

Developmental Change in Early Competencies of Institution-Reared Children as Compared to  
Their Parent-Reared Peers

by

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## **STATEMENT OF AUTHORSHIP**

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## ABSTRACT

Adverse effects of institutional care on child outcomes have been shown by multiple studies comparing institution-reared and parent-reared children. The current study adds to the extant literature by examining whether the developmental change within one year in social (social competence, aggressive behavior, and social withdrawal), cognitive (theory of mind, executive function), and language domains differs with respect to rearing context. Data were collected from 73 institution-reared children, 51 parent-reared children with low to middle-educated mothers, and 75 parent-reared children with high-educated mothers at two time points, one year apart. At Time 1 and Time 2, theory of mind, executive function, and language skills were measured via individual assessments, while social competence, aggressive behavior, and social withdrawal were measured via caregiver/mother reports. ANCOVAs, controlling for age and sex, indicated that institution-reared group displayed significantly lower performance on theory of mind and executive function tasks than both parent-reared groups at two time points. Also, they had significantly lower level of social competence and language than two parent-reared groups. Hierarchical regression analyses with the difference score as the outcome variable revealed that institutional care predicted poorer developmental change within one year in social competence and language skills, controlling for age and sex. The difference between parent-reared group with high-educated mothers and institution-reared group was higher than the difference between parent-reared group with low to middle-educated mothers and institution-reared group for the developmental change in language. This study discloses the differences in social and cognitive developmental change in children under typical and atypical rearing contexts.

*Keywords:* institutional rearing, developmental change, mother education, theory of mind, executive function, language, aggression, social competence

## ÖZET

Kurumda yetişmiş olmanın çocukların becerileri üzerindeki olumsuz etkisi, kurum bakımındaki çocuklarla ailesiyle yaşayan çocukları kıyaslayan birçok çalışma ile gösterilmiştir. Bu çalışma ise, sosyal (sosyal yetkinlik, saldırganlık davranışı, içe çekilme), bilişsel (zihin kuramı, yönetici işlevler) ve dil alanlarındaki gelişimsel değişimin çocuğun yetiştiği çevreye göre farklılaşıp farklılaşmadığını araştırarak mevcut literatüre katkı sağlamaktadır. Araştırma verisi, kurum bakımındaki 73 çocuktan, ve ebeveynleri ile yaşayan, annesi düşük-orta eğitilmiş 51 çocuk ile annesi yüksek eğitilmiş 75 çocuktan bir yıl arayla iki farklı zamanda toplanmıştır. Hem Zaman 1 hem Zaman 2’de; zihin kuramı, yönetici işlevler ve dil becerileri bireysel değerlendirmelerle; sosyal yetkinlik, saldırganlık ve içe çekilme ise anne/bakıcı raporları ile ölçülmüştür. Yaş ve cinsiyetin etkisi kontrol edildikten sonra, Kovaryans Analizi sonuçları, kurum bakımındaki çocukların zihin kuramı ve yönetici işlevler testlerinde, ailesiyle yaşayan iki grup çocuğa göre iki zamanda da anlamlı olarak daha düşük performans elde ettiğini göstermiştir. Ayrıca kurum bakımındaki çocuklar, sosyal yetkinlik ve dil becerileri açısından ailesiyle yaşayan çocuk gruplarına göre anlamlı olarak daha düşük seviyede gelişim göstermiştir. Cinsiyetin ve yaşın etkisi kontrol edildiğinde, fark skoru metodu ile yapmış olduğumuz hiyerarşik regresyon analizi sonuçları kurum bakımının sosyal yetkinlik ve dil alanlarında düşük gelişimsel değişimi (1 yıl içindeki) yordadığını göstermektedir. Yüksek eğitilmiş annelerin çocukları ile kurum bakımındaki çocukların arasındaki dil alanındaki gelişimsel değişim farkının, düşük-orta eğitilmiş annelerin çocukları ile kurum bakımındaki çocukların arasındaki değişim farkından büyük olduğu bulunmuştur. Bu çalışma tipik ve atipik yetiştirme ortamlarındaki çocukların sosyal ve bilişsel gelişimsel değişimindeki farklılıklarını ortaya koymaktadır.

*Anahtar sözcükler:* kurum bakımı, gelişimsel değişim, anne eğitimi, zihin kuramı, yönerici işlevler, dil, saldırganlık davranışı, sosyal yetkinlik

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## Chapter 1

### INTRODUCTION

Early life experiences have been frequently investigated in the literature due to their impact on child development. Increasing evidence shows that a positive child-rearing environment fosters the development of crucial child outcomes, such as social competence, language, cognitive abilities, and academic success, while negative child rearing poses a high risk for developmental delay and internalizing and externalizing problems (Appleyard, Egeland, van Dulmen, & Alan Sroufe, 2005; Capage & Watson, 2001; Hughes & Ensor, 2008). Given the significant role of rearing context in child development, this paper focused on institutional care, which is considered as one of the most extreme rearing contexts; and compared institution-reared children with their parent-reared peers who had mothers with different education levels in terms of developmental change in social, cognitive, and language skills.

In cases of severe life conditions, such as extreme poverty, abuse, abandonment, death or long-term imprisonment of a parent, a child is placed in a rearing institution. Even though the majority of child-rearing institutions provide proper nutrition, medical care, and hygiene, institutions are typically “deprived environments” characterized by high child-staff ratio and unstable and restricted interaction with caregivers (MacLean, 2003). Regardless of the quality of the institution, institution-reared children still lack one-to-one relationship with a stable caregiver. Consequently, the institutional environment is considered to be suboptimal, even under the best circumstances (Gunnar, Bruce, & Grotevant, 2000; Tottenham, 2012). Being raised in such institutions is found to be strongly linked with attachment disorder, clinical and behavioral problems, as well as lagging language and cognitive skills (Bos, Zeanah, Fox, Drury, McLaughlin, & Nelson, 2011; Colvert et al., 2008a; Colvert et al., 2008b; Lee, Seol,

Sung, & Miller, 2010; MacLean, 2003; St. Petersburg-USA Orphanage Research Team, 2008; Yagmurlu, Berument, & Celimli, 2005). Most cross-sectional (e.g., Roy, Rutter, & Pickles, 2000) and longitudinal studies (e.g., Kreppner et al., 2007) compare the development of children living in institutions with children who were adopted in the first year of age or those in foster care, revealing that institution-reared children lag behind in many aspects of development including social, cognitive and language skills, compared to children who are adopted or in foster care. In examining the *exclusive* role of the institutional rearing context in child development, it is important to compare institution-reared children with their peers who live with their biological families. Yet, only a limited number of studies were conducted to compare the social and cognitive development of institution-reared children with their parent-reared peers. For instance, a study comparing emotional and behavioral problems of institution-reared children aged 6 to 18 with their family-reared peers with no institutional care experience demonstrated that institution-reared children had higher level of rule breaking behaviors, social problems, social withdrawal, aggressive behaviors, anxiety, and conduct problems than their parent-reared peers (Şimşek, Erol, Öztop, & Münir, 2007). However, to our knowledge, the question of whether developmental change in various domains differs according to rearing context during the early childhood has not been addressed yet. Accordingly, the main aim of the current study was to compare the one-year developmental change in Turkish institution-reared children with their parent-reared peers, in social (social competence, aggressive behavior, social withdrawal), cognitive (theory of mind, executive function), and language domains during preschool.

## Chapter 2

### LITERATURE REVIEW

#### 2.1 Social competence, aggressive behavior, and social withdrawal

Studies investigating the abilities that constitute a basis for positive social interaction mostly address the issue of social competence (Mendez, Fantuzzo, & Cicchetti, 2002). Social competence is about establishing and maintaining a healthy and positive relationship with others (Bornstein, Hahn, & Haynes, 2010). The extant literature suggests that it constitutes a basis for positive social interaction by enhancing the ability of child to display socially appropriate behaviors and avoiding rule-breaking behaviors (Domitrovich, Durlak, Staley, & Weissberg, 2017). Thus, socially competent children display prosocial behaviors more (Moore, Barresi, & Thompsom, 1998) and hostile behaviors less often (Capage & Watson, 2001; Werner, Cassidy, & Juliano, 2006). A meta-analytic review also suggested that there was a small to medium-sized relation between socially competent behaviors and emotion knowledge; that is children who display socially competent behaviors are more likely to understand the emotional cues in social environment, or vice versa (Trentacosta & Fine, 2010).

Aggressive behaviors which is a component of the social developmental domain were also investigated in this study. A widely used definition for aggressive behavior includes all actions that deliberately aim at harming others (Blain-Arcaro & Vaillancourt, 2017). Aggression does not only entail harming someone physically (*physical aggression*), such as hitting, kicking but also psychologically (*relational aggression*), such as ignoring a peer, gossiping or ridiculing (Estrem, 2005). A meta-analytic review of 148 studies investigating the relations between aggressive behaviors and child outcomes revealed that there was a strong relation between showing physical aggression and having externalizing problems; while showing relational aggression and having internalizing problems were associated (Card,

Stucky, Sawalani & Little, 2008). Similarly, a meta-analysis of Marshall and his colleagues (2015) also found a significant small to medium association between relational aggression and internalizing problems in children and adolescents; and it was suggested that the children who display relational aggression have more likely to experience internalizing problems like social isolation. Moreover, the longitudinal studies on aggressive behaviors in early childhood suggested that aggressive behaviors of children was a predictor of future social problems such as rejection by peers, and conduct disorder (Crick et al., 2006; Hughes, Aldercotte, & Foley, 2017).

Another significant component of social development is social withdrawal, which is characterized by avoidance from personal relationships (Asendorpf, 1990) and increasing evidence shows that socially withdrawn behaviors in early childhood is linked to concurrent and future problems in social relations. To illustrate, social withdrawal at 1 year of age was correlated with emotional and behavioral problems in preschool years (Guedeney et al., 2014). Similarly, socially withdrawn behaviors were found to be an early predictor of peer rejection, so it should not be surprising that the children who are withdrawn at early years are more likely to have internalizing problems, such as anxiety and depression than their not withdrawn counterparts (Rubin, Coplan, & Bowker, 2009).

Previous research shows that institution-reared children show delays or difficulties in the social domain. Children with a history of institutional care have problems in their interactions with peers (Fisher, Ames, Chisholm, & Savoie, 1997), have poorer social competence (Leve, Fisher, & DeGarmo, 2007), and display higher level of internalizing (e.g., socially withdrawn behavior and anxiety) and externalizing (e.g., rule breaking and aggressive behaviors) problems (Trout, Hagaman, Chmelka, Gehringer, Epstein, & Reid, 2008), and attachment (e.g., insecure and disorganized attachment) problems (Lionetti, Pastore, & Barone, 2015). Likewise, Attar-Schwartz (2008) conducted a study with 4420 Israeli

institution-reared children (aged 6 to 18) to identify their behavioral and social problems. The findings demonstrated that the mean level of emotional and social behavior problems of all institution-reared children were higher than normal range, and it also showed that boys displayed more aggressive behaviors than girls, and girls had more internalizing problems, including anxiety and depression, than boys. Cross-sectional studies conducted in Turkey also revealed that children and adolescents, who were in residential care, displayed a higher level of internalizing and externalizing problems, compared to their parent-reared peers (Erol, Öztop, & Özcan, 2008). A recent study of Julian and his colleagues (2019) had similar findings with the earlier studies. Their findings suggested that institutional rearing was linked with poor social skills, and children with a higher levels of social problems were more likely to have higher rates of behavior problems.

