Research in Developmental Disabilities 85 (2019) 187–196

Contents lists available at ScienceDirect

Research in Developmental Disabilities

journal homepage: www.elsevier.com/locate/redevdis

# Daily living skills in children with autism spectrum disorder and intellectual disability: A comparative study from Turkey

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ARTICLE INFO

*Keywords:*
Daily living skills
Autism spectrum disorder
Intellectual disability
Children
Quality of life

ABSTRACT

*Background:* Better daily living skills (DLS) are associated with increased independence and positive functional outcomes in Autism Spectrum Disorder (ASD).
*Method:* The present study aimed to investigate daily living skills (DLS) and the associated factors in 51 children with ASD and intellectual disability (ASD group) and 51 age- and gender-matched controls with intellectual disability (ID group). The severity of the autistic symptoms was measured with the clinician-rated Childhood Autism Rating Scale and the parent-reported Autism Behavior Checklist (ABC) in all children. The mothers also completed the Pediatric Quality of Life Inventory and the Basic DLS Questionnaire.
*Results:* The ASD group scored lower than the comparison group in the total DLS score, personal hygiene, dressing, safety and interpersonal skills, despite being comparable in the parent-reported quality of life. Regression analysis of the whole sample demonstrated that the child's age, intellectual level, speech level, autism symptom severity and the monthly household income were independent correlates of the total DLS. Exploratory analyses for each group revealed differential effects of these variables: in the ASD group; a higher speech level and monthly income, while in the ID group; an older age, a higher intellectual level and monthly income and a lower ABC score emerged as significant predictors of higher DLS.
*Conclusions:* Deficient DLS in Turkish children with ASD, given their IQ, suggest that lower level of adaptive skills is inherent in ASD, rather than culture-specific to US and Western Europe.

## What this paper adds

Research on adaptive functioning and daily living skills in Autism Spectrum Disorder (ASD) have predominantly been undertaken in USA and other western countries, and very few is known for other parts of the world, including Turkey. The aims of the present study was to investigate the levels, and demographic and clinical correlates of daily living skills (DLS) in children with ASD in comparison to an age-, gender- and intellectual level- matched group of children with intellectual disability (ID). The ASD group scored lower in the total score, personal hygiene, dressing, safety and interpersonal skills of the DLS. In the whole sample older age, higher intellectual and speech levels, lower autism symptom severity and increased household income appeared as independent correlates of higher DLS levels. Separate analyses in the ASD group revealed that only household income and language level had

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https://doi.org/10.1016/j.ridd.2018.12.005
Received 25 July 2017; Received in revised form 10 December 2018; Accepted 10 December 2018
Available online 18 December 2018
0891-4222/ 

significant correlations with DLS. To our knowledge, this study is the first to report on positive relation between household income and DLS. In addition, our study confirmed previous western reports that many expected parameters did not have significant relation with DLS in the ASD. So interventions directly targeting the DLS are warranted in all children with ASD regardless of their age, level of intellectual deficit or severity of autistic symptoms.

## 1. Introduction

Adaptive functioning refers to how well a person meets the community standards of personal independence and social responsibility in comparison to others of a similar age and socio-cultural background (American Psychiatric Association, 2013). Although lower adaptive functioning is a defining aspect of intellectual disability (ID), many individuals with Autism Spectrum Disorder (ASD) also display difficulties in adaptive behaviour skills (Kanne et al., 2011).

### 1.1. Adaptive behaviour in ID

Adaptive behaviour includes those behaviours critical to living independently, including functional communication skills, social skills and daily living skills (e.g., dressing and grooming oneself). Adaptive skills proceed along a developmental trajectory, so they are found to be higher in older children (Loveland & Tunali-Kotoski, 1998). A positive relationship between intellectual level and adaptive behaviour has been demonstrated by most researchers, and stronger correlations were found in cases with more severe ID (De Bildt, Kraijer, Sytema, & Minderaa, 2005; De Bildt, Sytema, Kraijer, Sparrow, & Minderaa, 2005; Vig & Jedrysek, 1995). Additionally specific syndromes and behavioural or psychiatric problems play a role (De Bildt, Kraijer et al., 2005; De Bildt, Sytema et al., 2005). Different profiles of adaptive behaviour have been proposed for some genetic syndromes that are associated with the ID. For example, better socialization and communication skills, but weaker performances of daily living skills (DLS) were demonstrated for Williams Syndrome compared to developmentally matched children (Hahn, Fidler, & Hepburn, 2014), and a profile indicating a significant weakness in communication compared to the level of DLS and socialization skills has been reported for children with Down Syndrome (Dykens, Hodapp, & Evans, 2006).

### 1.2. Adaptive behaviour in ASD and comorbid ID

Individuals with ASD and higher intellectual functioning display higher levels of adaptive behaviour than those with lower intellectual functioning (Kanne et al., 2011; Liss et al., 2001). Additionally, studies have generally found that levels of adaptive skills increase with age (Hill, Gray, Kamps, & Varela, 2015; Levy & Perry, 2011). However, rate of acquisition of these skills is more attenuated among children with ASD than in their non-ASD peers, thus their deficits become more evident with age (Fenton et al., 2003; Gabriels, Ivers, Hill, Agnew, & McNeill, 2007).

A typical pattern of adaptive behaviour marked by significant deficits in socialization, intermediate deficits in communication and relative strength in DLS has been reported for individuals with ASD and comorbid ID (ASD + ID) (Carpentieri & Morgan, 1996; Kraijer, 2000). However, more recent studies have been unable to demonstrate this proposed “autism profile” (Fenton et al., 2003; Matthews et al., 2015; Mouga, Almeida, Cafe, Duque, & Oliveira, 2015) and found significant adaptive deficits in all domains.

Decreased levels of DLS were found in individuals with ASD + ID compared to heterogeneous groups of children and adolescents with ID (Ando, Yoshimura, & Wakabayashi, 1980; Mouga et al., 2015) as well as adults (Matson, Dempsey, & Fodstad, 2009; Matson, Rivet, Fodstad, Dempsey, & Boisjoli, 2009). In addition, Matson, Dempsey et al. (2009) reported that adults with ASD and ID had lower scores in the tasks of dressing, grooming and hygiene but similar scores in the tasks of bathing, housekeeping and meal preparation than individuals with severe ID. Deficits in DLS may be recognized at early ages (Jasmin et al., 2009), and individuals with ASD fall further behind than their peers as they get older (Green & Carter, 2014; Smith, Maenner, & Seltzer, 2012).

