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**INVESTIGATING EMPATHY SKILL LEVELS OF
CHILDREN WITH AUTISM AND TYPICALLY
DEVELOPED CHILDREN BETWEEN THE AGES OF 9-16**

**9-16 YAŞLARI ARASINDAKİ OTİZMLİ VE TİPİK GELİŞİM
GÖSTEREN ÇOCUKLARIN EMPATİ BECERİ DÜZEYLERİNİN
İNCELENMESİ**

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Abstract

The purpose of this study is to investigate empathy skill levels of children with high functioning autism or Asperger Syndrome between the ages of 9 to 16 in terms of diagnosis, age and gender variables and compare the results with typically developed peers. This study was designed as a relational survey method, which is one of the descriptive methods. The subjects were 28 children with autism spectrum disorder (HFA and AS) and 42 typically developed children. Data collected via an adapted version of the "Empathy Scale for Children" and demographic forms. The results indicated a significant difference in empathy skill levels of the children with different diagnosis. The study reveals that children with high functioning autism (HFA) have lower empathic skills, whereas children with Asperger Syndrome (AS) do not differ from typically developed (TD) children in terms of empathic skill levels. Female children with HFA have a higher performance on a self-report empathy questionnaire than male children with HFA and there is no significant difference between females with HFA, AS and TD females. On the other hand, females with AS and HFA autism revealed slightly lower performances. According to the results, younger children (n<12) with AS and HFA do not differ from TD children. Children with HFA, older than 11 years of age revealed lower performances than children with AS and TD children.

Key Words: *High functioning autism, Asperger syndrome, typically developed child, theory of mind, empathy*

Öz

Bu çalışmanın amacı 9-16 yaş arasında yüksek fonksiyonlu otizm veya Asperger sendromu tanımlı çocukların empati becerilerini tanı, yaş, cinsiyet değişkenleri açısından normal gelişim gösteren yaşlılarıyla karşılaştırmalı olarak incelemektir. Çalışma betimsel araştırma yöntemlerinden ilişkisel tarama modeli kullanılarak yapılmıştır. Çalışmaya otizm spektrum grubundan (yüksek fonksiyonlu otizm ve/veya Asperger Sendromu tanımlı) 28 ve normal gelişim gösteren 42 çocuk katılmıştır. Veriler Byrant tarafından 1982 de geliştirilen ve Yılmaz-Yüksel tarafından 2003'te Türkçe'ye uyarlanan "Çocuklar için Empati Ölçeği" ve araştırmacılar tarafından hazırlanan Demografik Bilgi Formu kullanılarak toplanmıştır. Tanı grubuna göre yapılan karşılaştırma sonuçlarında, yüksek işlevli otizmlili grubun Asperger sendromu tanımlı ve normal gelişim gösteren akranlarına göre daha düşük empati düzeyine sahip olduğu belirlenmiştir. Cinsiyete göre yapılan karşılaştırmada yüksek işlevli otizm tanımlı kızların, YFO'li erkeklere göre daha yüksek performans gösterdiği saptanmıştır. Yüksek işlevli otizm, Asperger Sendromu ve normal gelişim gösteren kızların empati puanları arasında anlamlı farklılık bulunmamıştır. Ancak otizm spektrum grubundakilerin az da olsa daha düşük performans gösterdikleri görülmüştür. Yaşa göre yapılan karşılaştırmada 12 yaş altı YFO ve AS'lu çocukların puanlarının normal gelişim gösteren çocukların puanlarından anlamlı ölçüde farklılaşmadığı, ancak 12 yaş üzerinde farklılaştığı belirlenmiştir. 12 yaş üzeri normal gelişim gösteren çocukların empati beceri düzeyinin otizm spektrum grubundaki yaşlılarında daha yüksek olduğu belirlenmiştir. Bulgular alanyazın ışığında tartışılmıştır.