### **2.2 Theory of mind, executive function, and language**

Theory of mind (ToM) refers to the ability to understand one's own and others' mental states (e.g., desires, beliefs, emotions, thoughts, and intentions). Since the fastest growth in ToM happens during preschool years, preschool children start to predict what is in other people's minds and understand how mental states influence behaviors (Ruffman, Perner, Natio, Parkin, & Clements, 1998; Wellman, Cross, & Watson, 2001). Improvement of this ability is reflected on the social life of children, because ToM is associated with the start and continuity of social interaction (Perner & Lang, 1999). ToM development facilitates engaging in more positive and sophisticated social interaction with others. It is also closely associated with several competencies in the social, cognitive, and language domains. To illustrate, children with high levels of ToM are more likely to display prosocial behaviors (Watson, Nixon, Wilson, & Capagne, 1999); their peers are more likely to accept them into the play than the children with low levels of ToM (Slaughter et al. 2002), and they have more sophisticated language abilities compared to children with low levels of ToM (Miller, 2006).



It was also found that ToM development of preschoolers is negatively correlated with aggressive behaviors even after age and language of children were accounted for (Capage & Watson, 2001). Additionally, ToM is negatively associated with behavioral inhibition in early childhood (Suway, Degnan, Sussman, & Fox, 2012).

In addition to ToM, executive function (EF) draws ample attention as a cognitive ability in the early childhood literature. It is an umbrella term that is associated with complex and higher order cognitive processes. Planning, making decisions, controlling impulsive actions, developing strategies and achievements and putting those achievements into practice, time and attention controlling are all related to EF (Garon, Bryson, & Smith, 2008; Hughes, 1998). In line with the literature on ToM, EF development shows remarkable growth during the preschool period (Zelazo, Craik, & Booth, 2004), and children's adaptive and goal-oriented behaviors increase in their social relations in these years (Liew, 2012). The extant literature reveals that children with poorer EF abilities tend to show externalizing problems, such as conduct problems, aggressive behaviors (Hughes, White, Sharpen, & Dunn, 2000; Raaijmakers et al., 2008), and internalizing problems, such as socially withdrawn behaviors (Booth-LaForce & Oxford, 2008).

The literature on early childhood also emphasizes language abilities as it relates to several cognitive, socio-cognitive, and social child outcomes (Gertner, Rice, & Hadley, 1994; Lee, 2011; Storch & Whitehurst, 2002). A meta-analysis carried out by Milligan, Astington, and Dack (2007) indicated that language measures were related to children's ToM in both typically developing children (Ruffman, Slade, Rowlandson, Rumsey, & Garnham, 2003) and in atypical samples, such as deaf children (Woolfe, Want, & Siegal, 2002). Additionally, language abilities enhance healthy social interactions with others by laying the foundation for good communicative skills, thereby helping children establish and maintain positive peer relationships (Gertner, Rice, & Hadley, 1994) and be liked by their peers (Hart, Fujiki,

Brinton, & Hart, 2004). Correspondingly, poor language abilities are linked with higher relational and physical aggression (Estrem, 2005).

Not surprisingly, children with a history of institutionalization were found to show impairments in cognitive and language domains (Bos, Zeanah, Fox, Drury, McLaughlin, & Nelson, 2011). A study of children aged 3 to 6 indicated that the institution-reared group had lower level of receptive and expressive language abilities than the control group who live with their biological families (Spratt et al., 2012). EF and ToM have also been vulnerable to institutional care (Colvert et al., 2008b). To illustrate, preschoolers in foster care were compared with their parent-reared peers from low-income background in terms of ToM development, and the findings suggested that children in foster care had significantly worse ToM than the parent-reared children controlling for age, intelligence, and EF (Pears & Fisher, 2005b). Even though there is a close link between cognitive abilities and internalizing problems in the literature of typically developing children, there are relatively few studies examining the concurrent and longitudinal links between cognitive abilities (e.g., EF and ToM) and internalizing problems (e.g., social withdrawal) in institution-reared children. A recent 1-year longitudinal study by Selcuk, Yavuz, Etel, Harma, and Ruffman (2018) revealed that EF was a predictor of social withdrawal for institution-reared preschoolers, and there was a significant relation between ToM and EF at both time points.

### **2.3 Developmental change**

As explained above, there are multiple studies examining the development of institution-reared children. Yet, most are cross-sectional, so they do not explain how the social and cognitive abilities change over time, or whether the developmental change on social, cognitive, and language domain is different than the parent-reared children. There are a limited number of studies that have examined the developmental change for children with a history of institutional care. In one study (Colvert et al., 2008a), researchers examined

whether there was an impact of institutional rearing on emotional problems and how it changed from age 6 to 11 for three groups of Romanian adoptees: i) Romanian institutional group, ii) Romanian non-institutionalized group (who were directly adopted without any experience of institutional care; control group), and iii) within-UK adoptees who were adopted before the age of 6 months. They found that Romanian institutional group showed significantly more change in emotional difficulties than the within-UK adoptees and the Romanian noninstitutionalized group. In addition, a recent study investigated how early institutional care was linked with high level of psychopathology from age 8 years to age 16 years, and how it differed according to rearing environment including institutional care, foster care, and family care (Wade, Fox, Zeanah, & Nelson, 2018). The findings revealed that the group differences in developmental change of psychopathology became observable at age 12 years. However, to our knowledge, there is no study investigating the developmental change in preschool years for institution-reared children as compared to parent-reared children who live with their biological parents.

A significant body of longitudinal research on institution-reared children is mostly focused on adoptees or children in foster care, and indicates that children with a history of institutional care show dramatic improvements across developmental domains after being adopted by a family (Juffer et al., 2011; Kreppner et al., 2007). These longitudinal studies highlight the importance of duration of deprivation and the possibility of “catch-up” in social and cognitive developmental domains when the living conditions improved. Yet, we still lack the important knowledge on the developmental change over the course of staying in the institution, especially during the preschool period where critical cognitive skills are developed.

### Chapter 3

#### PRESENT STUDY

Existing literature suggests that institution-reared children lag behind in many developmental domains compared to parent-reared children. Yet, as far as we are aware, the question of whether the developmental change in early childhood differs with respect to rearing context has not been examined before. To address this issue, we collected data from both institution-reared and parent-reared preschool age children at two-time points, one year apart. Given the role of early competencies in the social and cognitive domains in later development, we measured social competence, aggressive behaviors, socially withdrawn behaviors, ToM, EF, and language.

As MacLean (2003) argued, there is no ideal comparison group in the literature of institution-reared children in terms of research design, and most studies had comparison groups from at-risk children, such as adoptees. Another at-risk group in terms of developmental delay in various outcomes is parent-reared children with low educated mothers. Low maternal education puts children at risk for developmental and health problems beginning in infancy by decreasing mothers' agreement with modern medical practices (Motedayen, Dousti, Sayehmiri, & Pourmahmoudi, 2019). Additionally, high-educated mothers are more likely to have higher income, to be married with high-educated spouses, to be more responsive and supportive. Their knowledge on child development is also more than the low-educated mothers, which in turn helps to improve the social, cognitive, and language abilities of children. For instance, Carneiro, Meghir, and Parey (2013) suggested that maternal education increases the children's math and language abilities, and decreases the behavioral problems including antisocial behavior, social withdrawal, and peer conflict. In the light of all of these studies showing the role of mothers' education on child development, we also took

the role of maternal education into account for the parent-reared sample in our study. We first collected data from a large sample of parent-reared children, and then we divided the parent-reared sample into two groups according to maternal education (parent-reared group with low to middle-educated mothers and parent-reared group high-educated mothers).

Maternal education is frequently used in the literature to index socioeconomic status (SES), and it is well-established that SES plays a critical role on child's development including social, cognitive, and language domain (see Hoff, 2003). A meta-analysis by Letourneau, Duffett-Leger, Levac, Watson, and Young-Morris (2013) revealed that low SES increases the risk of having internalizing and externalizing problems, and having difficulties in language and cognitive development. This is because SES is strongly associated with not only lack of access to material resources such as goods and healthcare services but also lack of qualified education and low parental education that potentially benefit children's development (Brooks-Gunn & Duncan, 1997; Engle & Black, 2008). To examine if institutional rearing poses a risk for difficulties in early competencies beyond the effect of living in a disadvantaged environment such as low-SES, Yagmurlu, Berument, and Celimli (2005) investigated the role of early context on ToM development by comparing institution-reared preschoolers with their parent-reared peers. Considering the role of SES on child development, they collected data from parent-children dyads from low- and middle-SES backgrounds. Their findings explaining the group differences showed that even though it was not statistically significant, low-SES children performed better on ToM tasks than institution-reared children. Yet, language and nonverbal intelligence of institution-reared and low-SES parent-reared children were quite similar. Furthermore, middle-SES children had significantly better language and nonverbal intelligence but not on ToM. All these findings suggested that ToM and the other early competencies that are linked with ToM are differentially influenced by the rearing environment. Therefore, the researchers performed a further analysis to explain

the role of child rearing environment on ToM by creating dummy variables. The results showed that institutional rearing predicted low level of ToM controlling for the variables which were related to ToM, yet differences in the SES level of parent-reared children did not predict the ToM. Therefore, it can be suggested that living in even low socioeconomic conditions with the family is more advantageous for a child than rearing in institutions.

We formed our predictions in the light of the extant literature, investigating the adverse impacts of institutional care and low-SES including having low-educated mothers on early competencies. We expected that institution-reared children would display more negative outcomes (i.e., aggressive behavior and social withdrawal) and poorer performance in positive outcomes (social competence, ToM, EF, language) compared to both groups of parent-reared children at both time points. We also hypothesized that the parent-reared children who had high-educated mothers would have more sophisticated social, cognitive, and language abilities comparing with the parent-reared children with low to middle-educated mothers. Furthermore, we aimed to investigate whether there was any difference between institution-reared and parent-reared children in terms of the developmental change within one year in social, cognitive, and language domains. Accordingly, we expected that institution-reared children would have poorer developmental change in child outcomes as compared to both groups of parent-reared children.

## Chapter 4

### METHOD

#### 4.1 Participants

Data were collected at two-time points with one year apart ( $M = 12.50$  months,  $SD = .70$ ) from two groups of children in Turkey: a) institution-reared children, b) parent-reared children. The sample consisted of only the children who attended to the study at both Time 1 (T1) and Time 2 (T2). None of the children in the sample had known chronic physical health problems or developmental problems. To measure social competence, aggressive behavior, social withdrawal, and general developmental level of children, primary child-care providers (mothers for parent-reared children, primary caregivers for institution-reared children) also participated in the study.

We initially collected data from 75 children who lived in child-rearing institutions in Istanbul, Ankara, Bursa, and Edirne. Two children were found to have developmental delay according to Ankara Developmental Screening Inventory (Savaşır, Sezgin, & Erol, 1998) and were excluded from the study. The final sample of institution-reared children consisted of 73 children who were living in institutions at the time of data collection. There was a gender imbalance in the sample due to the high rate of adoption for girls. Descriptive statistics for institution-reared group were shown in Table 1.

The living conditions were quite similar across the institutions due to regulation of the Ministry of Family, Labor and Social Services. Institution-reared children lived with their peers and female caregivers on a shift system. All the caregivers had high school education on child development, and they also attended child-care training programs provided by the Ministry of Family, Labor and Social Services. The primary caregivers lived with the institution-reared children about 11 months ( $SD = 8.69$ ) at T1 and about 13 months ( $SD =$

7.86) at T2. At T1, the mean number of children in each group was 11.16 ( $SD = 1.61$ ,  $min = 9$ ,  $max = 14$ ), and it was 9.52 ( $SD = 3.41$ ,  $min = 6$ ,  $max = 16$ ) at T2. The child-staff ratio, indicating the number of children per caregiver, decreased from 10.63 ( $SD = 5.82$ ) at T1 to 3.88 ( $SD = 2.81$ ) at T2 because some children were placed into “child houses” by the Ministry of Family, Labor and Social Services; and also the mean number of caregivers increased from T1 ( $M = 2.38$ ,  $SD = .66$ ) to T2 ( $M = 4.37$ ,  $SD = 2.33$ ).