### 1.3. Implications of DLS on outcome

Living a safe, productive and independent life is one of the major concerns for parents of children with disabilities (Bilgin & Kucuk, 2010; Shipley-Benamou, Lutzker, & Taubman, 2002), and the ability to independently perform DLS can contribute to a person’s meaningful participation in society and to their overall quality of life (Carnahan, Hume, Clarke, & Borders, 2009). DLS such as personal hygiene, dressing, meal preparation, completing household chores, following safety rules and money management are important prerequisites for self-sufficiency and autonomy (Sparrow, Cicchetti, & Balla, 2005). Research has shown that youths with disabilities who are able to independently perform feeding and dressing skills are more likely to be engaged in post-secondary education, work, or preparation for work, after high school than youths with less developed skills (Wagner, Newman, Cameto, Garza, & Levine, 2005). Likewise, enhanced DLS are associated with increased independence and sustained community employment for individuals with ASD and co-occurring ID (Chan et al., 2017). Furthermore, as a result of limited DLS, children and adolescents increasingly rely on others for support, which comes primarily from their family members. Recent studies have found that poorer DLS has emerged as a significant predictor of both lower levels of family quality of life (Gardiner & Iarocci, 2015) and higher levels of parental distress (Tomanik, Harris, & Hawkins, 2004). Further, gains in the DLS of children are associated with a decrease in parenting stress, above and beyond the children’s developmental level, autism symptom severity and problem behaviours (Green & Carter, 2014).

Despite the fact that deficits in DLS are common in ASD and that these skills are predictive of both current and later functioning of

children and their families, research to date has focused more heavily on social and communication skills (Jasmin et al., 2009). In addition, excluding very few instances (Malhi & Singhi, 2015; Poon, 2011), research on adaptive functioning and DLS in ASD have predominantly been performed in the USA or other western countries, and very little is known regarding other parts of the world, including Turkey.

### 1.4. Educational services for individuals with ASD in Turkey

Turkey is increasingly investing more resources into the needs and education of children with disabilities; however, the amount and quality of support are far from adequate for children with ASD. Studies have suggested that behavioural intervention programmes, with frequencies of at least 20 h per week, are needed to achieve improvements in cognitive and functional domains during the preschool period (Weinmann et al., 2009). In Turkey, state-paid interventions comprise weekly two-hour individualised and one-hour group education sessions for individuals with ASD and/or ID. Depending on their functional level, children with ASD can also attend mainstream schools/classes with some extra support, as well as special schools or classes for children with ASD or ID. There is a shortage of special education teachers and related experts (e.g., behaviour analysts, speech and language pathologists), and special education teachers with bachelor's degrees generally start to work immediately after they have completed their undergraduate studies without obtaining further specialization in ASD.

Although Turkish parents have reported that their most important expectation for the future is their child's ability to take care of himself or herself independently (Koydemir-Özden & Tosun, 2010), DLS are rarely highlighted during special education. For example, only two mothers out of 50 reported that they had received some education in teaching self-help skills to their children (aged between 2 and 12 years of age) with ASD (Selimoğlu, Özdemir, Töret, & Özkubat, 2014). Another study revealed that parents never had a conversation with special education teachers about safety skills instruction, and neither parents nor teachers had enough knowledge or experience for teaching safety skills (Sirin & Tekin-Iftar, 2016). The inadequate teaching of DLS to children with ASD may partially be related to the heavier emphasis on social and communication skills and a lack of availability of standardized scales for adaptive skills in Turkish.

Most DLS tend to be relatively explicit and concrete, and they may be easier to learn for children with ASD (Hume, Loftin, & Lantz, 2009). Several strategies (e.g., prompting, modelling, reinforcement, shaping, and chaining) and various interventions (e.g., video modelling, behavioural in vivo procedures, visual cues, and audio cueing) have been shown to be effective in teaching DLS to individuals with ASD (Ninci et al., 2015). These interventions have demonstrated moderate to strong effect sizes for improving various types of DLS (i.e., self-help, housing chores, employment skills and community access), in different age groups (i.e., preschool children, school-age children and adolescents), different mental levels (i.e., with and without ID), various settings (i.e., home, school, employment and community) and through different implementers (i.e., parent, teacher, and researcher) (Ninci et al., 2015). These kinds of interventions may be of critical importance, especially for countries with limited financial resources like Turkey.

### 1.5. Aims of the study

The primary aim of the current study was to compare the DLS of children and adolescents with ASD and ID (ASD group) to their non-ASD peers with ID (ID group). The ID group was included in order to control for the intellectual level in the ASD group. We also investigated the correlates of DLS in the groups. We expected that the participants with ASD would generally score lower on measures of DLS. In addition, the level of DLS would be higher in the older participants with higher verbal and intellectual skills and milder levels of ASD symptoms.

## 2. Methods

### 2.1. Participants

The participants in this study were 51 children with ASD and 51 age- and gender-matched controls with ID, who were being followed in the outpatient clinic of the Child and Adolescent Psychiatry Department, Istanbul Faculty of Medicine. The inclusion criteria of the study were: a) children aged between 6–18 years old, b) children having a confirmed diagnosis of a mild, moderate or severe ID, c) parents giving informed consent for their child to participate in the study d) parents being able to read, understand and fill in the forms properly, and e) The ASD group was also required to have a confirmed diagnosis of ASD according to the DSM-IV-TR (American Psychiatric Association, 2000) criteria. Each group included 15 girls and 36 boys with a male/female ratio that is typical of ASD in the literature (Lai, Lombardo, & Baron-Cohen, 2014).

### 2.2. Procedure

All the children underwent a detailed assessment of the diagnostic evaluation of ASD and ID that was conducted by the certified and experienced child and adolescent psychiatrists. The diagnoses were based on the criteria outlined in the DSM-IV-TR rather than in the DSM-5 because a) the DSM-5 missed the diagnoses of 19.3% of Turkish children with the DSM-IV-TR-based pervasive developmental disorders (Yaylaci & Miral, 2017) b) this is the only published Turkish study on individuals with DSM-5-based ASD, and there is no study that included persons with DSM-5-based ID, so the use of the DSM-IV-TR criteria would increase the comparability of our study with previous ones, and c) two scales that were used in this study to evaluate the ASD symptom severity were standardized

according to the DSM-IV-TR. The diagnostic process included examining the child, interviewing their parents, and reviewing all the relevant information, including medical and psychiatric reports.

The diagnosis of ID included significantly subaverage intellectual functioning (IQ test score below 70) and deficits or impairments in two areas of adaptive functioning. The level of intelligence was determined through evaluations that were conducted by licensed psychologists who used standardized measures of cognitive ability [i.e., the Wechsler Intelligence Scales for Children-Revised (Savasir & Sahin, 1995; Wechsler, 1974) and the Stanford-Binet Intelligence Scale-Third revision (Terman & Merrill, 1960; Uğurel-Şemin, 1987)] and behavioural observations. Because there is no standardized tool for the assessment of adaptive functioning in Turkish children, the deficits in adaptive functioning were evaluated via parent and child interviews, in addition to their school reports. The severity of the autistic symptoms was rated using the Childhood Autism Rating Scale (Schopler, Reichler, Devellis, & Daly, 1980).

The parents also provided detailed information on demographics and the developmental, medical, clinical and family history of each child and also completed the relevant questionnaires. The speech of each child was determined by direct observation and parental description in five levels: a) non-verbal, b) uses words but no phrasal speech exists, c) uses phrasal speech with 2–3 words, d) have spontaneous but sometimes incoherent speech and, e) has spontaneous and reciprocal conversation with others.

