

Comparison of Attachment-Related Social Behaviors in Autistic Disorder and Developmental Disability

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Abstract

Objective: This study examined social behaviors related to attachment in children with autistic disorder and the differences in these behaviors from those observed in developmentally disabled children. Additionally, we aimed to investigate the relationship between attachment behaviors and clinical variables, such as age, cognitive development, severity of autism, language development, and mothers' attachment styles.

Method: The study group consisted of 19 children with autistic disorder (mean age: 37.9 ± 6.8 months) and the control group consisted of 18 developmentally disabled children without autistic disorder that were matched with respect to age, gender, and cognitive development. The Childhood Autism Rating Scale (CARS) was administered to all the children by two child psychiatrists. Mothers completed the Relationships Scale Questionnaire (RSQ). Cognitive development of the children was assessed with the Stanford-Binet intelligence scale. Attachment behaviors of the children were evaluated with a modified Strange Situation Procedure (SSP).

Results: Attachment behaviors in the children with autistic disorder and in the children with developmental disabilities were similar. In contrast to the developmentally disabled group, the children with autistic disorder stayed closer toward their mothers compared with their responses to strangers. In the autistic disorder group, attachment behaviors were not associated with age, intelligence quotient, or mothers' attachment styles; however, a significant relationship between the severity of autism and the presence of speech was observed.

Conclusion: Parents' understanding of the attachment needs and the attachment behaviors of their autistic children in the early stages of the disorder may lead to more secure attachment relationships and improved social development.

Key Words: Autistic disorder, developmental disabilities, attachment, social behavior

INTRODUCTION

According to John Bowlby's theory (Bowlby 1969,1979,1986,1988), attachment is a lifetime emotional bonding that is established between caregiver and child. It helps children to communicate with their caregiver, to search for their caregiver when caregivers are out of sight, and to pursue physical closeness with their caregiver. Attachment occurs especially in times of stress; it has strength and continuity. Bowlby suggested that babies are born with the necessity of establishing a relationship with a caregiver. Babies are born with attachment behaviors, such as sucking, crying, watching,

touching, and smiling, in order to establish interactions and improve the attachment with their caregiver. These behaviors improve over time if the relationship is continuous and consistent. Babies channel their attachment behaviors to the primary attachment object that they are in a close relationship with. According to Bowlby, one of the definitional characteristics of attachment is child's desire for keeping close distance with a person (being around of him/her, resist to separate from his/her), who can cope with the world better than the child. The main function of attachment is protection from danger. There is a relationship between attachment behavior and ex-

Received: 03.02.2008 - Accepted: 18.09.2008

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ploring/searching behaviors. If a child has a secure attachment relationship, she/he feels secure even in stressful conditions and can explore its environment. The primary attachment figure is regarded as a secure base to which babies can return after exploring their environment while feeling safe. Babies maintain closeness with their primary attachment figure by displaying such behaviors as eye contact, verbal contact, and physical contact during the exploration of the environment. Attachment behaviors reflect children's expectations of how the caregiver will respond to their search for comfort. It has been thought that these expectations help in regulating their negative feelings and in coping with stress (Rutgers et al., 2007). The quality of the attachment relationship is related to the quality of the relationship between children and their caregiver, and the development of attachment disorders increases in response to a baby's social, physical, and emotional deprivation (Boris et al., 1998; Smyke et al., 2002; Boris et al., 2004;).

Ainsworth et al. (1978) improved the Bolby's attachment theory and classified attachment patterns as secure and insecure using the Strange Situation Procedure (SSP), which evaluates babies' social reactions toward their caregivers and their reactions to separation/reunion. Babies with a secure attachment pattern with the primary attachment figure explore their environment even in the absence of the caregiver, try to keep the close to their caregivers, and perceive them as a secure base. They show reactions to separation from the caregiver, but they are relieved with the caregiver's return and continue their exploring behaviors.