For the parent-reared sample, data were collected from preschools in four cities of Turkey: Istanbul, Bursa, Muğla, and Tekirdağ ( $n = 129$ ). Yet, the ADSI scores of three children indicated that they had a developmental delay; so, the parent-reared sample consisted of the remaining 126 children who showed typical development. Then, we divided the parent-reared children sample into two categories with regard to maternal education: a) parent-reared children with low to middle-educated mothers, b) parent-reared children with high-educated mothers. Maternal education was scored as 0 = illiterate to 10 = having a graduate degree. Children whose mothers were at most high school graduates were categorized into the parent-reared group with low to middle-educated mothers; and the ones whose mothers' education level was at least two years college were categorized into the parent-reared group with high-educated mothers. Descriptive statistics for both parent-reared groups were presented in Table 1. It could be significant to note that we did not prefer to take the paternal education into consideration while classifying the parent-reared groups. This is because, maternal education was found to be stronger predictor of SES comparing with paternal education (Corwyn & Bradley, 2002; Davis-Kean, 2005), and also all the caregivers of institution-reared children were female so their interaction with a male is quite limited comparing to a female.

In the parent-reared group with low to middle-educated mothers, 11% of the mothers were literate but had no school experience, 25% had primary school degree, 5% dropped out secondary school, 15% had secondary school degree, 2% dropped out high school, and 39%



had high school degree. Among the mothers of children in high-educated group, 16% had 2-years college degree, 4% dropped out university, 56% had a university degree, and 24% had a graduate degree.

The mean number of siblings was 0.80 ( $SD = 0.83$ ) for the parent-reared group with low to middle-educated mothers, whereas it was 0.51 ( $SD = 0.60$ ) for the parent-reared group with high-educated mothers.

## 4.2 Materials

**General developmental level.** Ankara Developmental Screening Inventory (ADSI; Savaşır, Sezgin, & Erol, 1998) is an age-standardized assessment for Turkish children, and it is used to assess general developmental level of children from two months to 6 years of age. ADSI is used to follow the general development of children and to detect developmental delay or risk in children. It has four subscales: language-cognitive, fine motor, gross motor, and social and self-care development. In the light of these subscales, general developmental level is calculated by using a standard *t-score*. In this study, only children who showed age-typical development were included.

**Social behavior.** The Penn Interactive Peer Play Scale (PIPPS; Fantuzzo, Mendez, & Tighe, 1998) and the Social Competence and Behavioral Evaluation Scale (SCBE; LaFreniere & Dumas, 1996) were given to mothers/caregivers both at T1 and T2 to assess social behaviors of children, including social competence, aggressive behavior, and social withdrawal. The PIPPS measures social behaviors during peer play, whereas the SCBE assesses social behaviors during general peer and teacher interaction. The PIPPS uses 4-point Likert type scale (1=never to 4=always) and has three subscales (i.e., Play Interaction, Play Disruption, and Play Disconnection). Similarly, the SCBE has three subscales (Social Competence, Anger-Aggression, and Anxiety-Withdrawal), and the scale items is rated on a 4-point Likert scale. Social competence, aggressive behavior, and social withdrawal scores

were computed by averaging two subscales of the PIPPS and the SCBE (see Etel & Yagmurlu, 2015 for similar procedures).

*Social competence.* To calculate social competence score of children, the Play Interaction subscale (8 items; example item: Helps the other children in the play) of the PIPPS and the Social Competence subscale (8 items; example item: Values the other children's opinion) of the SCBE were used. Scores were averaged to calculate the Play Interaction subscale ( $M = 2.72$ ,  $SD = 0.56$ ;  $\alpha = .77$ ) and the Social Competence subscale scores ( $M = 2.85$ ,  $SD = 0.57$ ;  $\alpha = .76$ ). There was a significant correlation between the Play Interaction subscale and the Social Competence subscale ( $r = .66$ ,  $p < .001$ ). The two subscale scores were averaged to compute the total social competence score.

*Aggressive behavior.* The Play Disruption subscale of the PIPPS (12 items; e.g., 'Starts fights and arguments') and the Anger-Aggression subscale (10 items; e.g., 'Gets mad easily') of the SCBE were used to assess aggressive behaviors of children. We averaged the scores for each item compute the Play Disruption subscale score ( $M = 1.73$ ,  $SD = 0.57$ ;  $\alpha = .91$ ) and the Anger-Aggression subscale score ( $M = 1.88$ ,  $SD = 0.58$ ;  $\alpha = .88$ ). There was a significant correlation between the two subscales ( $r = .79$ ,  $p < .001$ ). The two subscale scores were averaged to compute the total aggressive behavior score.

*Social withdrawal.* To measure social withdrawal of children, the Play Disconnection subscale (10 items; e.g., 'Is rejected by others') of the PIPPS and the Anxiety-Withdrawal subscale (10 items; e.g., 'Remains apart, isolated from others') of the SCBE were used. We took the mean of the items in the subscales to compute the Play Disconnection subscale score ( $M = 1.39$ ,  $SD = 0.37$ ;  $\alpha = .82$ ) and the Anxiety-Withdrawal subscale score ( $M = 1.29$ ,  $SD = 0.32$ ;  $\alpha = .77$ ). There was a significant correlation between the two subscales ( $r = .66$ ,  $p < .001$ ). The two subscale scores were averaged to compute the total social withdrawal score.

**Theory of mind.** Theory of mind abilities of children were measured with the Contents False Belief task (Wellman & Liu, 2004) and the classic Unexpected Change task (Wimmer & Perner, 1983) at two time points.

*Contents False Belief task.* We used a crayon box but full of band-aids instead and we asked children to guess its contents. Then, we opened the box and showed its real contents. Then, a doll who has never seen inside the crayon box was presented, and we asked “What will this doll think is inside the box?”. We expected children to say “crayons”, not “band-aids” as a correct answer. One point was given to the children for the correct response (Wellman & Liu, 2004).

*Unexpected Change task.* We told a story of one boy doll who played with a ball. In this story, the boy doll puts his ball into the blue box after playing, and then he leaves the room. Then, a girl doll comes and take the ball from the blue box and place it into the yellow box. To be sure that children understood the story correctly, we asked a memory question about the story. Then, we asked the children “Where will the boy doll look for his ball when he comes back?” (target question). Children who answered both the target and memory questions correctly received 1 point (Wimmer & Perner, 1983).

The Contents False Belief task and the Unexpected Change task were significantly correlated at both T1 ( $r = .36, p < .001$ ) and T2 ( $r = .38, p < .001$ ). The two scores were summed to compute the total ToM score.

**Executive function.** The day-night task (Gerstadt, Hong, & Diamond, 1994) and the peg-tapping task (Diamond & Taylor, 1996) were used to assess executive function of children at two time points.

*Day-night task.* Two pictures were used: One of them represented “night” (moon and stars) and other one represented “day” (sun). We wanted the children to point the opposite picture when we told them to show the day or night picture. Children needed to point the day

picture when we said “night”, or to point the night picture when we said “day”. There were three training trials and 10 test trials in this task. A proportion score, indicating the number of correct responses divided by the total number of trials, was calculated as a measure of performance on this task.

*Peg-tapping task.* The task had two parts. For the first part of the peg-tapping task, we wanted children to tap twice when we tapped once, and to tap once when we tapped twice. After the practice trials, 12 test trials were administered, and each correct tapping response was scored as one point. In the second part, we added a new rule to increase the complexity of the peg-tapping task; so, children were instructed not to tap when we tapped three times. Similarly, there were practice trails and 12 test trials for the second part of the task, and each correct response was scored as one point. Similar to the day-night task, to measure total peg-tapping task performance, a proportion score was calculated.

These two executive function tasks were significantly correlated at both T1 ( $r = .60, p < .001$ ) and T2 ( $r = .58, p < .001$ ). The total EF score was calculated by taking the sum of the day-night and the peg-tapping task scores (see Hughes & Ensor, 2008; Pellicano, 2010 for similar procedures).

**Language.** The Turkish Expressive and Receptive Language Test (TIFALDI-AD; Berument & Güven, 2010) was used to assess children’s receptive language abilities. This test was developed specifically for 2 to 12 year-old Turkish children. In this test, we expected the children to point the correct picture among four different pictures. The receptive vocabulary scores were obtained by applying three parameter Item Response Theory (IRT) that provides latent language ability scores. These scores were regressed on linear and quadratic indicators of age (in months), and resulting scores were used as an indicator of receptive language ability (see Baydar et al., 2014; Etel & Yagmurlu, 2015 for similar computations).

### **4.3 Procedure**

Firstly, approvals were received from the University Institutional Review Board and the Ministry of Family, Labor and Social Services to collect data from the institution-reared children and their caregivers. The data were collected at two-time points (T1, T2) with approximately one year apart. To begin with, mothers/caregivers were given the demographic form, which included information on the child's age, sex, physical health problems, duration of institutionalization (for institution-reared children). Then, the Ankara Developmental Screening Inventory (ADSI) was given to mothers/caregivers only at T1 to exclude the children with developmental delay from the study. As explained before, two institution-reared children and three parent-reared children were found to have developmental delay, and so they were excluded from the sample at the beginning of the study. The PIPPS and the SCBE were given to the primary care-provider at both time points. The ToM, EF, and language tasks were administered to the children via individual assessment at both time points as well; each session took approximately 50 minutes. We gave a box of crayons, coloring books, and stickers to the children for their participation at the end of the sessions.

### **4.4 Data Analysis Plan**

Before testing our hypothesis, we first conducted preliminary analyses. Paired sample *t*-tests were conducted to examine the specific components of ToM and EF scores for three groups of children. To determine the covariates in the subsequent analyses, we explored the potential sex-related differences among each three groups of children by using independent sample *t*-test, and the potential age-related differences among three groups of children by using analysis of variance (ANOVA). Then, we examined the correlations at T1 between demographic information (duration of stay in the institution, child-staff ratio for only the institution-reared group; education of mothers for both parent-reared groups; age for all three groups of children) and study variables (social competence, aggressive behavior, social

withdrawal, ToM, EF, and language). Additionally, both zero-order correlations and partial correlations controlling for age were performed to examine the associations between study variables separately for each group of children. Furthermore, to explore whether the three groups of children differed at each time point in social (social competence, aggressive behavior, social withdrawal), cognitive (ToM, EF) and language domains, ANCOVAs were performed controlling for age and sex.

We used the difference score method in order to compare groups in terms of developmental change in our study variables from T1 to T2 (our main hypothesis). As we had a nonrandomized study with baseline imbalance, we preferred the difference score analysis instead of ANCOVA (see Kisbu-Sakarya, MacKinnon, & Aiken, 2013 for comparison of ANCOVA and difference score analysis methods). Hierarchical regression analyses with the difference score as the outcome variable were performed to elucidate the role of institutional context as compared to parent rearing in the developmental change of child outcomes.

## Chapter 5

### RESULTS

#### 5.1 Preliminary analyses

##### 5.1.1 Change from T1 to T2 for the components of ToM and EF

We performed paired sample *t*-test analyses to examine whether there is a change from T1 to T2 on the components of ToM and EF for all three groups of children. As explained before, the total ToM score was the sum of the Unexpected Change task and the Contents False Belief task, whereas the total EF score was calculated by taking the sum of the day-night task and the peg-tapping task scores.

For the components of ToM score, all groups of children performed significantly better on the Unexpected Change task at T2 as compared to T1 [ $t(72) = -2.76, p = .007$  for the institution-reared group;  $t(50) = -3.64, p = .001$  for the parent-reared group with low to middle-educated mothers;  $t(74) = -4.17, p < .001$  for the parent-reared group with high-educated mothers]. Similarly, the mean score of the Contents False Belief task significantly increased from T1 to T2 for the three groups of children [ $t(72) = -2.99, p = .004$  for the institution-reared group;  $t(50) = -3.25, p = .002$  for the parent-reared group with low to middle-educated mothers;  $t(74) = -3.84, p < .001$  for the parent-reared group with high-educated mothers].