### 2.3. Measures

#### 2.3.1. The Childhood Autism Rating Scale (CARS)

The Childhood Autism Rating Scale (CARS) is a 15-item clinical interview designed to help differentiate children with autism from those with other developmental disabilities (Schopler et al., 1980). The total score range is between 15 and 60, and a score over 29 is considered in the autistic range. The Turkish adaptation was conducted (Sucuoglu, Oktem, Akkok, & Gokler, 1996) and it was reported to be a valid and reliable (Incekas Gassaloglu, Baykara, Avcil, & Demiral, 2016). The CARS is currently the only validated clinical interview for measuring the severity of autistic symptoms in Turkey (Kara et al., 2014).

#### 2.3.2. The Autism Behavior Checklist (ABC)

The Autism Behavior Checklist (ABC) consists of 57 behaviours that are noted more commonly in children with autism than in children with other disabilities (Krug, Arick, & Almond, 1980). This parent-report tool includes five subscales (i.e., sensory, relating, body and object use, language skills, social/self-help) and a total score. A total score of 67 or above was considered to indicate autism with high probability and scores in the range of 53–67 are considered to indicate 'questionable' autism. The reliability and validity of the scale were found to be satisfactory for Turkish children aged between 3–15 years old (Irmak, Sütçü, Aydın, & Sorias, 2007).

#### 2.3.3. The Basic Daily Living Skills (BDLS) questionnaire

The Basic Daily Living Skills (BDLS) Questionnaire was developed by the authors via examination of the Turkish educational curriculum for children with ASD (Milli Egitim Bakanligi, 2008, 2013) and the Waisman Activities of Daily Living Scale (W-ADL; Maenner et al., 2013).

The W-ADL was used to measure the activities of daily living in adolescents and adults with developmental disabilities. It contains 17 activities, and each is rated on a three-point scale. In this study, some of the items of the W-ADL, such as "doing home repairs", "doing laundry, washing and drying" or "banking and managing daily finances" were removed as children, especially with developmental disabilities, are not usually required to do these themselves. Some of the items in the W-ADL were changed to easier tasks (e.g., "Doing errands, including shopping in stores" was changed to "Shopping at a familiar grocery store or school-canteen"). We also divided some of the items of the W-ADL (e.g., Item 7 "Grooming, brushing teeth, combing and/or brushing hair" is divided into two items "Brushing teeth" and "Combing hair") into separate items, as one child may be able to do one task but may not be able to do the other.

After consultation with professionals who work with children with ASD and ID regarding the items, a pilot study was conducted with 10 parents to assess whether they understood the items correctly, and then some modifications were made accordingly. The final scale consisted of 27 statements covering personal hygiene (six items), dressing skills (six items), mealtime skills (three items), safety skills (three items), household chores (five items) and interpersonal skills (four items). For a list of the items, see Supplementary

**Table 1**
Comparison of the groups for the demographic characteristics.

| | ASD Group ($N$ = 51) Mean *(SD)* | ID Group ($N$ = 51) Mean *(SD)* | $p$ |
|---|---|---|---|
| Child age | 10.48 (3.75) | 11.65 (3.33) | 0.08 |
| Mother's age | 37.16 (6.60) | 38.32 (5.48) | 0.18 |
| Mother's education (years) | 6.50 (3.44) | 5.40 (2.78) | 0.11 |
| Father's age | 40.53 (6.76) | 41.76 (5.78) | 0.14 |
| Father's education (years) | 8.08 (3.71) | 6.88 (3.32) | 0.12 |
| Monthly Income (Lira) | 1656.86 (837.91) | 1442.40 (699.99) | 0.35 |
| Number of children | 2.20 (0.94) | 2.65 (1.21) | 0.036 |

ASD: Autism spectrum disorders; ID: Intellectual disability.

Table 1. The parents rated the items on a three-point scale of independence as follows: 0 = does not perform the task at all, 1 = performs the task with help or 2 = performs the task independently. The internal consistency of the total score was 0.94. Cronbach's $\alpha$ values of the subscales were as follows: hygiene = 0.88, dressing = 0.89, mealtime = 0.66, safety = 0.71, chores = 0.84, interpersonal = 0.74. The test–retest stability after 21 days was estimated in 33 children (25 males and 8 females, with mild (n = 15), moderate (n = 15), severe (n = 3) ID and mean age = 10.67 years, SD = 3.47), and the correlation coefficients were found to be moderate to high (total score: $r = 0.91$, $p < 0.001$; hygiene: $r = 0.77$, $p < 0.001$; dressing: $r = 0.83$, $p < 0.001$; mealtime: $r = 0.69$, $p = 0.001$; safety: $r = 0.76$, $p < 0.001$; chores: $r = 0.80$, $p = 0.001$ and interpersonal skills: $r = 0.91$, $p < 0.001$).

#### 2.3.4. The Pediatric Quality of Life Inventory (PedsQL)

The Pediatric Quality of Life Inventory (PedsQL) was developed for assessing the health-related quality of life of children and adolescents (Varni, Burwinkle, Seid, & Skarr, 2003). This scale examines four different areas of functioning: physical, emotional, social, and school-related and the latter three are combined to determine a broad psychosocial health summary score. A score between 0–100 was obtained and the higher the score, the better the functioning. The Turkish version of the parent-proxy form for ages 8–12 was used in this study (Memik, Ağaoğlu, Coşkun, & Karakaya, 2008).

### 2.4. Ethics

The study was approved by the Research Ethics Committee of the Istanbul Faculty of Medicine, Istanbul University (Approval No: 2014-621) and all the parents gave written informed consent.

### 2.5. Statistical analysis

The statistical analysis was performed using SPSS v.23.0, and a two-tailed $p \leq 0.05$ was accepted as the level of statistical significance for all tests. After the descriptive statistics were calculated, the ASD and ID groups were compared in terms of the demographic and clinical variables. The categorical variables were analysed using chi-square tests. Independent t-tests and Mann-Whitney U tests were conducted for the parametric and nonparametric data, respectively. In our study, we found that the ASD group had significantly lower levels of daily speech skills. Previous studies have found that communications skills are associated with DLS, so we carried out a one-way analysis of covariance (ANCOVA) to adjust the effects of speech on the groups' BDLS scores.

The effect of the demographic and clinical variables on the total BDLS scores of all the participants was investigated through hierarchical multiple regression. After univariate analyses, including independent sample t-test, the Mann-Whitney U test, and bivariate correlations (via Pearson or Spearman correlation tests), the variables associated with the level of the DLS were analysed after controlling for the influence of the demographic variables. $R^2$ was used as an expression of the explained variance.