Leo Kanner, who first defined early infant autism, specified that children with autism are liable to be alone, that they close themselves off to all kinds of environmental stimuli, that they cannot distinguish their own mother and father from strangers, and that their mother's and father's are cold and distant (Kanner, 1943). Kanner's description gave rise to the thought that fathers and mothers of autistic children do not have the ability to attachment. Sigman et al. were the first researchers to show that autistic children could attach to their caregivers (Sigman and Ungerer, 1984; Sigman et al., 1986; Sigman and Mundy, 1989). They observed children diagnosed with autistic disorder and children with normal development that were matched in terms of cognitive development during free play and separation from and reunion with their mothers. They reported that autistic children displayed social behaviors, such as the search for closeness and physical contact with their mothers, and that they preferred their mothers to strangers, even

though they did not exhibit any tension during separation from their mothers. Subsequent studies similarly showed that although children with autism disorder had distorted reciprocity compared to normal children, their secure attachment rates were not lower than those of the control group (Shapiro et al., 1987; Rogers et al., 1991,1993; Buitelaar 1995; Dissanayake and Crossley, 1996,1997; Naber et al., 2007a). Children with autism disorder cannot display joint attention behavior, which is an attachment behavior that involves the ability to point to a specific object or a person and to direct one's attention to a specific place (McArthur and Adamson, 1996; Griffith et al., 1999; Naber et al., 2007b). Some studies indicate that joint attention attachment behaviors in children with autism (which was evaluated in the present study, too) were lower than in control groups (Sigman et al., 1986; Sigman and Mundy, 1989; Dissanayake and Crossley, 1996, 1997).

Studies that investigated attachment in children with autism aimed to understand the relationship between attachment behaviors, and language development, chronological age, cognitive development, and severity of autism (Pehlivanurk, 2004); however, different results were obtained from different studies. Most studies showed that there is no relationship between the severity of autism and attachment in autistic disorder (Shapiro et al., 1987; Rogers et al., 1991, 1993; Willemsen-Swinkels et al., 2000), whereas some studies indicated that as the severity of autism increases the level of secure attachment decreases (Naber et al., 2007a; van Ijzendoorn et al., 2007). Rogers et al. (1991,1993) showed that secure attachment is related to the cognitive developmental level of the child and thus argued that attachment in children with autism develops later than in children with normal development. Some studies reported that there is no relationship between attachment in autism and cognitive development (Sigman and Ungerer, 1984; Shapiro et al., 1987; Sigman and Mundy, 1989; Rogers and Dilalla, 1990). Other studies showed that there is a relationship between the mother's attachment style and her relationship with her normally developed child, as well as the child's attachment style; mothers who have secure attachment have securely attached children (Eiden et al., 1995; Pederson et al., 1998). Caregiver attachment style is posited to be equally important for children with autism (van Ijzendoorn et al., 2007); however, the attachment style of the mothers of autistic children has not been studied. There are studies that reported a significant relationship between language development and attachment in autistic children (Rogers and Dilalla, 1990; Rogers et al., 1991, 1993; Dissanayake and Crossley

TABLE 1. Clinical findings.

	Autism Group n = 19		Developmental Disability Group n = 18		t
	Mean	SD	Mean	SD	
Age at which first symptoms were observed (month)	17.9	6.5	11.8	6.7	2.362*
Age at which a doctor was consulted (month)	26.5	8.9	12.7	8.8	2.810*
CARS first researcher score	39.4	4.8	23.4	2.9	11.334**
CARS second researcher score	39.5	4.2	25.3	3.5	8.72**
First recognized symptom	Number	Percent	Number	Percent	χ^2
Social relationship dysfunction	7	36.8	0	0	15,651**
Communication dysfunction	8	42.1	10	55.5	
Restricted behaviors and areas of interest	3	15.8	0	0.0	
Delay in motor development	1	5.3	8	44.5	
Language development					
Present	10	52.6	17	94.4	9.805*
Absent	9	47.4	1	5.6	

* $P \leq 0.05$, ** $P < 0.01$

1997), but other studies reported an insignificant relationship between language development and attachment in these children (Sigman and Mundy, 1989). Attachment might be related to cultural-specific care giving attitudes and cultural expectations of the child; therefore, studies on attachment in autism across cultures would be useful for evaluating the existing data on attachment in autism.