For the components of EF, analysis showed that the proportion score of the day-night task significantly increased from T1 to T2 for the parent-reared group with low to middle educated mothers [ $t(50) = -4.24, p < .001$ ] and the parent-reared group with high-educated mothers [ $t(74) = -5.51, p < .001$ ], but not for the institution-reared group [ $t(72) = -1.22, p = .228$ ]. The proportion score of the peg-tapping task significantly increased from T1 to T2 for all groups of children [ $t(72) = -8.90, p < .001$  for the institution-reared group;  $t(50)$

= -7.74,  $p < .001$  for the parent-reared group with low to middle-educated mothers;  $t(74) = -8.22$ ,  $p < .001$  for the parent-reared group with high-educated mothers]. Descriptive statistics of all study variables are shown in Table 1.

### 5.1.2 Age- and sex-related differences

The findings of one-way ANOVA showed that there was a significant age difference between three groups of children ( $F(2, 196) = 13.75$ ,  $p < .001$ ) at baseline. Post hoc analyses using the Tukey HSD tests suggested that children with high-educated mothers were significantly younger than institution-reared children and children with low to middle-educated mothers. Yet, there was no age difference between the institution-reared group and the parent-reared group with low to middle-educated mothers (see Table 1).

Independent sample  $t$ -test was conducted to examine sex-related differences in child outcomes for each group of children at both T1 and T2 (see Table 2). For the institution-reared group, significant sex-related differences were found only in social competence, aggressive behavior, and social withdrawal. Accordingly, institution-reared girls showed higher social competence than boys at T2 [ $t(71) = 2.07$ ,  $p = .042$ ]. Boys displayed higher levels of aggressive behaviors than girls both at T1 [ $t(71) = -2.40$ ,  $p = .019$ ] and T2 [ $t(71) = -3.19$ ,  $p = .002$ ]. Boys had also higher levels of social withdrawal than girls at T2 [ $t(71) = -2.04$ ,  $p = .045$ ].

For the parent-reared group with low to middle-educated mothers, statistically significant sex-related differences were found in aggressive behavior and language. Boys had higher levels of aggressive behavior than girls at T2;  $t(49) = -2.52$ ,  $p = .015$ . Also, boys had better language abilities than girls at T1;  $t(49) = -2.54$ ,  $p = .014$ . For the parent-reared group with high-educated mothers, there was a significant sex-related difference in social competence. Girls had higher level of social competence than boys at T1;  $t(73) = 2.68$ ,  $p = .009$ .



Table 1  
*Descriptive statistics*

	Institution-reared group ( <i>n</i> = 73)		Parent-reared group with low to middle-educated mothers ( <i>n</i> = 51)		Parent-reared group with high- educated mothers ( <i>n</i> = 75)	
	<i>M</i> ( <i>SD</i> )	<i>Min</i> / <i>Max</i>	<i>M</i> ( <i>SD</i> )	<i>Min</i> / <i>Max</i>	<i>M</i> ( <i>SD</i> )	<i>Min</i> / <i>Max</i>
<b>Demographic Information</b>						
T1 Child age (in months)	57.73 (9.29)	37 / 71	55.75 (9.65)	34 / 72	49.92 (9.19)	35 / 72
T2 Child age (in months)	70.38 (9.15)	49 / 90	68.57 (9.76)	46 / 85	62.20 (9.04)	47 / 83
Child-staff ratio	10.63 (5.82)	5 / 20	-	-	-	-
T1 Duration of stay in institution	22.97 (2.03)	2 / 69	-	-	-	-
Education of mothers (0-10)	-	-	3.88 (1.95)	1 / 6	8.88 (.96)	7 / 10
<b>Study Variables</b>						
T1 Social competence	2.73 (.56)	1.38 / 3.94	2.83 (.56)	1.50 / 3.86	2.80 (.43)	1.75 / 3.88
T2 Social competence	2.64 (.66)	1.21 / 4.00	3.03 (.52)	1.79 / 4.00	2.99 (.43)	1.93 / 3.93
T1 Aggressive behavior	1.97 (.73)	1.00 / 4.00	1.74 (.39)	1.05 / 3.35	1.70 (.34)	1.09 / 3.18
T2 Aggressive behavior	1.95 (.66)	1.00 / 4.00	1.69 (.35)	1.04 / 2.93	1.64 (.29)	1.09 / 2.61
T1 Social withdrawal	1.28 (.35)	1.00 / 2.95	1.41 (.29)	1.05 / 2.50	1.36 (.29)	1.00 / 2.30
T2 Social withdrawal	1.36 (.33)	1.00 / 2.10	1.36 (.27)	1.00 / 2.10	1.32 (.26)	1.00 / 2.27
T1 ToM <sup>a</sup> (0-2)	.38 (.66)	0 / 2	.71 (.76)	0 / 2	.68 (.72)	0 / 2
T1 Contents False Belief	.11 (.32)	0 / 1	.22 (.42)	0 / 1	.20 (.40)	0 / 1
T1 Unexpected Change	.27 (.45)	0 / 1	.49 (.51)	0 / 1	.48 (.50)	0 / 1
T2 ToM <sup>a</sup> (0-2)	.75 (.80)	0 / 2	1.29 (.73)	0 / 2	1.20 (.77)	0 / 2
T2 Contents False Belief	.29 (.46)	0 / 1	.49 (.50)	0 / 1	.45 (.50)	0 / 1
T2 Unexpected Change	.47 (.50)	0 / 1	.80 (.40)	0 / 1	.75 (.44)	0 / 1
T1 EF <sup>b</sup> (0-2)	1.08 (.56)	0 / 2	1.39 (.48)	.10 / 2	1.34 (.61)	0 / 2
T1 Day-night (0-10)	.66 (.33)	0 / 1	.82 (.26)	.10 / 1	.74 (.33)	0 / 1
T1 Peg-tapping (0-24)	.42 (.30)	0 / 1	.57 (.31)	0 / 1	.60 (.33)	0 / 1
T2 EF <sup>b</sup> (0-2)	1.39 (.56)	0 / 2	1.81 (.24)	.87 / 2	1.80 (.29)	.30 / 2
T2 Day-night (0-10)	.72 (.36)	0 / 1	.96 (.10)	.60 / 1.20	.95 (.13)	.30 / 1
T2 Peg-tapping (0-24)	.67 (.28)	0 / 1	.85 (.20)	.67 / 1	.86 (.19)	0 / 1
T1 Language	.20 (.38)	-.60 / -.94	.29 (.32)	-.42 / .93	.48 (.41)	-.32 / -1.59
T2 Language	.16 (.39)	-.63 / .94	.48 (.46)	-.42 / 1.77	.69 (.40)	-.02 / 1.48

*Note.* T1, Time 1; T2, Time 2; ToM, theory of mind; EF, executive function.

<sup>a</sup> T1 and T2 ToM scores refer to the summed scores of Contents False Belief task and Unexpected Change task.

<sup>b</sup> T1 and T2 EF scores refer to the sums of the peg-tapping and day-night proportion scores.

T1 Peg-tapping, T2 peg-tapping, T1 day-night, and T2 day-night scores refer to proportion scores.

Table 2  
Sex-related differences in child outcomes for each group of children at both T1 and T2

T1	Institution-reared group ( $n = 73$ ) (14 girls, 59 boys)			Parent-reared group with low to middle-educated mothers ( $n = 51$ ) (30 girls, 21 boys)			Parent-reared group with high-educated mothers ( $n = 75$ ) (34 girls, 41 boys)		
	<i>Girls</i>	<i>Boys</i>	<i>t</i>	<i>Girls</i>	<i>Boys</i>	<i>t</i>	<i>Girls</i>	<i>Boys</i>	<i>t</i>
	<i>M (SD)</i>	<i>M (SD)</i>		<i>M (SD)</i>	<i>M (SD)</i>		<i>M (SD)</i>	<i>M (SD)</i>	
Social competence	2.92 (.47)	2.68 (.56)	1.43	2.87 (.57)	2.76 (.56)	.68	2.94 (.45)	2.69 (.38)	2.68*
Aggressive behavior	1.56 (.56)	2.07 (.74)	-2.40*	3.12 (.48)	2.89 (.56)	-1.62	1.64 (.34)	1.75 (.33)	-1.38
Social withdrawal	1.30 (.53)	1.27 (.30)	.23	1.42 (.33)	1.40 (.24)	.25	1.34 (.30)	1.38 (.28)	-.67
ToM	.50 (.85)	.36 (.61)	.73 <sup>†</sup>	.70 (.75)	.71 (.78)	-.07	.94 (.74)	.46 (.64)	3.02
EF	1.11 (.57)	1.07 (.56)	.23	1.43 (.40)	1.33 (.59)	.78	1.41 (.59)	1.29 (.63)	.84
Language	.33 (.40)	.17 (.37)	1.47	.20 (.31)	.41 (.29)	-2.54*	.54 (.40)	.43 (.41)	1.16
T2									
Social competence	2.96 (.66)	2.56 (.64)	2.07*	3.12 (.48)	2.89 (.56)	1.54	3.09 (.45)	2.69 (.38)	1.81
Aggressive behavior	1.47 (.42)	2.06 (.66)	-3.19**	1.59 (.28)	1.83 (.41)	-2.52*	1.59 (.29)	1.69 (.27)	-.161
Social withdrawal	1.20 (.26)	1.39 (.33)	-2.04*	1.35 (.26)	1.39 (.29)	-.49	1.29 (.24)	1.35 (.27)	1.09
ToM	.93 (.92)	.71 (.77)	.92	1.20 (.76)	1.43 (.68)	-1.10	1.21 (.73)	1.20 (.81)	.66
EF	1.53 (.66)	1.35 (.53)	1.04	1.86 (.17)	1.75 (.32)	1.66	1.81 (.25)	1.80 (.33)	.28
Language	.29 (.39)	.13 (.38)	1.41	.44 (.48)	.54 (.44)	-.72	.69 (.42)	.69 (.39)	-.01

Note. <sup>†</sup> $p < 0.6$ ; \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

### 5.1.3 Correlations among variables at T1

For institution-reared children, zero-order correlations at T1 revealed that duration of stay in the institution was not associated with the measured outcomes except for ToM. Child-staff ratio (i.e., the number of children per caregiver) was positively correlated with social competence. Age was positively correlated with social competence, ToM, and EF whereas it was negatively correlated with social withdrawal. Yet, there was no significant correlation between age and aggressive behavior. Since the language score was age-standardized, the correlation between age and language was 0. Due to the strong correlation between age and study variables, age was controlled for further analysis. After controlling for age, social competence was negatively correlated with aggressive behavior, social withdrawal, and language and was positively correlated with EF. There were also positive correlations between aggression and social withdrawal; ToM and EF; and EF and language (see Table 3A) for institution reared children at T1, controlling for child age.

For the whole group of parent-reared children, age of the child was positively correlated with social competence, ToM, and EF. Even though the education of mothers was not significantly correlated with study variables except for language, we found significant positive relations between education of mothers and study variables such as EF, language, and ToM (marginally) after controlling for child age. Additionally, controlling for child age, there were positive relations between aggressive behavior and social withdrawal; ToM and EF; EF and language (marginally) while there were significant negative relations between social competence and aggressive behavior; social competence, and social withdrawal; aggressive behavior and ToM; aggressive behavior and EF; and lastly social withdrawal and ToM (see Table 3A).