## 3. Results

### 3.1. Demographic and clinical variables

The groups did not differ in terms of the average child and parental ages, parental education, or in monthly family income (Table 1). However, the number of children in the house was significantly lower in the ASD group ($p = 0.036$). Spearman correlation analyses revealed significant correlations of number of children with maternal age (r = 0.20, p = 0.05), and maternal education in years (r = −0.25, p = 0.014). All the children, except one child in the ASD group, were living in two-parent families. Only two (4%) and five (10%) mothers were currently working in paid jobs in the ASD and ID groups, respectively. The mothers were the predominant caregivers, and only six mothers in the ASD group and five in the ID group reported getting significant help from others. All the fathers in the ASD group were employed, whereas three (6%) fathers in the ID group were unemployed.

Forty (78%) and thirty-three (66%) participants in the ASD and ID groups were using psychotropic medications, respectively. In the ASD group, 16 (31%) children received monotherapy (antipsychotics in eight [15%], stimulants in four [8%] and anti-epileptics in four [8%]) and 24 (47%) used combination therapy. In total, 30 (59%) of them used antipsychotics, 10 (20%) used stimulants, eight (16%) used atomoxetine, eight (16%) used anti-epileptics, and seven (14%) used antidepressants. In the ID group, 15 (30%) children received monotherapy (stimulants in eight [16%], antipsychotics in four [8%], anti-epileptics in two [4%] and antidepressants in one [2%]) and 18 (36%) used combination therapy. In total, the current medication use of the ID group included 17 (33%) children using antipsychotics, 15 (29%) using stimulants, 12 (24%) using anti-epileptics, six (12%) using antidepressants, and four (8%) using atomoxetine. The groups were comparable in terms of the rates of medication use, comorbid epilepsy and ADHD (Table 2).

The groups did not differ with respect to their intellectual level or the attainment of major physical milestones such as head-holding, sitting, or walking without support. However, there was a statistically significant difference for the attainment of first words and in the use of two-word-sentences, both of which were delayed in the ASD group ($M = 35.98$ [$SD = 30.85$] vs. $M = 20.60$ [$SD = 13.99$], and $M = 58.14$ [$SD = 30.54$] vs. $M = 45.98$ [$SD = 29.65$] months). There was also a statistically significant difference between the groups in terms of speech level, CARS scores and the ABC total and subscale scores. Physical and psychosocial functioning of the groups with PedsQL was similar (Table 2).

**Table 2**
Comparison of the groups for clinical variables and daily living skills scores.

| | ASD Group ($N$ = 51) | ID Group ($N$ = 51) | $p$ |
|---|---|---|---|
| IQ Level *n*, (%) | | | 0.64 |
| Mild | 20 (39.2) | 20 (39) | |
| Moderate | 23 (45.1) | 26 (51) | |
| Severe | 8 (15.7) | 5 (10) | |
| Epilepsy positive *n*, (%) | 8 (16) | 13 (26) | 0.33 |
| ADHD positive *n*, (%) | 22 (43) | 26 (51) | 0.43 |
| Current medication use *n*, (%) | 40 (79) | 33 (65) | 0.19 |
| Level of Speech *n*, (%) | | | 0.002 |
| Non-verbal | 6 (12) | 3 (6) | |
| Words exist but no phrasal speech | 15 (29) | 3 (6) | |
| Phrasal speech with 2–3 words | 20 (39) | 27 (53) | |
| Spontaneous but sometimes incoherent speech | 8 (16) | 6 (12) | |
| Spontaneous, reciprocal conversation | 2 (4) | 12 (24) | |
| Childhood Autism Rating Scale, mean (*SD*) | 38.32 (5.62) | 23.61 (2.73) | < 0.001 |
| Autism Behavior Checklist, mean (*SD*) | | | |
| ABC Total | 67.11 (28.74) | 30.69 (25.61) | < 0.001 |
| ABC Sensory | 7.98 (5.51) | 3.61 (4.59) | < 0.001 |
| ABC Relating | 16.31 (10.20) | 6.59 (6.36) | < 0.001 |
| ABC Body/Object use | 14.34 (8.19) | 6.00 (6.60) | < 0.001 |
| ABC Social/Self help | 14.23 (6.02) | 8.51 (6.18) | < 0.001 |
| ABC Language | 13.72 (6.73) | 6.14 (6.62) | < 0.001 |
| PedsQL 4.0, mean (*SD*) | | | |
| Total Score | 56.62 (11.47) | 56.62 (13.26) | 0.73 |
| Physical functioning | 61.25 (18.53) | 62.26 (21.49) | 0.80 |
| Emotional functioning | 64.04 (16.60) | 70 (19.34) | 0.056 |
| Social Functioning | 44.12 (21.25) | 44.00 (21.26) | 0.98 |
| School Functioning | 53.07 (16.26) | 46.73 (12.89) | 0.08 |
| Psychosocial Functioning | 54.30 (11.93) | 53.55 (12.23) | 0.85 |
| Daily living skills, mean (*SD*) | | | |
| Personal Hygiene (0–12) | 6.63 (3.30) | 9.24 (2.87) | < 0.001 |
| Dressing skills (0–12) | 7.29 (3.72) | 8.96 (2.92) | 0.02 |
| Mealtime skills (0–6) | 4.84 (1.49) | 5.20 (1.25) | 0.084 |
| Safety skills (0–6) | 2.59 (1.87) | 3.65 (1.80) | 0.004 |
| Household chores (0–10) | 4.02 (2.77) | 5.06 (3.52) | 0.134 |
| Interpersonal skills (0–8) | 2.96 (2.20) | 5.53 (2.17) | < 0.001 |
| Total Daily Living Skills (0–54) | 28.33 (12.52) | 37.63 (11.31) | < 0.001 |

ADHD: Attention deficit hyperactivity disorder, PedsQL 4.0: The Pediatric Quality of Life Inventory 4.0, ABC: Autism Behavior Checklist.

### 3.2. Daily living skills

The ASD group scored significantly lower than the ID-matched controls in the total DLS skills, and this difference persisted even after controlling for the effect of speech ($F(1, 99) = 7.03$, $p = 0.003$). The mean scores of the ASD group were lower in personal hygiene, dressing, safety and interpersonal skills (Table 2). The specific skills that were more deficient in the ASD group were washing hands/face (p = 0.003), brushing teeth (p = 0.003), combing hair (p = 0.006), toileting to appropriate places (p = 0.005), cleaning after defecation ($p < 0.001$), bathing (p = 0.009), putting shoes on (p = 0.048), doing simple housework (p = 0.025), folding clothes (p = 0.013), asking help from adults (p = 0.003), shopping from a familiar market or school-canteen ($p < 0.001$), telling his/her address or parent's phone-number when needed (p = 0.001) and answering phone ($p < 0.001$).

The univariate analyses of the total DLS scores of the whole sample (N = 102) correlated with the child's age ($p = 0.001$; $r = 0.34$), as well as with the maternal age ($p = 0.007$; $r = 0.27$), paternal age ($p < 0.001$; $r = 0.37$), monthly income ($p = 0.02$; $r = 0.23$), ABC score ($p < 0.001$, $r = -0.58$), CARS score ($p < 0.001$, $r = -0.41$), the QoL score ($p = 0.002$, $r = 0.31$), intellectual level ($p = 0.008$, $r = 0.26$) and current verbal ability ($p < 0.001$, $r = 0.49$).