The present study aimed to evaluate social behaviors with respect to the attachment process in children diagnosed with autism disorder. In this context, we attempted to investigate whether there are attachment behaviors (i.e. preferring caregivers to strangers, reaction to separation from caregiver, and reaction to reunion with the caregiver) in children with autistic disorder when the attachment processes are triggered. We also compared these behaviors to the attachment behaviors of children with developmental disability (without an autistic disorder) and examined how mothers in both groups predicted their children's attachment behaviors. In addition, the relationship between attachment behaviors in autistic children and their mother's attachment style, and clinical variables, such as the child's age, cognitive development, the severity of autism, and language development were evaluated.

METHOD

Sample

The study group consisted of 19 children diagnosed with autism disorder according to DSM-IV criteria (American Psychiatric Association, 1994) that were seen

at the Hacettepe University Medical Faculty Child Psychiatry Clinic. The control group included 18 children with developmental disability that were not diagnosed with autism disorder. The control group children were matched with the study group in terms of age, gender, and intelligence.

The autistic children were newly diagnosed in our clinic; hence, they had not received any special education prior to the time the study was conducted. They did not have any additional medical diagnoses. They had physical and neurological examinations to identify the presence of any organic etiology. None of the children with autism disorder had an organic disorder like epilepsy, phenylketonuria, fragile X syndrome, or tuberous sclerosis. Age in the study group ranged between 27 and 49 months.

The control group children were followed-up in pediatric clinics or special education centers due to their speech and motor developmental disabilities. They did not have any symptoms of autistic disorder. Their age ranged between 28 and 51 months.

Instruments

Interview Form

The researchers developed a semi-structured interview form to collect data of a sociodemographic nature, parents' problems about the child, the first time the parents recognized their child's symptoms and the nature of the symptoms, whether the parents consulted any other

TABLE 2. Attachment behaviors.

	Autism Group n = 19		Developmental Disability Group n = 18		X ²
	Number	Percent	Number	Percent	
Mother-child together					
Indifference	4	21.1	0	0.0	9.354*
Distant relationship	7	36.8	4	22.2	
Close relationship	3	15.8	1	5.6	
Reciprocal relationship	5	26.3	13	72.2	
Mother-child-stranger together					
Indifference	5	26.3	1	5.6	12.328**
Distant relationship	12	63.1	7	38.8	
Close relationship	1	5.3	0	0.0	
Reciprocal relationship	1	5.3	10	55.6	
Separation from mother					
Indifference	10	52.6	8	44.4	3.68 NS
Distant relationship with mother	1	5.3	5	27.8	
Goes back to the mother	1	5.3	1	5.6	
Calls mother, does not let her go	7	36.8	4	22.2	
Reunion with the mother					
		n = 18		n = 17	
Indifference	4	22.2	3	17.6	1.174 NS
Distant relationship	9	50.0	8	47.1	
Close relationship with mother	0	0.0	1	5.9	
Reciprocal relationship	5	27.8	5	29.4	

NS: Non-significant, *P ≤ 0.05, **P < 0.01

physicians for these symptoms and any recommendations of these physicians, and the first time the parents consulted to our clinic due to their child's symptoms. The presence of similar symptoms in other family members, the developmental and medical history of the child, and the presence of any mental or chronic disorder in the family were also inquired about during the interview. The medical history of each child was compared with its medical records.

Childhood Autism Rating Scale (CARS)

The Childhood Autism Rating Scale (Schopler et al., 1980) is a widely used measure for the differentiation of autism disorders from other developmental disorders. Children are evaluated with CARS via family interviews and child observations. The scale consists of 15 items that indicate the severity of autism in the child. The evaluator must be very knowledgeable of the definition and rating of the scale's 15 items before observation.