Table 3A

*Zero-order correlations and partial correlations controlling for age at Time 1*

Institution-reared children ( <i>n</i> = 73)									
Variables	1	2	3	4	5	6	7	8	9
1. Age	-								
2. Duration of stay in institution	.27*	-							
3. Child-staff ratio	.35**	-.27*							
4. Social competence	.39**	-.01	.24*						
5. Aggressive behavior	-.08	.15	-.11	-.48***					
6. Social withdrawal	-.41***	-.13	-.21	-.53***	.49***				
7. ToM	.50***	.31**	.19	.11	-.04	-.18			
8. EF	.54***	.18	.18	.45***	-.13	-.34**	.53***		
9. Language	-.02	-.01	-.11	.24*	-.12	-.15	.14	.43***	-
Parent-reared children ( <i>n</i> = 126)									
Variables	1	2	3	4	5	6	7	8	
1. Age	-								
2. Education of mothers	-.35***	-							
3. Social competence	.24**	.01							
4. Aggressive behavior	.04	-.09	-.35***						
5. Social withdrawal	.15	-.03	-.23**	.33***					
6. ToM	.44***	-.01	.18*	-.27**	-.14				
7. EF	.68***	-.03	.18*	-.13	.04	.47***			
8. Language	.18*	.27**	.07	.00	-.04	.16	.25**		

*Note.* Zero-order correlations are presented below the diagonal, and partial correlations controlling for age are presented above the diagonal.

†*p* < 0.6; \**p* < .05; \*\**p* < .01; \*\*\**p* < .001.

As explained in the methods section, we categorized parent-reared children into 2 groups: the parent-reared group with low to middle-educated mothers and the parent-reared group with high-educated mothers by taking the education of mothers into consideration. For the parent-reared group with low to middle-educated mothers, zero-order correlations at T1 showed that age was significantly correlated with ToM and EF. Even though education of mothers was not significantly related to any study variables, we found a significant correlation between education of mothers and EF after controlling for age. Partial correlations at T1 suggested that there was a positive relation between aggressive behavior and social withdrawal after controlling for age. We also found negative correlations between social competence and aggressive behavior; aggressive behavior and ToM; social withdrawal and ToM, aggressive behavior and EF; social withdrawal and language controlling for age (see Table 3B).

For the parent-reared group with high-educated mothers, zero-order correlations at T1 indicated that age of child was positively correlated with social competence, ToM, EF, and language. Education of mothers was positively related to social withdrawal. When controlled for age, the findings showed that education of mothers was positively correlated with social withdrawal and language. Additionally, there were negative correlations between social competence and aggressive behavior; social competence and social withdrawal; aggressive behavior and ToM while there was a positive correlation between aggressive behavior and social withdrawal after controlling for age (See Table 3B).

Table 3B

*Zero-order correlations and partial correlations controlling for age at Time 1*

Parent-reared group with low to middle-educated mothers ( $n = 51$ )								
Variables	1	2	3	4	5	6	7	8
1. Age	-							
2. Education of mothers	-.27	-	.27	-.10	.05	.16	.34*	.12
3. Social competence	.24	.19	-	-.44**	-.21	.07	.08	-.02
4. Aggressive behavior	.01	-.10	-.43**	-	.40**	-.40**	-.32*	-.05
5. Social withdrawal	.17	.01	-.16	.40**	-	-.35*	-.11	-.37**
6. ToM	.42**	.03	.16	-.36**	-.25	-	.25	.14
7. EF	.63***	.09	.21	-.25	.02	.44**	-	.04
8. Language	.15	.07	.02	.05	-.33*	.19	.13	-
Parent-reared group with high-educated mothers ( $n = 75$ )								
Variables	1	2	3	4	5	6	7	8
1. Age	-							
2. Education of mothers	-.14	-	-.14	-.07	.26	.04	.07	.24*
3. Social competence	.24*	-.17	-	-.30**	-.35**	.10	-.02	.05
4. Aggressive behavior	.04	-.07	-.29*	-	.26*	-.24*	-.14	-.02
5. Social withdrawal	.10	.25*	-.31**	.26*	-	-.14	-.06	.12
6. ToM	.49***	-.04	.20	-.19	-.07	-	.21	-.01
7. EF	.75***	-.06	.17	-.06	.04	.49**	-	.11
8. Language	.34**	.17	.13	-.01	.15	.16	.33**	-

*Note.* Zero-order correlations are presented below the diagonal, and partial correlations controlling for age are presented above the diagonal.

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

#### **5.1.4 Group differences**

Due to significant age and sex difference among groups, ANCOVAs controlling for age and sex were performed to investigate baseline differences in child outcomes. Differences at T1 between the three groups were significant for EF, ToM, and language ability. Post hoc comparisons using the Bonferroni test ( $p < .05$ ) indicated that the institution-reared group had significantly lower scores on the ToM and EF tasks compared to both parent-reared groups. For language abilities, the parent-reared group with high-educated mothers had higher language skills than both the parent-reared group with low to middle-educated mothers and the institution-reared group (see Table 4).

At T2, overall significant differences among the three groups were found in social competence, aggressive behavior, ToM, EF, and language. Post hoc comparisons using Bonferroni test ( $p < .05$ ) indicated that institution-reared children had significantly lower scores on social competence, ToM, and EF tasks as compared to both the parent-reared groups. They also had significantly higher levels of aggressive behaviors than the parent-reared group with high-educated mothers. For language, we found significant group differences among all pairs of groups. Accordingly, the parent-reared group with high-educated mothers had significantly better language abilities compared to both the parent-reared group with low to middle-educated mothers and the institution-reared group; and similarly the parent-reared group with low to middle-educated mothers had better language abilities than the institution-reared group (see Table 4).

#### **5.2 Group differences in developmental change**

Hierarchical multiple regression analysis was performed to investigate the predictive role of child-rearing context in the change score for each outcome variable. Child's age and

Table 4. *Group differences controlling for age and sex of child*

	Institution-reared group ( <i>n</i> = 73)	Parent-reared group with low to middle-educated mothers ( <i>n</i> = 51)( <i>n</i> = 51)	Parent-reared group with high-educated mothers ( <i>n</i> = 75)		
T1					
Variable	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )	<i>F</i>	<i>Partial</i> $\eta^2$
1. Social competence	2.73 (.56)	2.83 (.56)	2.80 (.43)	1.523	.02
2. Aggressive behavior	1.97 (.73)	1.74 (.39)	1.70 (.34)	3.042	.03
3. Social withdrawal	1.28 (.35)	1.41 (.29)	1.36 (.29)	2.494	.03
4. ToM <sup>a,b</sup>	.38 (.66)	.71 (.76)	.68 (.72)	10.736	.10
5. EF <sup>a,b</sup>	1.08 (.56)	1.39 (.48)	1.34 (.61)	24.820	.20
6. Language <sup>b,c</sup>	.20 (.38)	.29 (.32)	.48 (.41)	12.477	.11
T2					
Variable	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )	<i>F</i>	<i>Partial</i> $\eta^2$
1. Social competence <sup>a,b</sup>	2.64 (.66)	3.03 (.52)	2.99 (.43)	7.547	.07
2. Aggressive behavior <sup>b</sup>	1.95 (.66)	1.69 (.35)	1.64 (.29)	4.897	.05
3. Social withdrawal	1.36 (.33)	1.36 (.27)	1.32 (.26)	0.697	.01
4. ToM <sup>a,b</sup>	.75 (.80)	1.29 (.73)	1.20 (.77)	15.935	.14
5. EF <sup>a,b</sup>	1.39 (.56)	1.81 (.24)	1.80 (.29)	34.557	.26
6. Language <sup>a,b,c</sup>	.16 (.39)	.48 (.46)	.69 (.40)	35.043	.27

*Note.* <sup>a</sup> indicating significant difference between institution-reared group and parent-reared group with low to middle-educated mothers. <sup>b</sup> indicating significant difference between institution-reared group and parent-reared group with high-educated mothers. <sup>c</sup> indicating significant difference between parent-reared group with low to middle-educated mothers and parent-reared group with high-educated mothers.



sex were entered into the equation in Step 1. Two dummy variables were entered into the equation in Step 2 - dummy 1 comparing institution-reared group to parent-reared group with low to middle-educated mothers, and dummy 2 comparing institution-reared group to parent-reared group with high-educated mothers.

As shown in Tables 5A and 5B, age was negatively related to the change in social competence, EF, and ToM. The first set of regression analysis reveals that dummy variables “institution-reared group vs. parent-reared group with low to middle-educated mothers” and “institution-reared group vs. parent-reared group with high-educated mothers” further added to the prediction of the developmental change in social competence, controlling for age and sex [ $F(4, 194) = 3.90, p = .005, \text{Cohen's } f^2 = 0.07$ ]. The second set of regression analysis indicates that dummy variables “institution-reared group vs. parent-reared group with low to middle-educated mothers” and “institution-reared group vs. parent-reared group with high-educated mothers” further added to the prediction of the developmental change in language after age and sex were accounted for ( $F(4, 194) = 5.89, p < .001, \text{Cohen's } f^2 = 0.12$ )

As post-hoc analyses, we performed paired sample *t*-test for each group. As Figure 1 shows, institution-reared children showed no significant improvement from T1 to T2 in neither social competence nor language ability, while both the parent-reared children groups had significant progress in both variables. More specifically, the findings revealed that it was not statistically significant, yet there was a decrease in social competence from T1 to T2 for the institution-reared group;  $t(72) = 1.12, p = .27$  while there was a significant increase in social competence from T1 to T2 for both the parent-reared group with low to middle-educated mothers;  $t(50) = -2.67, p = .01$ , and the parent-reared group with high-educated mothers;  $t(74) = -3.96, p < .001$ . The similar pattern was also seen in the scores of language for all groups. There was a significant decrease in language scores from T1 to T2 for institution-reared children;  $t(72) = 4.95, p < .001$ . However, both the parent-reared children

groups had higher language scores at T2 in comparison with their scores at T1. There was a significant difference in language scores between T1 and T2 for both the parent-reared group with low to middle-educated mothers;  $t(50) = -3.10, p = .003$ , and the parent-reared group with high-educated mothers;  $t(74) = -4.33, p < .001$ .

Table 5A

*Hierarchical regression analysis predicting change in (1) social competence, (2) aggressive behavior, and (3) social withdrawal*

	Step 1			Step 2		
	<i>B</i>	<i>SE</i>	$\beta$	<i>B</i>	<i>SE</i>	<i>B</i>
(1) DV: Social competence						
Age	-.01	.00	-.17*	-.01	.00	-.13
Sex	-.11	.08	-.10	-.04	.08	-.03
Institution vs. low to middle-edu				.26	.11	.20*
Institution vs. high-edu				.21	.010	.18*
$R^2$ ( <i>Adjusted R</i> <sup>2</sup> )	.04 (.03)			.07 (.06)		
<i>F</i> for change in $R^2$	4.16*			3.90**		
(2) DV: Aggressive behavior						
Age	.00	.00	-.00	-.00	.00	-.01
Sex	.04	.07	.04	.04	.08	.04
Institution vs. low to middle-edu				-.01	.10	-.01
Institution vs. high-edu				-.02	.09	-.02
$R^2$ ( <i>Adjusted R</i> <sup>2</sup> )	.00 (-.01)			.00 (-.02)		
<i>F</i> for change in $R^2$	.18			.03		
(3) DV: Social withdrawal						
Age	.00	.00	.05	.00	.00	.02
Sex	.11	.05	.18	.09	.05	.13
Institution vs. low to middle-edu				-.10	.06	-.14
Institution vs. high-edu				.27	.06	-.14
$R^2$ ( <i>Adjusted R</i> <sup>2</sup> )	.04 (.03)			.05 (.03)		
<i>F</i> for change in $R^2$	3.55			1.81		

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

Table 5B

*Hierarchical regression analysis predicting change in (1) theory of mind, (2) executive function, and (3) language ability*