Hierarchical multiple regression was conducted with the whole sample in order to assess the contribution of the above clinical variables on the total DLS score, after controlling for the influence of associated demographic variables. Because the CARS score was highly associated with both the group assignments (ASD group; $p < 0.001$, $r = 0.87$) and the ABC score ($p < 0.001$, $r = 0.67$) and violated the assumption of multicollinearity (Variance inflation factor = 10.48), it was removed from the analysis.

Multiple regression was performed in three steps. The first model, in which the ages of the children and the parents as well as monthly income were entered, was statistically significant and accounted for 17% of the variance in the DLS score ($F(4, 92) = 4.71$; $p = 0.002$).The second model, with the addition of the group assignment and the ABC scores, was also statistically significant ($R^2 = 0.48$, $F(6,90) = 13.94$, $p < 0.001$) and accounted for an additional 31.2% of the variance in the DLS score above and beyond

**Table 3**
Hierarchical multiple regression analysis predicting daily living skills from demographic and clinical variables.

| Variable | *B* | *SE B* | *ß* | *p* |
|---|---|---|---|---|
| Step 1 | | | | |
| Constant | 8.66 | 8.39 | | 0.31 |
| Child Age | 0.80 | 0.43 | 0.22 | 0.07 |
| Mother Age | −0.44 | 0.38 | −0.21 | 0.24 |
| Father Age | 0.62 | 0.38 | 0.31 | 0.10 |
| Monthly Income | 0.004 | 0.002 | 0.26 | 0.01 |
| Step 2 | | | | |
| Constant | 24.67 | 8.81 | | 0.06 |
| Child Age | 0.87 | 0.35 | 0.24 | 0.015 |
| Mother Age | −0.46 | 0.30 | −0.22 | 0.13 |
| Father Age | 0.35 | 0.31 | 0.17 | 0.26 |
| Monthly Income | 0.005 | 0.001 | 0.33 | < 0.001 |
| ASD diagnosis | 2.08 | 2.38 | 0.08 | 0.39 |
| ABC Score | −0.21 | 0.04 | −0.53 | < 0.001 |
| Step 3 | | | | |
| Constant | −3.35 | 11.22 | | 0.77 |
| Child Age | 1.05 | 0.34 | 0.29 | 0.003 |
| Mother Age | −0.43 | 0.27 | −0.20 | 0.12 |
| Father Age | 0.35 | 0.28 | 0.17 | 0.21 |
| Monthly Income | 0.005 | 0.001 | 0.28 | < 0.001 |
| ASD diagnosis | 2.04 | 2.29 | 0.08 | 0.38 |
| ABC Score | −0.14 | 0.04 | −0.37 | < 0.001 |
| Speech level | 2.31 | 0.91 | 0.20 | 0.013 |
| Intellectual level | 3.69 | 1.50 | 0.20 | 0.016 |
| PedsQL total score | 0.14 | 0.08 | 0.13 | 0.10 |

Note. $R^2 = 0.170$ for Step 1, $R^2 = 0.482$ for Step 2, $R^2 = 0.586$ for Step 3.
ABC: Autism Behavior Checklist, PedsQL: Pediatric Quality of Life Inventory.

model 1 ($\Delta F(2, 90) = 27.06$, $p < 0.001$). The third model, which added the speech and IQ levels and also the Peds QL scores, was statistically significant ($R^2 = 0.59$, $F(9, 87) = 13.66$ $p < 0.001$); inclusion of these variables accounted for an additional 10.4% of the variance in the DLS score beyond model 2 ($\Delta F(3, 87) = 7.27$, $p < 0.001$). Within model 3, five of the variables made statistically significant contributions to the DLS score: the ABC score ($\beta = -0.37$, $p < 0.001$), the child's age ($\beta = 0.29$, $p = 0.003$), monthly income ($\beta = 0.28$, $p < 0.001$), intellectual level ($\beta = 0.20$, $p = 0.016$) and speech level ($\beta = 0.20$, $p = 0.013$). See Table 3 for a summary of the model at each step.

### 3.3. Exploratory analysis

We first examined the effect of clinician-rated ASD severity on DLS, and entered the CARS score (instead of the ASD diagnosis and ABC score) in the second step. The whole model explained 52% of the variance (the second step explained 21.4% ($R^2 = 0.384$, $F(5,76) = 9.49$, $p < 0.001$) and the third step explained 13.5% ($R^2 = 0.52$, $F(8,73) = 9.87$, $p < 0.001$). The variables that exerted a statistically significant effect were the child's age ($\beta = 0.34$, $p = 0.004$), the CARS score ($\beta = -0.29$, $p = 0.003$), the quality of life score ($\beta = 0.25$, $p = 0.004$) and monthly income ($\beta = 0.25$, $p = 0.005$).

Second, we investigated the effects of the child's age, monthly income, the ABC score, the intellectual level, and the speech level on the DLS score with separate independent standard linear regressions within each group. Due to the small sample size of each group, an adjusted $R^2$ is reported to provide a better estimate of the explained variance for the true population (Pallant, 2010). In the ASD group, the above five parameters explained 41% of the variance in the total DLS score ($F(5, 41) = 7.32$, $p < 0.001$). In the final model, the two measures that were statistically significant were the speech level ($\beta = 0.47$, $p = 0.001$) and monthly income ($\beta = 0.27$, $p = 0.024$). In the ID group, these five parameters explained 64% of the variance in the total DLS score ($F(5,44) = 18.11$, $p < 0.001$). In the final model, the four measures that were statistically significant were the ABC score ($\beta = -0.52$, $p < 0.001$), the child's age ($\beta = 0.45$, $p < 0.001$), monthly income ($\beta = 0.28$, $p = 0.003$) and the intellectual level of the child ($\beta = 0.28$, $p = 0.005$).

## 4. Discussion

The present study investigated the levels and correlates of basic DLS in a clinical population of children with ASD and ID. The ASD group scored lower in several DLS domains in comparison to children at similar intellectual levels. The age, intellectual level and speech level of the child, as well as the autism symptom severity and the monthly income of the household, were identified as independent correlates of DLS.

In this study, children with ASD scored lower than the ID group in personal hygiene, dressing skills, safety skills and interpersonal skills, but were similar in mealtime skills and household chores. Matson et al. also found a similar pattern of the deficits in adults with

ASD compared to those with severe ID (Matson, Dempsey et al., 2009; Matson, Rivet et al., 2009). Deficits in the DLS of children and adolescents with ASD + ID compared with the IQ-matched controls were also reported in a recent study (Mouga et al., 2015).