Anahtar Kelimeler: *Yüksek işlevli otizm, Asperger sendromu, tipik gelişim gösteren çocuklar, zihin kuramı, empati.*

Introduction

Understanding other's mental states such as emotions, thoughts, intentions and responding according to information is very important in social life. People with autism have difficulties in socialization and there are many studies which have revealed that people with autism have difficulties in understanding other are mental states (See [Baron-Cohen 2001] for a review). Theory of mind is the ability to understand one's mental states such as beliefs, feelings and thoughts (Premack & Woodruff, 1978). According to Baron-Cohen and Swettenham (1997), understanding complex causes of emotions is standing in theory of mind development.

According to Rogers (1970), empathy is a process rather than a situation (Yılmaz-Yüksel, 2003). Minio-Paluello, Lombardo, Chakrabarti, Wheelwright and Baron-Cohen, (2009) defined empathy as a process where another person's mental state (which includes intentions, desires, emotions and proprioceptive states) automatically activates in the observer a representation of the observed state. Empathy has both emotional and cognitive components and each component has an effect on the other one. Cognitive empathy includes the capacity of perspective taking and understanding other's mental states and emotional (affective) empathy includes responses to other's emotional state (Dziobek, Rogers, Fleck, Bahnemann, Heekeren, Wolf & Convit, 2008). At this point, some researchers distinguish between empathy and theory of mind (Shamay-Tsoory, Shur, Barcai-Goodman, Medlovich, Harari & Levkovitz, 2007). And some of them use one term for another (Blair, 2005). There are also studies which indicate that there is a link between empathy and theory of mind (Charman, Swettenham, Baron-Cohen, Cox, Baird, & Drew, 1998; Dyck, Ferguson & Shochet, 2001; Shamay-Tsoory, et.al., 2007; Völlm, Taylor, Richardson, Corcoran, Stirling, McKie, Deakin and Eliot, (2005). It's obvious that empathy and theory of mind are so close and related terms that their lines are not discrete.

The issue of empathic skills of children with autism still needs further research. Although some of the children with autism can understand simple causes of emotions, they find it difficult to understand complex causes of emotion (Baron-Cohen, 1990). It is also known that children with autism have insensitivity to other people's feelings (Howlin, Baron-Cohen, & Hadwin, 1999). Rogers Dziobek, Hassenstab, Wolf and Convit (2007), suggest that people with autism have less ability to ascertain others' feelings, but demonstrate equal empathy when they are aware of others' states of mind. At the same time, it is known that people with autism have difficulties in being aware of other's states of mind (Tager-Flusberg, 2007). Yirmiya, Sigman, Kasari and Mundy (1992), compared understanding and responding to emotional states of children with autism (9-14 age) and normally developed children (9-16 age). In this study, although children with autism couldn't perform as well as normally developed children, it can be claimed that they can label emotions of others, take perspective of others and respond to them.

There are studies in which children's empathy and theory of mind are investigated. Charman, et.al. (1998), conducted a study with autistic children at 20 month age. According to results, children with autism have both empathy and theory of mind deficits. In another case, Dyck, Ferguson and Shochet (2001) conducted a study with 174 autistic children between the ages of 9 to 16. In this study, theory of mind and empathic abilities of children with autism and other diagnostic groups (attention deficit/hyperactivity disorder, mild mental retardation, anxiety disorder and children with no psychological disorders) were tested. In this study,

children with autism and children with Asperger Syndrome were compared. According to the results of the study, children with autism have the lowest performance on empathic abilities. Another study was made by Johnson, Filliter and Murphy Johnson, (2009), they measured both empathic skills and autistic traits of 22 young person with autism and 20 controls. The results were also compared with parents' opinions. In this study, both parents and participants reported higher autistic traits and less emphatic skills than control group. Also participants reported less autistic traits and more empathic abilities than their parents' reports.