	Step 1			Step 2		
	<i>B</i>	<i>SE</i>	$\beta$	<i>B</i>	<i>SE</i>	$\beta$
(1) DV: Theory of mind						
Age	-.01	.01	-.15*	-.01	.01	-.15
Sex	.18	.13	.10	.25	.14	.14
Institution vs. low to middle-edu				.29	.17	.14
Institution vs. high-edu				.11	.16	.06
$R^2$ ( <i>Adjusted R</i> <sup>2</sup> )	.03 (.02)			.05 (.03)		
<i>F</i> for change in $R^2$	3.15*			1.49		
(2) DV: Executive function						
Age	-.02	.00	-.46***	-.02	.00	-.48***
Sex	-.00	.06	-.00	.01	.07	.01
Institution vs. low to middle-edu				.08	.08	.07
Institution vs. high-edu				-.03	.08	-.03
$R^2$ ( <i>Adjusted R</i> <sup>2</sup> )	.21 (.21)			.22 (.21)		
<i>F</i> for change in $R^2$	26.68***			.83		
(3) DV: Language						
Age	-.00	.00	-.03	.00	.00	.07
Sex	-.06	.05	-.08	.01	.05	.02
Institution vs. low to middle-edu				.24	.07	.29***
Institution vs. high-edu				.27	.06	.36***
$R^2$ ( <i>Adjusted R</i> <sup>2</sup> )	.01 (-.00)			.11 (.09)		
<i>F</i> for change in $R^2$	.75			5.89***		

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

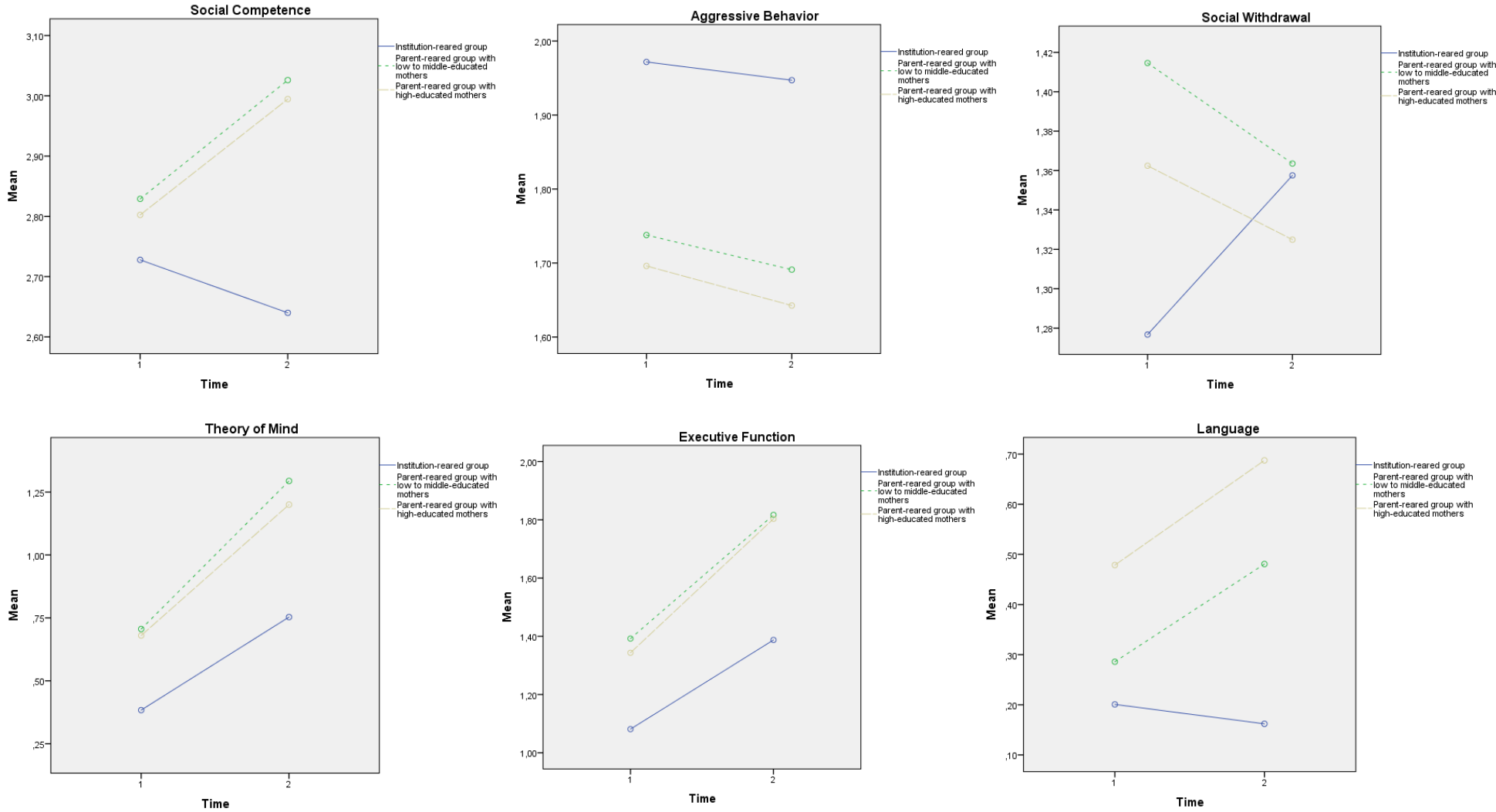


Figure 1. Mean scores of study variables at Time 1 and Time 2 for three groups of children.

## Chapter 6

### DISCUSSION

To our knowledge, this is the first study that investigates the developmental change in social (social competence, aggressive behavior, social withdrawal) and cognitive (ToM, EF) domains and in language by comparing institution-reared preschool-aged children with their parent-reared peers who had mothers with different education levels (low to middle-educated and high-educated). We aimed to understand the kind of impact rearing context has on the developmental pathways of these children.

In line with the previous literature (Bos, Fox, Zennah, & Nelson, 2009; Pollak et al., 2010), we expected to find that institution-reared children would have notable difficulties in social competence, and they would display higher levels of aggressive behavior and social withdrawal compared to the parent-reared groups. However, our findings showed that there were no significant differences in the social domain at baseline among the three groups of children. This might be related to our measurement of social behavior (social competence, aggressive behavior, and social withdrawal), since it was solely based on caregiver-report. It could be possible that caregivers and mothers may have different norms to evaluate children's social behaviors. Caregivers of institution-reared children may have compared the children with their peers in a child-rearing institution rather than typical children. As we explained before, the level of aggressive behaviors, social withdrawal, and problems in social competence are higher among institution-reared children than the parent-reared children because of pre-adoption experiences including abuse, neglect (The St. Petersburg-USA Orphanage Research Team, 2008). This might influence caregivers' assessment by creating a positive bias. Secondly, training provided for caregivers in such institutions mostly focus on physical care needs of children, and it is likely "that caregivers perform their duties with little

responsiveness and sensitivity to children's emotional needs (Leve et al., 2012). It might be also possible that caregivers have a restricted interaction with the children because of the high child-staff ratio in the institutions, which in turn causes the caregivers not to have remarkable powers of observation (NICHD Early Child Care Research Network, 2001).

Despite no significant group differences in the social domain at baseline, we found significant differences in cognitive (ToM, EF) and language domains among three groups of children. Accordingly, two parent-reared children groups performed significantly better in ToM and EF than institution-reared children. Their language scores were also higher than institution-reared children, but this difference was significant only between the institution-reared group and the parent-reared group with high-educated mothers. These results were mainly consistent with the literature, suggesting that institutional care is related to difficulties in cognitive skills and language (e.g., Tarullo et al., 2007). It might be argued that cognitive development could be more vulnerable to institutional care, compared to social development. Due to institution-reared children's early traumatic life experiences before institutionalization, such as neglect, abuse, or extreme poverty, they are at elevated risk for impairment in key areas of brain development, such as the prefrontal cortex, which is directly linked with cognitive abilities (Pears & Fisher, 2005a). Even if the intensity and nature of adverse experiences are diverse, institution-reared children mostly come from extremely poor families (Selçuk & Yeniad, 2016). Therefore, the likelihood of exposure to early-care risks, such as teratogens in the prenatal period or prenatal malnourishment that are linked with impairment in cognitive abilities are quite high among institution-reared children (Miller, 2005).

Our prediction that being reared by high-educated mothers would predict positive child outcomes was partly confirmed. It is well established that children with low educated mothers have higher risks of impairments in social and cognitive skills than their peers with high-educated mothers (Carneiro, Meghir, & Parey, 2013). Yet, our findings showed that

there was no significant difference between the parent-reared groups, except language, controlling for age and sex. It could be related to the nature of our parent-reared sample. As explained in the methods section, we divided parent-reared sample into two categories after the data collection, and our data do not allow us to divide the parent-reared group with low to middle-educated mothers into two groups as the parent-reared group with low-educated mothers and the parent-reared group with middle-educated mothers due to low sample size. Therefore, future studies that include parent-reared sample with low-educated mothers separately will be enlightening in this respect. When it comes to language abilities, Hoff (2003) could explain the reason of having more sophisticated language skills of parent-reared children with high-educated mothers. He conducted a study to identify the mechanism behind the role of maternal education on children's productive vocabulary development by comparing the children with middle- and high-educated mothers. The findings suggested that high maternal education was found to be related to the quantity, lexical richness, and sentence complexity of mothers' speech. This study could be informative to explain our findings, showing the importance of having high-educated mothers on children's language development. Even if our main research question was not examining the causal relationship between maternal education and child outcomes, it can be suggested that children who have highly educated mothers are exposed to longer, more complex, and more different words in comparison with children who have lower educated mothers (Hoff & Tian, 2005).

In the current study, our main goal was to find out how the developmental change in social, cognitive, and language domains differs according to rearing context. Thus, we aimed to make a contribution to the literature by showing not only the differences in early competencies between the institution-reared and parent-reared children at two different time points, but also the differences in developmental change of these child outcomes.

Accordingly, our findings revealed that institutional care predicted poor developmental



change in language and social competence after controlling for age and sex, compared to the home context.

Yet, there were no significant group differences in terms of developmental change in aggressive behaviors, social withdrawal, ToM, or EF. As can be seen in Figure 1, there was a significant improvement from T1 to T2 on all positive child outcomes, including social competence, ToM, EF, and language for both parent-reared children groups, while language and social competence scores of institution-reared children had a negative direction from T1 to T2. A reason for why institutional care predicted developmental change only for social competence and language could be that language is considered as a cognitive reserve for the various developmental areas, such as the social domain, for children with a history of institutional care (Croft et al., 2007). Similar to what Etel and Yagmurlu (2015) found in their study with institution-reared children, our findings showed that language abilities were closely linked with social competence. It seems possible that language works as a tool for the child to understand the social demands and respond them accordingly, and the children have difficulties engaging in socially appropriate behavior when they have poor language abilities (Hart, Newell, & Olsen, 2003). Moreover, our findings suggesting that there were no group differences on developmental change for social withdrawal and aggressive behavior were consistent with the findings of a recent study investigating trajectories of internalizing (i.e., depression, anxiety, social withdrawal) and externalizing (i.e., conduct behavior, overt and relational aggression) psychopathology among the children with a history of institutional rearing (Wade, Fox, Zeanah, & Nelson, 2018). In the study, they randomly assigned the institution-reared children to a care as usual group (CAUG) or a foster care group (FCG), and then they compared these two groups of children with never-institutionalized group (NIG) at three time points (at age 8, 12, and 16 years). Their findings revealed that there were no significant group differences on internalizing psychopathology at any given time points, and

on developmental change over time. Also, it was suggested that FCG showed a significant decline in externalizing problems within time, while there was no significant change for CAUG. In the light of these studies, it seems possible that the larger differences between institution-reared and parent-reared children notably in social domain become more visible in adolescence, not early childhood (Sonuga-Barke et al., 2017).

It is also noteworthy that we explored the role of institutional background, including the duration of institutionalization and child-staff ratio on child outcomes. Contrary to our expectation, they were not significantly correlated with any of the study variables in social, cognitive, and language domains, when the age was accounted for. Some studies have showed the impact of institutional background on early competencies, including ToM and EF (Beckett et al., 2006; Colvert et al., 2008b) while others did not find any relationship (i.e., Tarullo, Bruce, & Gunnar, 2007). In spite of these mixed results in the literature and the non-significant relationship in the present study, the institutional background still needs to be considered in the studies investigating early competencies of children with institutional care histories.