Families of children with ASD and/or ID often face financial problems to meet the additional needs of a person with a chronic disability. In addition, because one parent may be responsible for the care of the child, that parent may have to stop working, which results in a lack of income. In Turkey, almost half (48%) of the families of children with developmental disabilities (i.e., cerebral palsy, ID, ASD) have reported that they have financial difficulties (Sen & Yurtsever, 2007), and around half (49%) of the mothers of children with ASD report that low income is a source of distress (Bilgin & Kucuk, 2010). Monthly income in the household was demonstrated in the present study to be a significant correlate of DLS in both groups. Our finding is in line with those of Del Cole, Caetano, Ribeiro, Kummer, and Jackowski (2017), who found that being from a lower socio-economic level (i.e., in terms of the income and education level) was associated with less developed DLS in adolescents with ASD, Williams syndrome, and Down syndrome. In all three groups, those with a lower socioeconomic status had DLS scores approximately 25% lower than those from higher classes (Del Cole et al., 2017). Additionally, Chan et al. (2017) found that more independent living skills and higher family income predict a greater likelihood of sustaining community employment in young adults with ASD and ID. Individuals from families with a lower income may have limited access to services (Shattuck, Wagner, Narendorf, Sterzing, & Hensley, 2011) that could likely result in better DLS. Additionally, socioeconomic variables were found to be risk factors for parental well-being, which might affect both teaching and reporting of the parents on the DLS of their children (Olsson & Hwang, 2008). There is also a conflicting report that found that living in a more advantaged area predicted poorer self-care skills 16–17 years later (Gray et al., 2014), so future studies should address family variables, such as socioeconomic status, and investigate how these variables play a role in the acquisition and reporting of DLS in individuals with ASD.

Speech level was found to be associated with the level of DLS, especially in the ASD group. Previous studies have supported the importance of language skills for DLS. Verbal memory and language levels (Liss et al., 2001) and receptive communication skills (Park, Yelland, Taffe, & Gray, 2012) have been found to be correlated with the level of DLS in children with ASD. The significant and strong relation between speech level and DLS in this study suggests that these children would benefit more than those with ID from interventions supporting the development of communication skills. Contrary to our expectations, variables such as the age, intellectual level, and autism symptom severity did not help much to predict DLS levels in the ASD group. This finding is also in line with a recent study, which found that these variables had less than 10% in predicting DLS deficit in adolescents (Duncan & Bishop, 2015). Interventions directly targeting the development of DLS are warranted in many cases of ASD, regardless of their age, intellectual level or ASD symptom severity.

Another interesting finding of the present study was the families' having fewer children in the ASD group. Additionally, number of children also had significant correlations with lower maternal age and higher maternal education. A negative correlation between educational status and number of children has been previously reported in Turkey (Baksu, Gunes, Aki, Tuysuz, & Goker, 2005). Additionally, parents often stop planning on having another child once learn they have an autistic child. A study from Japan showed that over one-half of the mothers of children with ASD reported hesitation about second children on account of worries about uncertainty of ASD and perception of recurrence risk, burden on later-born children, and negative effects on a child with ASD (Kimura, Yamazaki, Mochizuki, & Omiya, 2010). A similar trend may also be seen in the ID group. Future studies should investigate which factors affect the families' childbearing preferences, and whether any significant differences exist in families of children with ASD or ID.

Our study had several strengths, such as being the first report from Turkey on DLS in ASD, the uniquely focus on children and adolescents with ASD and ID, and the use of a control group of children and adolescents with ID only. However, several limitations warrant mentioning when considering our results. First, the use of a non-standardized scale for the assessment of the DLS makes it difficult to interpret the findings of the study. On the other hand, no standard tool for the assessment of DLS (e.g., Vineland Adaptive Behavior Scales) is available in Turkish, and Basic DLS Questionnaire used in this study was developed by the researchers and demonstrated acceptable internal and test-retest reliability. Additional testing should be done to determine if the DLS domain items of the BDLS are appropriate and cluster within these domains with a larger sample. Second, the samples were recruited from a clinical population; most of them were using psychotropic medications, so they may have been more disabled relative to population-based samples. Third, we had no inter-rater reliability for the children's diagnoses. However, all the diagnoses were confirmed by experienced clinicians after extensive clinical assessments at the time of the study. Another limitation is the lack of a diagnostic assessment with tools such as the Autism Diagnostic Interview-Revised and the Autism Diagnostic Observation Schedule. Instead, we used CARS in the absence of more validated instruments for the Turkish population. Further, the effects of other co-occurring psychiatric conditions and the variety of educational and behavioural interventions in which the children were involved were not assessed in this study. Future research should more systematically investigate the effects of these factors, preferably in longitudinal designs, in order to address the best way to improve the poor living skills of individuals with ASD.

The results of this study have significant implications for both clinical and research contexts that highlight the need of focusing on the DLS of children with ASD and ID. First, we demonstrated some preliminary evidence regarding the reliability of the BDLS being used as a practical tool in children with ASD and ID. However, further studies are needed to justify the use of the BDLS as a standard measure of DLS in this population. Second, our assessment of DLS depended solely on the parental reports, which were predominantly completed by the mothers. Mothers are generally the primary caregivers of these children and provide important information; however, their perception of their children's skills and their role in the development of these skills might be affected by personal and social factors, such as the levels of anxiety, depression, burnout and social support. Future studies should investigate these factors and confirm our findings from different proxy-reports, such as fathers or special education teachers.

In conclusion, deficient DLS in children with ASD, given their IQ, was also demonstrated in Turkey. This suggests that lower level

of adaptive skills is inherent in ASD, rather than culture-specific to US and Western Europe. The use and dissemination of effective interventions that address improving DLS especially in personal hygiene, dressing, safety and interpersonal skills of children with ASD are of critical importance.

## Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

## Conflict of interests

None.

## Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.ridd.2018.12.005.