Culture is a very important factor in mental state understanding and empathy (Liu, Wellman, Tardif, & Sabbagh, 2008; Wellman, Cross & Watson, 2011). Theory of mind is still a new subject for Turkey. Although there are a number of studies on mental state understanding and empathy (Atasoy, 2008; Bora & Baysan, 2009; Girli & Tekin, 2010a; Girli & Tekin, 2010b; Gökçen, Bora, Erermis, Kesikçi & Aydın, 2009; Keçeli-Kaysılı, & Acarlar, 2009; Keçeli-Kaysılı, & Acarlar, 2010; Özbaran, Köse, & Erermiş, 2009; Tekin, 2010) there are few studies in Turkey on empathic skills of people with autism (Girli & Tekin, 2011). Atasoy (2008), conducted a study with typically developed children, children with pervasive developmental disorder and children with mental retardation. In this study, children's theory of mind (with first order false belief tasks) and executive functions were investigated. Children with pervasive developmental disorder performed significantly weak in theory of mind tests compared to other groups. Girli and Tekin (2010b) adapted first and second order false belief (ToM) tests to Turkish children with autism. 66 typically developed children and 28 children with autism participated and their theory of mind performance was investigated. According to this study, children with autism performed less than typically developed children. In another study, Girli and Tekin (2010a) investigated advanced theory of mind abilities of children with autism and typically developed children (with two advanced theory of mind tests: Strange Stories and Eyes Test). Children with autism performed weaker in the theory of mind tests. Keçeli-Kaysılı and Acarlar (2009), investigated the theory of mind abilities of children with autism and typically developed children (N=72, with first order false belief tasks). According to this study, children with autism revealed deficits in theory of mind tasks. These are the limited number of studies investigating theory of mind of people with autism and other studies were either reviews, test adaptations or experimental designed studies for teaching theory of mind components.

Girli and Tekin (2011), investigated mental state understanding (mind reading) from eyes and empathic inclination level of mothers' who have children with autism and typically developing children. According to results of this study, mothers who have normally developed children performed better at '*mind reading*' from eyes, than mothers who have children with autism. On the other hand, there was no significant difference between the two groups in empathic inclination results.

This study is a pre study of a project in which first order false belief, second order false belief, advanced theory of mind tests and empathic skill tests adapted for children with autism in Turkey. The purpose of this study is to investigate empathy skill levels of children with high functioning autism or Asperger Syndrome between the ages of 9 to 16 in terms of diagnosis, age and gender variables and compare the results with typically developed peers. With this study, empathic abilities of children with autism and normally developed children will be compared in Turkish sample.

METHOD

As the objective of this study is to investigate the empathy skill levels of children with autism compared to their typically developed peers, it was designed as a relational survey method, which is one of the descriptive methods.

Study Group

The study group consists of 28 children diagnosed with autism and 42 typically developed primary school students between the ages of 9-16. In order to include children with autism, there were a number of prerequisite. Firstly, all participants with autism were diagnosed in university hospitals' child psychiatry clinics, with DSM-IV criteria as autism spectrum disorder. Their diagnosis had been made by a team of qualified clinicians (child psychiatrist, child neuropsychologists and a pediatrician), using DSM-IV criteria (2001). The participants included in the study had no reported hearing difficulties and were free of other neuropsychiatric disorders (attention-deficit/hyperactivity disorder, depression and learning disabilities (dysphasia, dyslexia). Participants participated to this study according to their reports certified by university hospitals. In this report, participants had been diagnosed either with Asperger Syndrome or High functioning autism.

The second criterion to take part in this study was the developmental age. In order to understand tasks and tests properly, participants' developmental age had to be over 6. All participants had PEP-R assessment results which meet this criterion.

Thirdly, in order to reach empathic level of the test we used, all participants had to understand other's mind cognitively. In order to test participants' level, first and second order false belief tasks were applied as prerequisites. All participants with autism passed first and second order false belief tasks (For the detailed test adaptation information, (Girli & Tekin, 2010b). As first order tasks, a Sally-Anne task and a Smarties task, as second order tasks, a Chocolate Bar task and an Ice-cream Truck task were used. All participants are in an integration program and continue to get individual special education support.

Lastly, permissions were taken from participant's parents in order to participate to the study. The study process was explained to the parents by first researchers.

