhangi bir şeyden yoksun bırakıldığında) başkaldırır, karşı koyar. | 1 | 2 | 3 | 4 |

**Appendix F**

**Receptive Language**

**Turkish Expressive and Receptive Language Test (TIFALDI)-Script**

*(Teste başlamadan önce masada L şeklinde oturulur. TİFALDİ çocuğa dönük tutulur, puanlama kağıdı ise çocuğun göremeyeceği şekilde yan tarafa alınır. İlk önce çocuğun kronolojik yaşı hesaplanır. 2;00-2;11 yaş aralığı için 2, 3;00-3;11 yaş için 3 yaş... için belirtilen resimlerle teste başlanır.)*

Seninle "haydi resim bulalım" oyununu oynamak için resimli bir kitap hazırladım. Şimdi ben sana bir kelime söyleyeceğim, sen de bana o kelimenin resmini bulacaksın. Tamam mı?

Bazı resimler zor gelebilir, ama bu hiç önemli değil. Sen hangisinin doğru olduğunu düşünüyorsan, onu göster tamam mı?

*(Deneme kartlarıyla teste başlanır. İlk önce ilk iki sayfa gösterilir.)*

Haydi, şimdi başlayalım.

*(Deneme-1 sayfası açılır.)*

Bana "kediyi" gösterir misin?

*(Gösterirse)* Aferin, çok güzel.

*(Gösteremezse)* Bak, kedi burada.

*(Deneme-2 sayfası açılır.)*

Bana "yatağı" gösterir misin?

*(Gösterirse)* Aferin, çok güzel.

*(Gösteremezse)* Bak, yatak burada.

Şimdi de diğer resimlere bakalım.

*(Çocuğun kronolojik yaşı için belirtilen resimlerle teste başlanır.)*

*(Taban puan: Çocuğun arka arkaya 8 doğru cevap vermesi gerekiyor. En yüksek numara taban puanı oluyor.)*

*(Tavan puan: Çocuk arka arkaya gelen 10 maddede 8 yanlış cevap verirse, teste devam edilmez.)*

*(Toplam ham puan: Taban + Tabandan sonra yaptığı doğru sayısı)*

*(Birden fazla resim gösterirse,* "Hangisini seçtin?" *ya da* "Bana bir tanesini göster" *şeklinde yönerge verilir.)*

*(Test sonunda)* Aferin çok güzel yaptın. Teşekkür ederim.

**Turkish Expressive and Receptive Language Test (TIFALDI)-Words**

| Başlangıç Noktası | Sıra | Kelime | Hedef | Cevap | Başlangıç Noktası | Sıra | Kelime | Hedef | Cevap |
|---|---|---|---|---|---|---|---|---|---|
| **DENEME 1** | | Kedi | 4 | | **6 yaş** | 45 | Yunus | 3 | |
| **DENEME 2** | | Yatak | 3 | | | 46 | Bakmak | 1 | |
| **2 yaş** | 1 | Televizyon | 2 | | | 47 | Keçi | 3 | |
| | 2 | Yılan | 4 | | | 48 | Kask | 2 | |
| | 3 | Kapı | 1 | | | 49 | Ok | 2 | |
| | 4 | Pasta | 3 | | | 50 | Zarf | 4 | |
| | 5 | Parmak | 4 | | | 51 | Düdük | 4 | |
| | 6 | Salıncak | 3 | | | 52 | Roket | 1 | |
| | 7 | Mandal | 1 | | | 53 | Orman | 4 | |
| | 8 | Çanta | 2 | | | 54 | Teleskop | 1 | |
| | 9 | Kurbağa | 3 | | | 55 | Pervane | 3 | |
| | 10 | Simit | 1 | | | 56 | Şelale | 2 | |
| **3 yaş** | 11 | Yastık | 3 | | **7 yaş** | 57 | Dalmak | 2 | |
| | 12 | Öpmek | 3 | | | 58 | Küvet | 3 | |
| | 13 | Tabak | 4 | | | 59 | Doktor | 4 | |
| | 14 | Soğan | 1 | | | 60 | Dalgıç | 2 | |
| | 15 | Tavuk | 4 | | | 61 | Öğretmen | 1 | |
| | 16 | Armut | 3 | | | 62 | Palet | 1 | |
| | 17 | Maymun | 3 | | | 63 | Utangaçlık | 3 | |
| | 18 | Asmak | 4 | | | 64 | Sirk | 3 | |
| | 19 | Sabun | 4 | | | 65 | Ceviz | 3 | |
| | 20 | Hortum | 2 | | | 66 | Elips | 4 | |
| **4 yaş** | 21 | Bilezik | 3 | | | 67 | Fidan | 1 | |
| | 22 | Yalnız | 4 | | | 68 | Vedalaşmak | 4 | |
| | 23 | Lastik | 2 | | **8 yaş** | 69 | Silindir | 1 | |
| | 24 | Kravat | 2 | | | 70 | Felaket | 3 | |
| | 25 | Güç | 2 | | | 71 | Galibiyet | 4 | |
| | 26 | Koyun | 3 | | | 72 | Fabrika | 1 | |
| | 27 | Koşmak | 2 | | | 73 | Dikdörtgen | 3 | |
| | 28 | Sinek | 1 | | | 74 | Devirmek | 2 | |
| | 29 | Ayakkabı | 3 | | | 75 | Gitar | 3 | |
| | 30 | Kemer | 4 | | | 76 | Halat | 3 | |
| | 31 | Mutluluk | 2 | | | 77 | Heyecan | 2 | |
| | 32 | Kilit | 2 | | | 78 | Yelken | 3 | |
| **5 yaş** | 33 | Zincir | 3 | | | 79 | Yarım | 4 | |
| | 34 | Postacı | 2 | | | 80 | Verimlilik | 2 | |
| | 35 | Yazmak | 1 | | **9-10 yaş** | 81 | Raket | 4 | |
| | 36 | Papatya | 2 | | | 82 | Piramit | 4 | |
| | 37 | Kafes | 1 | | | 83 | Göl | 2 | |