Our study has several strengths. First of all, the current study differed from the earlier studies showing the adverse impacts of institutional rearing on social competence (see Etel & Yagmurlu, 2015) and language abilities of children (see Yagmurlu et al., 2005) by showing how these outcomes change with respect to the rearing environment. Second, children who were in the institution-reared group were not previously institutionalized children, and they were living in institution at the time of data collection.

Despite the strengths, our study should also be discussed in terms of its limitations. The most important limitation was that we were unable to collect data from the children at more than two-time points, so we did not have a chance to longitudinally investigate the role of child-rearing context on the “growth” patterns in child outcomes. Future longitudinal

studies that use growth modeling by collecting data at least three-time points could provide valuable information to explain the differences in terms of growth in social, cognitive and language domains over a period of time within and between groups for parent-reared and institution-reared children. Second, similar with the earlier studies in Turkey (i.e., Erol, Öztop, & Özcan, 2008), the measurement of social competence, aggressive behavior, and social withdrawal of children was solely based on caregiver report. Due to the restrictions of the Ministry of Family, Labor and Social Services, it was not possible to record videotapes to observe social behaviors of institution-reared children. The findings of a recent meta-analysis suggested that the effect size of studies investigating children's internalizing and externalizing problems with parent- or teacher-reports were smaller than the direct observations of children (Groh, Fearon, van IJzendoorn, Bakermans-Kranenburg, & Roisman, 2017). Additionally, some institution-reared children lived with different caregivers at T2. The instability of caregivers in the institutions could also negatively influence our findings for institution-reared children since different caregivers could differently evaluate the same children.

The current study could be informative by providing several implications for social policy, practitioners, and interventions. The most important result of the study was that the gap between institution-reared and parent-reared children in social competence and language had a tendency to increase even in one year. It has been well-established that adoption and foster care are found to be more effective than institutional care (Bakermans-Kranenburg, van IJzendoorn, & Juffer, 2008; van IJzendoorn, Juffer, & Poelhuis, 2005). There is support for this view demonstrating that adoption and foster care in early ages increase the likelihood of catch up in many respects. This is because, adoption and foster care contexts are more supportive and conclusive than the institutional rearing context (for a review, see Palacios & Brodzinsky, 2010). When the adoption or foster care is not possible, institution-based interventions could be helpful to improve institution-reared children's development. For

instance, Berument (2013) aimed to support the development of Turkish institution-reared infants and children through an 18-weeks intervention program. The findings of intervention program showed that the infants and children in the intervention group had significantly more sophisticated cognitive and language skills at the end of program. Yet, there was no significant improvement in social domain because of the short duration of intervention program. Thus, it might be suggested that caregiver training and decreasing the child-staff ratio are also needed to be part of interventions to increase the sustainable effects of interventions (for a review, see Hermenau, Goessmann, Rygaard, Landolt, and Hecker, 2017). This is because, high child-staff ratio and limited social and emotional interaction with adults in institutions could increase the developmental gap between institution-reared and parent-reared children (Tottenham, 2012). Shortly, this study constitutes a scientific basis for intervention programs by showing the importance of giving priority to social competence and language development of children with a history of institutional care.

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**Appendix A**  
**Genel Bilgi Formu**

Dolduran kişinin adı-soyadı: \_\_\_\_\_

Anketi doldurduğunuz tarih: Gün \_\_\_\_\_ Ay \_\_\_\_\_ Yıl \_\_\_\_\_

Yuvanın adı: \_\_\_\_\_

**Çalışmaya Katılan Çocuk ile İlgili Sorular:**

1. Çocuğun adı ve soyadı: \_\_\_\_\_

2. Çocuğun doğum tarihi: Gün \_\_\_\_\_ Ay \_\_\_\_\_ Yıl \_\_\_\_\_

3. Çocuğun cinsiyeti (lütfen işaretleyiniz): Erkek \_\_\_\_\_ Kız \_\_\_\_\_

4. Çocuğun ilk kez SHÇEK bünyesindeki herhangi bir kuruma geldiği tarih:  
Gün \_\_\_\_\_ Ay \_\_\_\_\_ Yıl \_\_\_\_\_

5. Çocuğun ilk kez şu anda kalmakta olduğu kuruma geldiği tarih:  
Gün \_\_\_\_\_ Ay \_\_\_\_\_ Yıl \_\_\_\_\_

6. Çocukta herhangi bir gelişimsel sorun var mı? (örnek: otizm, Down sendromu-  
mongolizm)

\_\_\_\_\_

\_\_\_\_\_

7. Çocuğun varsa kardeş sayısı: \_\_\_\_\_

Kardeşlerinin cinsiyeti ve doğum yılı:

1. Erkek \_\_\_\_\_ Kız \_\_\_\_\_ Yıl \_\_\_\_\_ Yıl \_\_\_\_\_ Yıl \_\_\_\_\_ Yıl \_\_\_\_\_

2. Erkek \_\_\_\_\_ Kız \_\_\_\_\_

3. Erkek \_\_\_\_\_ Kız \_\_\_\_\_

4. Erkek \_\_\_\_\_ Kız \_\_\_\_\_

8. Çocuk yuvada kaç kişilik bir grupla beraber yaşıyor?

\_\_\_\_\_

9. Çocuğun bulunduğu yaş grubundaki bakıcı sayısı nedir?

Tam zamanlı: \_\_\_\_\_ Yarı zamanlı: \_\_\_\_\_

10. Çocuk dışarıda anaokuluna/okul öncesi kuruma devam ediyor mu?

Evet / Hayır

Evet ise; çocuk anaokuluna/ kreşe ne zaman başladı? Ay \_\_\_\_\_ Yıl \_\_\_\_\_

**Cocuğun Sađlığı ve Gelişimi ile İlgili Sorular:**

11. Çocuđun geirdiđi önemli bir kaza, ameliyat veya hastalık var mı? (örnek: yüksek bir yerden düşme, yanma, trafik kazası, menenjit vb.)

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12. Çocuđun bilinen önemli bir sađlık sorunu ve/veya sürekli kullanması gereken ilaçlar var mı? (örnek: kalça çıkığı, astım, epilepsi, kalp, şeker, romatoid artrit, depresyon, hiperaktivite)

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Aşağıdaki yer alan durumlar bu çocukta görülüyorsa lütfen yanında işaret koyunuz:

Kekeleme		Nörolojik hastalık (epilepsi vb.)	
Konuşma gecikmesi		Bađışıklık sistemi hastalığı (vb.)	
Altını ıslatma (çiş-kaka tutamama)		Engel (görme, işitme, ortopedik vb.)	

13. Çocuđun son 6 aydır kullandığı bir cihaz veya alet var mı? (örnek: gözlük, atel, koltuk deđneđi vb.)

## Appendix B

Çocuğun Adı: \_\_\_\_\_  
 Bakıcının kuruluştaki çalıştığı süre: \_\_\_\_\_  
 Bakıcının yaşı: \_\_\_\_\_

### Sosyal Beceri Ölçeği

#### Bölüm A

Aşağıda, çocukların **serbest oyun zamanında vasıtlarına** gösterdikleri bazı davranışlar yer almaktadır. Lütfen her bir ifadeyi dikkatlice okuyunuz ve söz konusu davranışı çocuğun son **6 ay içerisinde** ne sıklıkla yaptığını işaretleyiniz. Soruları cevaplarırken çocuğun söz konusu davranışı **“oyun zamanında”** ne kadar yaptığını düşününüz. Eğer çocuk anlatılan davranışı **hiçbir zaman** yapmıyorsa 1’i; **bazen** yapıyorsa 2’yi; **sık sık** yapıyorsa 3’ü; **her zaman** yapıyorsa 4’ü işaretleyiniz.

	Hiçbir zaman	Bazen	Sık sık	Her zaman
1. Diğer çocuklara oyun sırasında yardımcı olur.	1	2	3	4
2. Oyun zamanında kavga veya tartışma başlatır.	1	2	3	4
3. Oyun zamanında diğerleri tarafından dışlanır.	1	2	3	4
4. Oyunda sırasını beklemeyi reddeder.	1	2	3	4
5. Oyun oynayan çocukların çevresinde dolanır, aralarına girmeye tereddüt eder.	1	2	3	4
6. Oyuncaklarını paylaşır.	1	2	3	4
7. Oyun zamanında içe kapanır.	1	2	3	4
8. Oyun zamanında amaçsızca çevrede dolanır.	1	2	3	4
9. Diğer çocukların oyunla ilgili fikirlerini reddeder.	1	2	3	4
10. Oyun zamanında diğer çocuklar tarafından görmezden gelinir/ yok sayılır.	1	2	3	4
11. Oyun sırasında gereksiz yere gevezelik eder, konuşur.	1	2	3	4

	<b>Hiçbir zaman</b>	<b>Bazen</b>	<b>Sık sık</b>	<b>Her zaman</b>
12. Oyun sırasında arkadaşları arasında çıkan anlaşmazlıkları yatıştırmaya çalışır.	1	2	3	4
13. Oyun zamanında başkalarının eşyalarına zarar verir.	1	2	3	4
14. Oyun sırasında başkalarıyla farklı görüşte olduğunu kavga etmeden ifade eder.	1	2	3	4
15. Oyuna çağrıldığında katılmayı reddeder.	1	2	3	4
16. Oyuna girebilmek için başkasının yardımına ihtiyaç duyar.	1	2	3	4
17. Oyun sırasında başkalarına sözlü olarak sataşır.	1	2	3	4
18. Oyun sırasında ağlar, mızımızlanır, huysuzluk eder.	1	2	3	4
19. Diğerlerini oyuna katılmaları için çağırır, onları teşvik eder.	1	2	3	4
20. Oyun sırasında başkalarının elindekileri (eşya ya da oyuncak) zorla alır.	1	2	3	4
21. Oyun sırasında birilerinin canı yandığında veya üzüldüklerinde onları teselli eder.	1	2	3	4
22. Oyun kurallarını anlayıp takip etmede zorlanır.	1	2	3	4
23. Herhangi bir oyuna başlayabilmek için bakıcı annenin yönlendirmesine ihtiyaç duyar.	1	2	3	4
24. Başkalarının oyununu bozar.	1	2	3	4
25. Oyun zamanında mutsuz görünür.	1	2	3	4
26. Oyun zamanında saldırgandır.	1	2	3	4
27. Oyun sırasında olumlu duygular gösterir (örn.: güler, kahkaha atar).	1	2	3	4
28. Oyun kurma konusunda yaratıcıdır.	1	2	3	4
29. Oyunu ve arkadaşlarını yönetmek ister.	1	2	3	4
30. Grup bir etkinlikten başka bir etkinliğe geçerken uyumsuz davranıp düzeni bozar.	1	2	3	4

**Bölüm B**

Aşağıda, çocukların **genel olarak** gösterdikleri bazı **duygu ve davranışlar** yer almaktadır. Lütfen her bir ifadeyi dikkatlice okuyunuz ve söz konusu duyguyu veya davranışı çocuğun **son 6 ay içerisinde “genel olarak”** ne sıklıkla yaptığını işaretleyiniz. Eğer çocuk anlatılan davranışı **hiçbir zaman** yapmıyorsa 1’i; **bazen** yapıyorsa 2’yi; **sık sık** yapıyorsa 3’ü; **her zaman** yapıyorsa 4’ü işaretleyiniz.