Data collection tool

Children's information collected via an information form which is prepared by researchers.

Psycho-Educational Scale-Revised (PEP-R)

Psycho-Educational Scale-Revised (PEP-R) was adapted from Schopler, Reichler, Bashford, Lansing and Marcus, 1990. PEP-R is made up of 174 items, of which 131 are used to determine the developmental level of the child in a total of seven domains, such as fine motor, gross motor, hand-eye integration, cognitive and verbal skills, and 43 to determine the level of autistic behaviors in four domains such as language, interest in games and materials, affectivity and sensory reactions. The internal consistency of Turkish version of PEP-R was carried out by using data collected from 178 children (aged between 18 months to 12 years). Cronbach Alpha is .88- .97. The content validity measures were done by comparing the developmental scale of PEP-R with Ankara Development Scanning Inventory (AGTE) and the results are ($r=0.81$) for total developmental points, $r=0.55-0.88$ among the categories. Also when calculated with Ritvo-Freeman Scale (RFRLS), the values are $r=0.68$ for total behavioral points and $r=0.27-0.68$ $p<.01$ and $p<.05$ for the categories (Girli, 2007).

Task 1 (Sally-Anne task):

The Sally-Anne task was adapted from Baron-Cohen et al., 1985. The task was shown with pictures on cards. There were two protagonists, Selin and Ece. The names of the original characters were changed into well-known Turkish names. There was also a box and a basket in the scene. Selin put her marble into the basket, and then she left. While she was away, Ece transferred the marble into the box and she also left. When Selin returned to the scene, The experimenter asked a Thought Question; "Where does Sally think her marble is?". After children's answer a Behavior Question was asked; "Where will Selin look for her marble?" and finally a Reality Control Question (reality question) was asked; "Where is the marble?" The reliability results of this study for Sally-Anne task KR-21 value is .78 (Girli & Tekin, 2010b).

Task 2 (Smarties task):

Smarties task was adapted from Hogrefe et.al. in 1986 (Girli & Tekin, 2010b). A Bonibon box and a crayon is used as materials. Smarties were changed into Bonibon, a well-known brand for a similar product and it also has a typical and well-known box just like Smarties. Crayon was used because children use it more often and can name it easily. Crayon was placed in a bonibon box. Then, the bonibon box was shown to the child and asked two control questions were asked; "What is this?" and "What is in it?" For these questions the child was supposed to give answers such as "bonibon box" and "bonibon". For these questions answers like "jelibon", "chocolate" were also accepted. Then a Belief Question was asked; "If I show this to X, (someone child knows and not present in the room), what will X think is in here?" The reliability results of this study for Smarties task KR-21 value is .82 (Girli & Tekin, 2010b).

Task 3 (Chocolate bar task):

The task was adapted from Flobbe, Verbrugge, Hendriks, & Krämer, 2008 (Girli & Tekin, 2010b). There were two protagonists, Arda and Ceren. Again, names were changed into well-known Turkish names. They were in a room with a window. There were also a box and a drawer in the room. Arda's mother came and gave him a bar of chocolate. Arda put his chocolate in the drawer. Then he left the room. Ceren transferred the chocolate bar from the drawer into the box. While she was doing that, Arda saw him from the window. After that, Arda came back to the room. There was a thought balloon over his head which showed that he wanted his chocolate. A Second order belief question was asked; where does Ceren think Arda will look for his chocolate, in the drawer or in the box? Then a control question was asked; where will Arda look for the chocolate? The Reliability results of this study for chocolate bar task KR-21 value is .84 (Girli & Tekin, 2010b).