## References

American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders.* Washington, DC: American Psychiatric Association.
American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders.* Arlington, VA: American Psychiatric Publishing.
Ando, H., Yoshimura, I., & Wakabayashi, S. (1980). Effects of age on adaptive behavior levels and academic skill levels in autistic and mentally retarded children. *Journal of Autism and Developmental Disorders, 10*, 173–184.
Baksu, A., Gunes, G., Aki, G., Tuysuz, F., & Goker, N. (2005). Change in contraceptive choices and the effect of education on use of contraception at the family planning clinic of Şişli Etfal Training and Research Hospital, Istanbul, Turkey. *European Journal of Contraception & Reproductive Health Care, 10*, 98–104.
Bilgin, H., & Kucuk, L. (2010). Raising an autistic child: Perspectives from Turkish mothers. *Journal of Child and Adolescent Psychiatric Nursing, 23*, 92–99.
Carnahan, C. R., Hume, K., Clarke, L., & Borders, C. (2009). Using structured work systems to promote independence and engagement for students with autism spectrum disorders. *Teaching Exceptional Children, 41*, 6–14.
Carpentieri, S., & Morgan, S. B. (1996). Adaptive and intellectual functioning in autistic and nonautistic retarded children. *Journal of Autism and Developmental Disorders, 26*, 611–620.
Chan, W., Smith, L. E., Hong, J., Greenberg, J. S., Lounds Taylor, J., & Mailick, M. R. (2017). Factors associated with sustained community employment among adults with autism and co-occurring intellectual disability. *Autism*. https://doi.org/10.1177/1362361317703760.
De Bildt, A., Kraijer, D., Sytema, S., & Minderaa, R. (2005). The psychometric properties of the vineland adaptive behavior scales in children and adolescents with mental retardation. *Journal of Autism and Developmental Disorders, 35*, 53–62.
De Bildt, A., Sytema, S., Kraijer, D., Sparrow, S., & Minderaa, R. (2005). Adaptive functioning and behaviour problems in relation to level of education in children and adolescents with intellectual disability. *Journal of Intellectual Disability Research, 49*, 672–681.
Del Cole, C. G., Caetano, S. C., Ribeiro, W., Kummer, A., & Jackowski, A. P. (2017). Adolescent adaptive behavior profiles in Williams-Beuren syndrome, down syndrome, and autism spectrum disorder. *Child and Adolescent Psychiatry and Mental Health, 11*, 40.
Duncan, A. W., & Bishop, S. L. (2015). Understanding the gap between cognitive abilities and daily living skills in adolescents with autism spectrum disorders with average intelligence. *Autism, 19*, 64–72.
Dykens, E. M., Hodapp, R. M., & Evans, D. W. (2006). Profiles and development of adaptive behavior in children with down syndrome. *Down's Syndrome, Research and Practice, 9*, 45–50.
Fenton, G., D'ardia, C., Valente, D., Del Vecchio, I., Fabrizi, A., & Bernabei, P. (2003). Vineland adaptive behavior profiles in children with autism and moderate to severe developmental delay. *Autism: The International Journal of Research and Practice, 7*, 269–287.
Gabriels, R. L., Ivers, B. J., Hill, D. E., Agnew, J. A., & McNeill, J. (2007). Stability of adaptive behaviors in middle-school children with autism spectrum disorders. *Research in Autism Spectrum Disorders, 1*, 291–303.
Gardiner, E., & Iarocci, G. (2015). Family quality of life and ASD: The role of child adaptive functioning and behavior problems. *Autism Research, 8*, 199–213.
Gray, K. M., Keating, C. M., Taffe, J. R., Brereton, A. V., Einfeld, S. L., Reardon, T. C., et al. (2014). Adult outcomes in autism: Community inclusion and living skills. *Journal of Autism and Developmental Disorders, 44*, 3006–3015.
Green, S. A., & Carter, A. S. (2014). Predictors and course of daily living skills development in toddlers with autism spectrum disorders. *Journal of Autism and Developmental Disorders, 44*, 256–263.
Hahn, L. J., Fidler, D. J., & Hepburn, S. L. (2014). Adaptive behavior and problem behavior in young children with Williams syndrome. *American Journal on Intellectual and Developmental Disabilities, 119*, 49–63.
Hill, T. L., Gray, S. A. O., Kamps, J. L., & Varela, R. E. (2015). Age and adaptive functioning in children and adolescents with ASD: The effects of intellectual functioning and ASD symptom severity. *Journal of Autism and Developmental Disorders, 45*, 4074–4083.
Hume, K., Loftin, R., & Lantz, J. (2009). Increasing independence in autism spectrum disorders: A review of three focused interventions. *Journal of Autism and Developmental Disorders, 39*, 1329–1338.
Incekas Gassaloglu, S., Baykara, B., Avcil, S., & Demiral, Y. (2016). Validity and reliability analysis of Turkish version of childhood autism rating scale. *Turkish Journal of Psychiatry, 27*, 266–274.
Irmak, T. Y., Sütçü, S. T., Aydın, A., & Sorias, O. (2007). An investigation of validity and reliability of autism behavior checklist (ABC). *Turkish Journal of Child and Adolescent Mental Health, 14*, 13–23.
Jasmin, E., Couture, M., Mckinley, P., Reid, G., Fombonne, E., & Gisel, E. (2009). Sensori-motor and daily living skills of preschool children with autism spectrum disorders. *Journal of Autism and Developmental Disorders, 39*, 231–241.
Kanne, S. M., Gerber, A. J., Quirmbach, L. M., Sparrow, S. S., Cicchetti, D. V., & Saulnier, C. A. (2011). The role of adaptive behavior in autism spectrum disorders: Implications for functional outcome. *Journal of Autism and Developmental Disorders, 41*, 1007–1018.
Kara, B., Mukaddes, N. M., Altinkaya, I., Guntepe, D., Gokcay, G., & Ozmen, M. (2014). Using the modified checklist for autism in toddlers in a well-child clinic in Turkey: Adapting the screening method based on culture and setting. *Autism, 18*, 331–338.
Kimura, M., Yamazaki, Y., Mochizuki, M., & Omiya, T. (2010). Can i have a second child? Dilemmas of mothers of children with pervasive developmental disorder: A qualitative study. *BMC Pregnancy Childbirth. 26*(October (10)), 69.
Koydemir-Özden, S., & Tosun, Ü. (2010). A qualitative approach to understanding Turkish mothers of children with autism: Implications for counselling. *Australian Journal of Guidance and Counselling, 20*, 55–68.
Kraijer, D. (2000). Review of adaptive behavior studies in mentally retarded persons with autism/pervasive developmental disorder. *Journal of Autism and Developmental Disorders, 30*, 39–47.