| | 38 | Tehlike | 4 | |
|---|----|---------|---|---|
| | 39 | Paten | 4 | |
| | 40 | Vazo | 3 | |
| | 41 | Cetvel | 2 | |
| | 42 | Fincan | 3 | |
| | 43 | Çatı | 3 | |
| | 44 | Ceza | 4 | |

| | 84 | Tır | 2 | |
|---|----|--------|---|---|
| | 85 | Ada | 1 | |
| | 86 | Fıçı | 3 | |
| | 87 | Sedye | 4 | |
| | 88 | Vagon | 4 | |
| | 89 | Horon | 2 | |
| | 90 | Sehpa | 3 | |

| Başlangıç Noktası | Sıra | Kelime | Hedef | Cevap |
|-------------------|------|---------|-------|-------|
| **11-12 yaş** | 91 | Baraj | 2 | |
| | 92 | Ekmek | 2 | |
| | 93 | Hamal | 1 | |
| | 94 | Pul | 2 | |
| | 95 | Onarmak | 4 | |
| | 96 | Mezura | 2 | |
| | 97 | Bere | 3 | |
| | 98 | Sal | 3 | |
| | 99 | Zıt | 2 | |
| | 100 | Viyadük | 1 | |
| | 101 | Faraş | 4 | |
| | 102 | Lamba | 2 | |
| | 103 | Pulluk | 1 | |
| | 104 | Radyatör | 2 | |

**Appendix G**

**Nonverbal Intelligence**

**Raven Colored Progressive Matrices Test-Script**

*(Yönergeye başlamadan önce süreyi tutun)*

Şimdi sana bazı şekiller göstereceğim. Her şeklin bir bölümü eksik.

Şimdi şu şekle bak. *(Kitapçıktaki A1 gösterilir.)* Gördüğün gibi, içinden bir parçası kesilip alınmış bir şekil var. Biz bu kesilmiş parçayı bulup yerine koymak istiyoruz. Bu parçaların her biri *(her bir parçayı sırayla göstererek)* bu boşluğa girecek biçimde. Ama bir tanesi bu şekli tamamlıyor.

*(İşaret ederek)* Bunlardan hangisi oraya konması gereken parçadır?

*(1., 2. ve 3. şekillerin neden doğru olmadığı açıklanır, 6. şeklin ise neden neredeyse doğru olduğu açıklanır.)*

1 numara doğru biçimde ama doğru şekilde değil. 2 numara zaten şekil değil. 3 numara oldukça yanlış. 6 numara hemen hemen doğru ama burası yanlış *(beyaz kısmı göster)*. İçlerinden sadece 1 tanesi doğru.

Şimdi doğru olan parçayı göster.

*(Eğer 4. şekli gösterirse)* Aferin, çok güzel.

*(Eğer çocuk başarısız olursa, çözeceği problemin özünü kavrayana kadar açıklamaya devam et).*

*(A1 başarılmadan A2'ye geçilmez.)*

*(A2'yi göstererek)* Şimdi bu şekilden çıkan parçayı göster.

*(Çocuk bu maddede başarısız olursa, A1 maddesini tekrar anlat, ama A2'yi göstermesini söyle. Devam etmeden önce, yönergeyi anladığından emin olana kadar aynı işlemi tekrarla).* Şimdi bunlara göre buradaki doğru şekli bana gösterir misin?

*(A3'e geçince )* Şimdi buradaki eksik parçayı göster bakalım.

# Raven Colored Progressive Matrices Test-Examples of Questions

Question 1: Question 2:

**Appendix H**

**Emotion Recognition**

**The Faces Task-Script**

Şimdi sana birkaç tane resim göstereceğim. Bu resimlerde bir kız duygularını ifade ediyor.

Senden istediğim bu kızın ne hissettiğini bana söylemen.

1) Şimdi söyle bakalım, sence bu kız nasıl hissediyor? Şaşkın mı, Mutlu mu?

2) Şimdi söyle bakalım, sence bu kız nasıl hissediyor? Kızgın mı, Korkmuş mu?

3) Şimdi söyle bakalım, sence bu kız nasıl hissediyor? İğreniyor mu, Üzgün mü?

4) Şimdi söyle bakalım, sence bu kız nasıl hissediyor? Mutlu mu, Şaşkın mı?

5) Şimdi söyle bakalım, sence bu kız nasıl hissediyor? İğreniyor mu, Üzgün mü?

6) Şimdi söyle bakalım, sence bu kız nasıl hissediyor? Kızgın mı, Korkmuş mu?

## The Faces Task-Pictures



ŞAŞKIN      MUTLU

KIZGIN      KORKMUŞ

İĞRENME      ÜZGÜN

MUTLU      ŞAŞKIN

İĞRENME      ÜZGÜN

KIZGIN      KORKMUŞ