The scale's items concern interpersonal relationships, imitation, emotional response, body use, object use, adaptation to change, visual response, listening response, taste and smell responses, use of touch, fear/nervousness, verbal communication, non-verbal communication, activity level, level of intellectual response, and general impressions. Each item is rated on a scale of 1-4, with midpoint

scores. Scores ≥ 30 indicate the presence of autism disorder. Scores of 30-36.5 indicate mild-moderate severity of autism, scores of 37-60 indicate severe autism. CARS is reported to have high sensitivity in differentiating children with autism disorder from children with mental retardation, developmental disability, and a pervasive developmental disorder not otherwise specified (Tachimori et al., 2003; Perry et al., 2005). For the Turkish version of the scale, item-total correlation (except 14th item) ranges between 0.60 and 0.91, and item analysis indicates that all items (except 14th item) differentiate children with mild to severe autism and its internal reliability coefficient is 0.86 (Sucuoğlu et al., 1996).

Stanford-Binet Intelligence Test

We utilized the third revision of the Stanford-Binet form in the present study (Terman and Merrill, 1960). The test might be administered to children aged 2-8 years. The verbal and non-verbal items, and the standard materials of the test are grouped in accord with age groups. Between the ages of 2 and 5, the test proceeds by half-year intervals. Between 5 and 14 the age levels correspond to yearly intervals.

No empirical studies of the Stanford-Binet test have been conducted in Turkey. The Stanford-Binet test is considered a standard clinical interview form for chil-

TABLE 3. Variables related to attachment in the autism group.

During separation from mother					
Variables	Indifference	Distant relationship	Goes to her	Calls/doesn't let her go	X ²
Language development n (%)					
Present	2 (10.5)	0 (0.0)	1 (5.3)	6 (31.5)	
Absent	8 (42.1)	1 (5.3)	0 (0.0)	1 (5.3)	9.144*
CARS first researcher mean-Q	42.2-4.4	48.0	31.5	36.5-4.5	11.808**
CARS second researcher mean-Q	40.7-4.4	48.0	33.5	36.5-4.5	10.235*

*P ≤ 0.05, **P < 0.01. CARS: Childhood Autism Rating Scale; Q (IQR) = Inter-quartile range, Kruskal-Wallis test were conducted for CARS

dren rather than a measure of cognitive abilities (Anastasi, 1982). Regarding the limitations of our use of this test due to the lack any adaption studies in Turkey, experienced clinicians in Turkey use the test for the cognitive evaluation of pre-school children. The IQ scores obtained are evaluated in accordance with normal adaptive behaviors for the child's age group.

Relationship Scales Questionnaire (RSQ)

RSQ was developed by Griffin and Bartholomew (1994) in order to measure adult attachment styles (secure, fearful, preoccupied, and dismissive). It consists of 30 items. The construct validity of the RSQ's Turkish version is reported to be high (Sümer and Güngör, 1999). The internal reliability of the Turkish RSQ's subscales ranges between 0.27 and 0.61, and its test-retest reliability ranges between 0.54 and 0.78 (Sümer and Güngör, 1999). Participants rate each item on a 7-point Likert-type scale (1 = not at all like me, 7 = very much like me) based on how they define themselves in close relationships. Each attachment style is calculated with the summation of items that are related to a given attachment style and the division of the sum to the number of items of a given subscale (a given attachment style). The highest subscale score (attachment score) is accepted as indicating the attachment orientation of the person. Each person obtains 4 subscale scores (attachment scores), which can be also used as continuous variables. A secure attachment style is related to cognitions of self-worth, and others' availability and responsiveness when they are needed. A fearful attachment style is linked to one's sense of unworthiness, and the expectation of non-trusting and rejecting behaviors from others. People with a preoccupied attachment style perceive themselves as unworthy, but perceive others as positive and worthy. A dismissive attachment style is related to self-worth, but with expectations of non-trusting and rejecting behaviors from others.