Task 4 (Ice-cream truck task):

This test was adapted from Perner and Wimmer in 1985. This second order test has a story, while telling its story, a card was also showed. Names and some pictures were changed according to Turkish culture. "Meltem and Can are in the park. Can wants to buy ice cream from the ice cream van but he hasn't got any money. The ice cream man tells her that he will be there all afternoon. Can go home to get money for ice cream. After that, the ice cream man tells Meltem that he has changed his mind and he is going to drive to school yard and sell ice cream there. The ice cream man sees Can on his way to school and he also tells him that he is going to school yard and sell ice cream there. Meltem goes to Can's house but Can is not there. His mom tells her that he has gone to buy ice cream. First the question 'Where does Meltem think Can has gone, to school or to park?' and then a control question were asked; "Where did

Can go to buy ice cream? The reliability results of this study for ice-cream truck task KR-21 value is .84. For the over all test results, KR-21 value is .83 (Girli & Tekin, 2010b).

Empathy Scale for Children

Data related to participants' empathy skill levels were gathered by using "Empathy Scale for Children". Empathy Scale for Children developed by Byrant in 1982 and it was adapted from Empathy Scale for Adults which is developed by Mehrabian and Elpstein in 1972. It consists of 22 items and its reliability and validity scores are high (Yılmaz-Yüksel, 2003). It was adapted to Turkish and its reliability and validity study was conducted by Yılmaz-Yüksel (2003). In Turkish adaptation and validity- reliability study, test-retest reliability is .69, internal consistency reliability .70 and for construct validation, a factor analysis was conducted. The scale consists of 20 items, single factor. The items were designed to measure cognitive and affective empathy. For example, "I can't understand boy cries when he gets happy" or "When I see a girl crying, it makes me cry too." Answers have two options; either right or wrong. The right answer is valued as one point. The maximum point of this test is 20. High empathic skills result in high test scores.

Procedure and Data Analysis

Prerequisite tasks were applied by researchers with the same process in study (Girli & Tekin, 2010b). Empathy tests were filled by participants in company with one of the researchers in a quite classroom environment. As a result of unequal variances between groups, Mann Whitney, Kruskal-Wallis test, and Pearson chi-square nonparametric methods were used in this study.

RESULTS

Diagnosis

Kruskal-Wallis Test was conducted to evaluate differences between the diagnoses with respect to empathy skill levels. The results indicated a significant difference in empathy skill levels of the children with different diagnosis, $\chi^2 (2, n=70) = 9.525, p= 0.009$, (Table, 1). Children with HFA had a lower empathy skill level than children with AS and TD children. Mann-Whitney test indicated a significant difference in the empathy skill levels of the children with HFA and TD children ($U=213.5, p<.05$). It also revealed that there is no significant difference in empathy skill levels of children with AS and TD children ($U=124.5, p>.05$).

Table 1. The results of Kruskal-Wallis test for empathy skill levels with respect to diagnosis

Diagnosis	n	Mean Rank	df	χ^2	p
Typically developed (TD)	42	41.45	2	9.525	.009*
Asperger Syndrome (AS)	9	30.11			
High Functioning Autism (HFA)	19	24.89			

* Significant difference ($p < 0.05$)

Gender

Kruskal-Wallis Test results indicated that, there is no significant difference in females between three groups $\chi^2 (2, n=19) = 3.237, p= 0.198$; however, there is a significant difference in males between three groups, $\chi^2 (2, n=51) = 8.001, p= 0.018$, (Table, 2). Males with HFA had a lower empathy skill level than males with AS and TD males. In females with HFA, there is no significant difference with TD females ($U=20.500, p>.05$); on the other hand, in males, there is a significant difference with TD males ($U=105.500, p=.005$). It also revealed that there is no significant difference in terms of gender between children with AS and TD children (for females, $U=2.50, p>.05$ and for males, $U= 86.0, p>.05$).