Krug, D. A., Arick, J., & Almond, P. (1980). Behavior checklist for identifying severely handicapped individuals with high levels of autistic behavior. *Journal of Child Psychology and Psychiatry, and Allied Disciplines, 21*, 221–229.
Lai, M. C., Lombardo, M. V., & Baron-Cohen, S. (2014). Autism. *Lancet, 383*, 896–910.
Levy, A., & Perry, A. (2011). Outcomes in adolescents and adults with autism: A review of the literature. *Research in Autism Spectrum Disorders, 5*, 1271–1282.
Liss, M., Harel, B., Fein, D., Allen, D., Dunn, M., Feinstein, C., et al. (2001). Predictors and correlates of adaptive functioning in children with developmental disorders. *Journal of Autism and Developmental Disorders, 31*, 219–230.
Loveland, K., & Tunali-Kotoski, B. (1998). Development of adaptive behavior in persons with mental retardation. In J. A. Burack, R. M. Hodapp, & E. Zigler (Eds.). *Handbook of mental retardation and development* (pp. 521–541). Cambridge, UK: Cambridge University Press.
Maenner, M. J., Smith, L. E., Hong, J., Makuch, R., Greenberg, J. S., & Mailick, M. R. (2013). Evaluation of an activities of daily living scale for adolescents and adults with developmental disabilities. *Disability and Health Journal, 6*, 8–17.
Malhi, P., & Singhi, P. (2015). Adaptive behavior functioning in children with autism. *Indian Journal of Pediatrics, 82*, 677–681.
Matson, J. L., Dempsey, T., & Fodstad, J. C. (2009). The effect of autism spectrum disorders on adaptive independent living skills in adults with severe intellectual disability. *Research in Developmental Disabilities, 30*, 1203–1211.
Matson, J. L., Rivet, T. T., Fodstad, J. C., Dempsey, T., & Boisjoli, J. A. (2009). Examination of adaptive behavior differences in adults with autism spectrum disorders and intellectual disability. *Research in Developmental Disabilities, 30*, 1317–1325.
Matthews, N. L., Pollard, E., Ober-Reynolds, S., Kirwan, J., Malligo, A., & Smith, C. J. (2015). Revisiting cognitive and adaptive functioning in children and adolescents with autism spectrum disorder. *Journal of Autism and Developmental Disorders, 45*, 138–156.
Memik, N.Ç., Ağaoğlu, B., Coşkun, A., & Karakaya, I. (2008). The validity and reliability of pediatric quality of life inventory in 8–12 year old Turkish children. *Turkish Journal of Child and Adolescent Mental Health, 15*, 87–98.
Milli Egitim Bakanligi (2008). *Özel eğitim ve rehabilitasyon merkezi yaygın gelişimsel bozukluklar destek programı (Curriculum for children with pervasive developmental disorders)*. Available: . [Accessed 12 March 2018] https://orgm.meb.gov.tr/meb_iys_dosyalar/2013_09/04010347_yaygngeliimselbozukluklardestekeitimprogram.pdf.
Milli Egitim Bakanligi (2013). *Özel egitim uygulama merkezi (okulu) birinci ve ikinci kademe egitim programi (otistik cocuklar icin) (Cirriculum for children with ASD) [online]*. Available: . [Accessed 12 March 2018] http://sehitmutlucankilic.meb.k12.tr/meb_iys_dosyalar/39/01/752954/dosyalar/2016_02/18021857_eitimprogram.pdf.
Mouga, S., Almeida, J., Cafe, C., Duque, F., & Oliveira, G. (2015). Adaptive profiles in autism and other neurodevelopmental disorders. *Journal of Autism and Developmental Disorders, 45*, 1001–1012.
Ninci, J., Neely, L. C., Hong, E. R., Boles, M. B., Gilliland, W. D., Ganz, J. B., et al. (2015). Meta-analysis of single-case research on teaching functional living skills to individuals with ASD. *Review Journal of Autism and Developmental Disorders, 2*, 184–198.
Olsson, M. B., & Hwang, C. P. (2008). Socioeconomic and psychological variables as risk and protective factors for parental well-being in families of children with intellectual disabilities. *Journal of Intellectual Disability Research, 52*, 1102–1113.
Pallant, J. (2010). *SPSS survival manual: A step by step guide to data analysis using SPSS.* Maidenhead: Open University Press/McGraw-Hill.
Park, C. J., Yelland, G. W., Taffe, J. R., & Gray, K. M. (2012). Brief report: The relationship between language skills, adaptive behavior, and emotional and behavior problems in pre-schoolers with autism. *Journal of Autism and Developmental Disorders, 42*, 2761–2766.
Poon, K. K. (2011). The activities and participation of adolescents with autism spectrum disorders in Singapore: Findings from an ICF-based instrument. *Journal of Intellectual Disability Research, 55*, 790–800.
Savasir, I., & Sahin, N. (1995). *Wechler Çocuklar için Zeka Ölçeği (WISC-R) Elkitabı [Manual for the Wechler Intelligence Scale for children (WISC-R)].* Ankara: Turkish Psychological Association.
Schopler, E., Reichler, R. J., Devellis, R. F., & Daly, K. (1980). Toward objective classification of childhood autism: Childhood Autism Rating Scale (CARS). *Journal of Autism and Developmental Disorders, 10*, 91–103.
Selimoğlu, Ö., Özdemir, S., Töret, G., & Özkubat, U. (2014). An examination of the views of parents of children with autism about their experiences at the Post-diagnosis period of autism. *International Journal of Early Childhood Special Education, 5*, 129–161.
Sen, E., & Yurtsever, S. (2007). Difficulties experienced by families with disabled children. *Journal for Specialists in Pediatric Nursing, 12*, 238–252.
Shattuck, P. T., Wagner, M., Narendorf, S., Sterzing, P., & Hensley, M. (2011). Post-high school service use among young adults with an autism spectrum disorder. *Archives of Pediatrics & Adolescent Medicine, 165*, 141–146.
Shipley-Benamou, R., Lutzker, J. R., & Taubman, M. (2002). Teaching daily living skills to children with autism through instructional video modeling. *Journal of Positive Behavior Interventions, 4*, 166–177.
Sirin, N., & Tekin-Iftar, E. (2016). Opinions of Turkish parents and teachers about safety skills instruction to children with autism spectrum disorders: A preliminary investigation. *Journal of Autism and Developmental Disorders, 46*, 2653–2665.
Smith, L. E., Maenner, M. J., & Seltzer, M. M. (2012). Developmental trajectories in adolescents and adults with autism: The case of daily living skills. *Journal of the American Academy of Child and Adolescent Psychiatry, 51*, 622–631.
Sparrow, S. S., Cicchetti, D. V., & Balla, D. (2005). *Vineland adaptive behavior scales.* Balla, DA: American Guidance Service, Inc.
Sucuoglu, B., Oktem, F., Akkok, F., & Gokler, B. (1996). A study of the scales for the assessment of the children with autism. *Journal of Psychiatry, Psychopharmacology and Psychology, 4*, 116–121.
Terman, L. M., & Merrill, M. A. (1960). *Stanford-binet intelligence scale: Manual for the third revision form L-M.* Boston: Houghton Mifflin.
Tomanik, S., Harris, G. E., & Hawkins, J. (2004). The relationship between behaviours exhibited by children with autism and maternal stress. *Journal of Intellectual and Developmental Disability, 29*, 16–26.
Uğurel-Şemin, R. (1987). *Stanford-Binet ölçeğinin İstanbul çocuklarına uygulanması (Application of Stanford-Binet Scale on children from Istanbul: A manual for the 3rd revision).* Istanbul: Istanbul University Faculty of Science.
Varni, J. W., Burwinkle, T. M., Seid, M., & Skarr, D. (2003). The PedsQL 4.0 as a pediatric population health measure: Feasibility, reliability, and validity. *Ambulatory Pediatrics, 3*, 329–341.
Vig, S., & Jedrysek, E. (1995). Adaptive behavior of young urban children with developmental disabilities. *Mental Retardation, 33*, 90–98.
Wagner, M., Newman, L., Cameto, R., Garza, N., & Levine, P. (2005). *After high school: A first look at the postschool experiences of youth with disabilities. A report from the National Longitudinal Transition Study-2*Menlo Park, CA: SRI International.
Wechsler, D. (1974). *Wechsler intelligence scale for children–revised.* New York: Psychological Corporation.
Weinmann, S., Schwarzbach, C., Begemann, M., Roll, S., Vauth, C., Willich, S. N., et al. (2009). Behavioural and skill-based early interventions in children with autism spectrum disorders. *GMS Health Technology Assessment, 5* Doc10.
Yaylaci, F., & Miral, S. (2017). A comparison of DSM-IV-TR and DSM-5 diagnostic classifications in the clinical diagnosis of autistic spectrum disorder. *Journal of Autism and Developmental Disorders, 47*, 101–109.