The Evaluation of Attachment Behaviors

The attachment behaviors of all participating children were evaluated with an adapted version of the Strange Situation Procedure (SSP) (Ainsworth et al., 1978). SSP was developed in order to observe the attachment behaviors of normal children toward their mothers. It consists of 7 stages in which child, mother, and a stranger participate, and the balance between the child's reaction to the soothing of his/her mother, his/her search for comfort, and his/her exploratory behavior are investigated. The modified version of SSP was used with the children and their mothers. Since the evaluation of the initiation of a reciprocal interaction behavior is very important for children with autism disorder, unlike with the standard SSP, in the present study the mothers and the strangers were told not to initiate an interaction and to reciprocate the child's behavior only if the child asked for their participation or cooperation. The separation from mother and reunion to her are conducted twice in the standard procedure. Nevertheless, separation and reunion were conducted only once in the present study, because it was very difficult to comfort the children with autistic disorder.

All children were observed in a 4 × 3 meter playroom with a one-way vision mirror. There were no posters in the room, though there were same toys and chairs in the room for each observation. First, the child and the mother entered the playroom. They played freely for 10 minutes and while the mother did not initiate an interaction, but offered a response to the child only if the child initiated an interaction. Then, a stranger entered the playroom and the child, mother, and stranger stayed there for 5 minutes. Similarly, the stranger also did not initiate any interaction with the child and responded to the child only if the child initiated an interaction. After 5 minutes the mother told her child that she was leaving, but that she would return soon. She then left

the playroom. The child and the stranger stayed in the playroom for 2-3 minutes. Then, the mother reentered the playroom, said hello to child at the door, and sat in her seat. She did not initiate any other verbal or physical contact with the child. After the mother, child, and the stranger stayed in the playroom for another 2-3 minutes the observation was terminated. These instances were recorded on videotape and at the same time they were observed and evaluated by two researchers behind the mirror. The researchers evaluated the behaviors of the children by ticking "present" or "absent" on a form that listed all attachment behaviors. When an attachment behavior was ticked as "present" by the researchers, this behavior was considered to have been exhibited by the child. If the researchers evaluated a given behavior differently, then video record of the child was reviewed and the researchers reached a consensus on the presence or absence of the given behavior. Before entering the playroom, mothers were instructed to first play with their child freely for 10 minutes, as they usually do at their home. They were told that they and their child would then stay with a stranger for 5 minutes before they left the playroom. They were told about what they should do and should not do (i.e. initiating an interaction with the child) when they reentered the playroom. Following these instructions, the mothers were provided information on attachment behaviors (Appendix 1) and they were asked which attachment behaviors they thought their child would show in the playroom. If the mother's prediction matched the child's behavior, then the mother's prediction of her child's attachment was accepted as correct.

The behavior of the children toward their mothers and the strangers were checked on a form by the researchers (Appendix 1). In this form attachment behavior was evaluated taking the child's highest scoring behavior level into consideration. Moreover, each child's behavior in different stages of the test (e.g. mother and child alone, mother, child, and stranger) were evaluated regardless of his/her highest behavior level and the presence of attachment behaviors were compared with those of the children in the control group.

Procedure

A physician evaluated the children that presented to the Hacettepe University Medical Faculty Child Psychiatry Clinic and directed those with autistic symptoms to our research team. Two experienced psychiatrists diagnosed these children in accordance with DSM-IV criteria (American Psychiatric Association, 1994). Children

that had developmental disability without any autism disorder symptoms were also recruited from the same clinic and special education centers, and were evaluated by our research team. Among these children, those that matched the children with autism disorder in terms of age, gender, and cognitive developmental level were assigned to the control group. The mothers of the children in both groups underwent clinical interviews with interview form. Two child psychiatrists administered the CARS to all the participating children and the mothers were administered the RSQ. Cognitive development of the children based on the Stanford-Binet test was evaluated by an experienced clinical psychologist. Subsequently, each child and his/her mother were invited to the playroom for observation of the child's attachment behaviors. All of these procedures took about 2-2.5 hours to complete. All the mothers were informed about the content and duration of the interview, and all gave consent to participate in the study, except for one mother that did not give permission to be videotaped in the playroom.