Table 2. The results of Kruskal-Wallis test for empathy skill levels with respect to gender

Gender		N	Mean Rank	df	χ^2	p
Female	TD	13	11.23	2	3.237	.198
	AS	2	3.75			
	HFA	4	9.13			
Male	TD	29	30.40	2	8.001	.018*
	AS	7	26.71			
	HFA	15	17.17			

* Significant difference ($p < 0.05$)

Age

We grouped children into two ($n < 12$ & $n \geq 12$) groups as younger and older children. Kruskal-Wallis Test results revealed that, there is no significant difference in younger group ($n < 12$) between three groups $\chi^2 (2, n=40) = 1.038, p= 0.595$; however, there is a significant difference in older group ($n \geq 12$) between three groups, $\chi^2 (2, n=30) = 10.817, p= 0.004$, (Table, 3). Mann-Whitney test indicated a significant difference in terms of age between children with HFA and TD children. In the younger group of children with HFA and TD children, there is no significant difference ($U=84.00, p>.05$), on the other hand, in the older group there is a significant difference ($U=24.50, p=.002$). It also revealed that there is no significant difference in terms of age between children with AS and TD children (for $n < 12$, $U=62.5, p>.05$ and for $n \geq 12$, $U= 10.0, p>.05$).

Table 3. The results of Kruskal-Wallis test for empathy skill levels with respect to age

Age		N	Mean Rank	df	χ^2	p
<12	TD	26	21.87	2	1.038	.595
	AS	6	17.92			
	HFA	8	18.00			
≥ 12	TD	16	20.34	2	10.817	.004*
	AS	3	12.50			
	HFA	11	9.27			

* Significant difference ($p < 0.05$)

Discussion

The purpose of this study is to investigate empathy skill levels of children with high functioning autism or Asperger Syndrome between the ages of 9 to 16 in terms of diagnosis, age and gender variables and to compare the results with typically developed peers. According to the results, children with HFA have significantly lower scores than children with AS and TD. On the other hand, the results of children with AS have no significant difference with TD children. Children with AS may need to be tested in more complicated tests. Some children and adults with AS reveal their empathy deficits in age appropriate adult tests (Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001).

Gender was another variable which may affect empathy. According to Eisenberg and Randy (Eisenberg, & Randy, 1983), gender differences in empathy depend on data collection tools. Self-report measures have large gender differences and facial, gestural and psychological measures do not have gender differences. Eisenberg and Strayer (1990), interpreted that results as female bias due to sex role stereotypes. In our findings, males with HFA have significantly lower scores and in the rest of the groups gender does not have a significant difference. Baron-Cohen and Wheelwright (2004) observed that, as predicted, males scored significantly lower than females in their empathy measure. These gender differences in empathy have also been identified in other studies (Bora & Baysan, 2009; Gouveia, Milfont, Gouveia, Neto, & Galvão, 2012; Lawrence, Shaw, Baker, Baron-Cohen & David, 2004; Muncer & Ling, 2006). On the other hand, Lai et.al. (2011), suggest that, in empathizing-systemizing profiles, people with autism do not reveal typical sex differences. Also, according to mind reading tests such as “Reading the mind in the eyes” test and “Faux Pas” test females with autism revealed a lower performance than control males. Contrary to these findings, in our results, female children with HFA have a higher performance on a self-report empathy questionnaire than male children with HFA and there is no significant difference between females with HFA, AS and TD females. On the other hand, females with AS and HFA autism revealed slightly lower performances. In larger samples, these results might change.

Ability to understand and response to other’s mental state starts to develop at a very early age and it continues to develop during the early school years but findings are inconsistent after 11 years of age (Lai, et.al., 2011). We grouped children into two ($n < 12$ & $n \geq 12$) groups as younger and older children. According to the results, younger children with AS and HFA do not differ from TD children. Children with HFA, older than 11 years of age revealed lower performances than children with AS and TD children. Younger children with HFA might be compensating their empathy skills with education and their cognitive abilities. However, with age, empathy gap between TD children and children with HFA seems to be growing.

Result generalization of this study is limited to sample. Another limitation of this study is the data collection tool, our data collection tool is based on self-reports. According to Johnson, Filliter and Murphy (2009), children and adolescents with autism can report higher empathic skills than their parents attributed to them. Further studies needs to be conducted with different data collection tools and larger sample.

Considering that gender differences were observed only for HFA, future studies should focus on large sample with ASD groups. Future studies will be able to provide further evidences of empathy skill levels of children with autism between typically developed peers.

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