	<b>Hiçbir zaman</b>	<b>Bazen</b>	<b>Sık sık</b>	<b>Her zaman</b>
31. Yüz ifadesinden duygularımı anlamak zordur.	1	2	3	4
32. Zorda olan bir çocuğu teselli eder ya da ona yardımcı olur.	1	2	3	4
33. Kolaylıkla hayal kırıklığına uğrayıp sinirlenir.	1	2	3	4
34. Faaliyeti kesintiye uğradığında kızar. (örnek: yemek zamanı elindeki oyunu vb. bırakması gerektiğinde kızgınlık gösterir.)	1	2	3	4
35. Huysuzdur, çabuk kızıp öfkelenir.	1	2	3	4
36. Gündelik işlerde yardım eder (örneğin, sınıf toplanırken ya da beslenme dağıtılırken yardımcı olur).	1	2	3	4
37. Çekingen ve ürkektir; yeni ortamlardan ve durumlardan kaçınır (örneğin yeni biriyle tanıştığında, yeni bir oyun öğrenilirken vb.).	1	2	3	4
38. Genel olarak üzgün, mutsuz ya da depresiftir.	1	2	3	4
39. Grup içinde çekingendir ya da grupta olmaktan huzursuz görünür.	1	2	3	4
40. En ufak bir şeyde bağırır ya da çığlık atar.	1	2	3	4
41. Hareketsizdir, oynayan çocukları uzaktan seyreder.	1	2	3	4
42. Anlaşmazlıklara çözüm yolları arar.	1	2	3	4
43. Gruptan ayrı, kendi başına kalır.	1	2	3	4
44. Diğer çocukların görüşlerine önem verir.	1	2	3	4
45. Diğer çocuklara vurur, onları ısırır ya da tekmeler.	1	2	3	4



	<b>Hiçbir zaman</b>	<b>Bazen</b>	<b>Sık sık</b>	<b>Her zaman</b>
46. Grup faaliyetlerinde diğer çocuklarla birlikte çalışır, onlarla iş birliği yapar.	1	2	3	4
47. Diğer çocuklarla anlaşmazlık yaşar.	1	2	3	4
48. Genel olarak halsiz ve yorgun görünür.	1	2	3	4
49. Oyuncaklara iyi bakar, oyuncakların kıymetini bilir.	1	2	3	4
50. Grup faaliyetleri sırasında konuşmayı ya da faaliyetlere katılmayı reddeder.	1	2	3	4
51. Kendinden küçük çocuklara karşı dikkatlidir.	1	2	3	4
52. Grup içinde fark edilmez, siliktir.	1	2	3	4
53. Diğer çocukları istemedikleri şeyleri yapmaya zorlar.	1	2	3	4
54. Bakıcı annelere kızdığı zaman onlara vurur ya da çevresindeki eşyalara zarar verir.	1	2	3	4
55. Genel olarak endişeli görünür.	1	2	3	4
56. Makul açıklamalar yapıldığında, söyleneni kabul eder.	1	2	3	4
57. Bakıcı annelerinin söylediklerine karşı çıkar.	1	2	3	4
58. Cezalandırıldığında (örneğin herhangi bir şeyden yoksun bırakıldığında) başkaldırır, karşı koyar.	1	2	3	4

## Appendix C

### Zihin Kuramı

#### 1. İçerik-Yanlı İnanış

**Materyaller:** Ön yüzünde görünür biçimde boya kalemleri resimleri olan standart bir boya kalemi kutusu. Kutunun içinden çıkacak bir yara bandı. Küçük bir erkek oyuncak bebek. Araştırmacı diğer materyalleri kaldırırken yeni materyalleri çıkarır: “Şimdi ben sana başka bir şey göstereceğim. Burada bir kalem kutusu var.”

Araştırmacı boya kalemi kutusunu çocuğun önüne koyar: “Sence bu kalem kutusunun içinde ne var?”

Bu soruya çocuğun “kalem” demesi için gerekirse yönlendirmede bulunulur. Örneğin birinci yönlendirmede araştırmacı “İçinde kalem olabilecek gibi mi görünüyor?” der. Çocuk yine de “kalem” demezse, ikinci yönlendirme yapılır, “Bu ne çeşit bir kutu? İçinde ne olmalı?” denir. Üçüncü yönlendirmede ise araştırmacı “Burada kalemler mi olmalı yoksa kitaplar mı?” diye sorar.

Çocuktan “kalem” cevabını aldıktan sonra araştırmacı heyecanla: “Hadi bakalım... Aaa içinde **bir yara bandı** varmış!”

Araştırmacı boya kalemi kutusunun içindeki yara bandını dışarı çıkarır ve çocuğun yara bandını gördüğünden emin olduktan sonra yara bandını tekrar boya kalemi kutusunun içine koyar ve kapağını kapatır.

Çocuğun boya kalemi kutusunun içinde yara bandı olduğunu öğrenip öğrenmediği kontrol edilir: “Peki... Ne vardı kutunun içinde?” (*kontrol sorusu*)

Eğer çocuk burada hata yaparsa, soruyu doğru yanıtlayana kadar kutunun içindeki yara bandı tekrar gösterilir.

Araştırmacı eline bebeği alır: “İşte Ahmet geldi (Ahmet’i gösterir). Ahmet bu boya kalemi kutusunun içini **daha önce hiç görmedi.**”

Sonra *hedef soruya* geçilir. Araştırmacı “Peki... Ahmet kutunun içinde ne olduğunu **düşünür?** Boya kalemi mi yoksa bir yara bandı mı?” diye sorar. Çocuk yanıtlamazsa soru tekrarlanır. Çocuğun cevabından sonra *hafıza sorusuna* geçilir. Araştırmacı “Ahmet bu kutunun içini **gördü mü?**” diye sorar.

**Puanlama:** Bu bölümdeki sorunun cevabının doğru olarak puanlanması için çocuğun *hedef soruyu* “boya kalemi” olarak ve *hafıza sorusunu* (görme hakkında olan son soru) “hayır” olarak yanıtlaması gerekmektedir.

## 2. Beklenmedik Değişiklik Testi

**Materyaller:** Hikayeyi anlatan bir görsel, 1 erkek bebek, 1 kız bebek

Bak bu Emre (erkek oyuncak bebek). (Görsel göstererek) Emre burada topuyla oynuyor. Oynaması bittikten sonra da topunu bu mavi kutuya (görsel işaret edilerek) koyup odadan çıkıyor. Daha sonra Damla (kız oyuncak bebek) gelir ve topu mavi kutudan alıp sarı kutuya koyar.

Çocuğun hikayeyi tam olarak anlayıp anlamadığına emin olmak için hikaye ile ilgili *hafıza sorusu* sorulur. Hikayenin anlaşıldığına emin olduktan sonra “Sence Emre odaya tekrar geldiğinde topunu bulmak için nereye bakacak? Mavi kutuya mı sarı kutuya mı?” (*hedef soru*) diye sorulur.

**Puanlama:** Bu bölümdeki sorunun cevabının doğru olarak puanlanması için çocuğun *hedef soruyu* “mavi kutu” olarak yanıtlaması gerekmektedir.

## Appendix D

### Yönetici İşlevler Değerlendirmeleri

#### 1. GECE-GÜNDÜZ TESTİ

**Araştırmacı:** ‘Şimdi çok acayip bir oyun oynayacağız seninle. Eğer ben sana “Gündüzün resmini göster” deseydim sen bana bu kartı gösterirdin, değil mi? Çünkü gündüz olduğunda güneş açar. Peki... ben sana “Bana gecenin resmini göster” deseydim, sen bu bana kartı gösterirdin, değil mi? Evet, çünkü gece gökyüzünde ay ve yıldızlar olur. Ama biz şimdi bunların tam tersini yapacağız. Ben ‘gece’ dediğimde, senin bana üzerinde güneş resmi olan bu kartı göstermeni istiyorum (araştırmacı elini gündüz resminin üstüne koyar ve bekletmeden geri çeker). Ben ‘gündüz’ dediğimde senin bana üzerinde ay resmi olan bu kartı göstermeni istiyorum (araştırmacı elini gece resminin üstüne koyar ve bekletmeden geri çeker). Haydi biraz alıştırmaya yapalım (gerçek denemelere geçmeden önce çocuğa iki tur yardımcı olunur).

Gerçek denemelere geçmeden önce yapılan alıştırmada denemelerinde çocuğa yanlış yaptıysa düzeltici yönerge verilmelidir: Örneğin, acayip bir oyun bu; gece deyince bunu göstereceksin, haydi bir deneme daha yapalım, ‘gece’.... Çocuk doğru yaptıysa övücü sözler söylenir: Örneğin ‘Aferin, gece dedim, sen gündüzü gösterdin’ gibi.

**Araştırmacı:** “Unutma, eğer ben gece dersem güneş kartını göstereceksin, gündüz dersem ay kartını göstereceksin. Kelimenin tam tersini gösteren karta işaret edeceksin. Bakalım sen bu acayip/tuhaf oyunu oynayabilecek misin? “

Gece - gece - gündüz - gece - gündüz ARA

Gece - gündüz - gündüz - gece - gündüz

**NOT:** Çocuğun her denemeden sonra elini kartlardan geri çekmesi, elini herhangi bir kartın üzerinde bırakmaması çok önemlidir. Bu konuda her deneme öncesi, gerektiğinde hatırlatma yapılır: Örneğin, ”Göster, sonra çek elini, tamam mı?” “Çek elini şimdi” gibi.

## 2. RİTİM TUTMA

**Araştırmacı:** “Şimdi başka bir oyuna geçelim. Bu kalemleri tıklatarak bir ritim oyunu oynayacağız. Öncelikle bu kalemlerden hangisini istersin?”

“Şimdi eğer masaya böyle bir kere tıklatırsam (tıklatır ve bitirince kalemi havada tutar), senin iki kere tıklatmanı istiyorum (Çocuğun doğru yapmasını sağlar). Aferin, aynen böyle” (Tebessüm).

“Eğer böyle iki kere tıklatırsam (iki defa tıklatır), senin sadece bir kere tıklatmanı istiyorum (Çocuğun doğru yapmasını sağlar). Aferin, aynen böyle” (Tebessüm).

İki kez tek ve çift tıklatma alıştırmaları yaparlar. Araştırmacı, çocuğun doğru yapmasına yardımcı olur, ona ne kadar iyi olduğu konusunda olumlu geribildirim verir, heyecan gösterir: “Harika! Sen bu oyunu nasıl oynayacağını biliyorsun. Haydi, şimdi gerçekten oynayalım.”

Bir İki İki Bir İki Bir

**Araştırmacı:** “Benimle çok güzel oynuyorsun hadi biraz daha oynayalım. Unutma ben bir kere tıklatınca sen iki kere, ben iki kere tıklatınca sen bir kere tıklatıyorsun.”

İki Bir Bir İki Bir İki

**Araştırmacı:** “Aferin... Hadi biraz daha zorlaştıralım bu oyunu. Bakalım daha zor bir ritmi oynayabilecek misin? Şimdi, eğer böyle bir kere tıklatırsam (tıklatır), senin sadece iki kere tıklatmanı istiyorum (Çocuğun doğru yapmasını sağlar), iki kere tıklatırsam (tıklatır) senin bir defa tıklatmanı istiyorum (Çocuğun doğru yapmasını sağlar), ama 3 kere tıklatırsam senin hiiiiiiç tıklatmanı istemiyorum. Hadi bir deneme yapalım. (Bir İki Üç deneme yaparlar). “Aferin, sen bu oyunu öğrenmişsin”.

Bir İki Üç İki Bir Üç

**Araştırmacı:** “Benimle çok güzel oynuyorsun hadi biraz daha oynayalım. Unutma ben bir kere tıklatınca sen iki kere, ben iki kere tıklatınca sen bir kere tıklatıyorsun, ben üç kere tıklatınca, sen hiç tıklatmıyorsun.”

Üç İki Bir İki Bir Üç

**Araştırmacı:** “Aferin çok güzel oynadın benimle.”

**NOT:** Çocuk eğer “Kaç tane vurdun hatırlamadım/anlamadım” derse “Olabilir, devam edelim” diyoruz; eğer “Kuralı hiç hatırlamıyorum” derse kuralı hatırlatıyoruz.