Statistical Analysis

SPSS 11.0 was used for statistical analysis (Statistical Package for Social Sciences). The categorical variables were evaluated with the chi-square (χ^2) test and Fisher's chi-square test. For the continuous variables, when the parametric test assumptions were met, the two groups were compared using Student's t-test (the significance of the difference between two means), otherwise we utilized the Kruskal Wallis test. The relationship between CARS scores and attachment behavior ratings of the two researchers were analyzed with Pearson's correlation analysis. The significance level was accepted as $P = 0.05$ for all statistical tests. The percentage of variables was given if they could be compared.

RESULTS

Sociodemographic and Clinical Variables

There were no significant differences between the two groups in terms of age, gender, or mean Stanford-Binet intelligence score. Mean age of the autistic children was 37.9 ± 6.8 years and 41.2 ± 8.5 years for the children with developmental disability. The study group consisted of 15 (78.9%) male and 4 (21.1%) females, whereas the control group consisted of 12 (66.7%) males and 6 (33.3%) females. Mean Stanford-Binet intelligence score was 70.8 ± 12.5 in the study group and 74.3 ± 19.2 in the control group. In the study group the Stanford-Binet

could not be administered to 5 children (26.3%), versus 3 (16.6%) children in the control group. There were no significant differences between the two groups in terms of their ranking among siblings in the family. Among the children with autism, 11 (57.9%) were the first child in their family, 5 (26.3%) were the second child, and 3 (15.8%) were the third child; among children with developmental disability, 7 (38.9%) were the first child in their family, 6 (33.3%) were the second child, 5 (27.8%) were the third or later child.

There were no differences between the two groups in terms of mothers or fathers mean age and level of education, or the employment status of the mothers and fathers. Mean age of the study group mothers was 30.9 ± 5.9 years and 30.0 ± 5.4 years for the control group mothers. Mean age of the study group fathers was 36.6 ± 7.6 years and 38.1 ± 5.8 years for the control group fathers. Mean level of education of the study group mothers was 10.5 ± 4.2 years and 11.0 ± 3.9 years for the control group mothers. Mean level of education of the study group fathers was 12.8 ± 3.1 years and 11.2 ± 3.7 years for the control group fathers. Eight (42.1%) of the study group mothers and 7 (10.5%) of the control group mothers worked outside the home. Among the study group fathers, 13 (68.4%) were civil servants, 4 (21.1%) worked freelance, and 2 (10.5%) were workers. Among the control group fathers, 11 (61.1%) were civil servants, 4 (22.2%) were workers, and 2 (16.7%) worked freelance.

There was a significant statistical difference between the two groups in terms of the age at which symptoms of the child were first observed and the nature of the first symptoms, the age of first consultation to a physician for the symptoms, language development (defined as meaningful and appropriate word - at least one word), and CARS scores (Table 1). The correlation between the two researchers' CARS scores (who are blind to each other's results) was 0.973 for the study group and 0.986 for both the study and control groups. CARS scores in the study group were significantly higher than those in the control group, according to both researchers. Among the study group, 13 (68.4%) children scored between 37 and 60 on CARS, according to both researchers. None of the children in the control group scored between 37 and 60, according to both researchers.

Attachment Behaviors

Data on attachment behaviors in both groups are presented in Table 2. Statistically significant differences were observed between the two groups in terms of at-

tachment behaviors when mother and child stayed together in the playroom. Children with autism disorder established more remote relationships and fewer mutual relationships with their mothers compared to the children in the control group. Similarly, a statistically significant difference was observed between the study and control group children with regard to attachment behaviors when the mother, child, and stranger stayed together in the playroom. Children with autistic disorder were less concerned with strangers or established more remote relationships with them compared to the control group children, whereas more of the children in the control group established reciprocal relationships with the strangers. In terms of attachment behaviors to mother and stranger, the study group children established closer relationships with their mothers than with the strangers. We did not observe a statistically significant difference in the children with developmental disability in terms of attachment behavior to their mothers and to the strangers (for children with autistic disorder: $P < 0.01$; $\chi^2 = 23.138$; for children with developmental disability: $P > 0.05$; $\chi^2 = 1.286$). There were no statistically significant differences between the two groups in terms of separation from and reunion with their mothers. In each group, one child did not accept being separated from his/her mother and did not let his/her mother leave. Thus, the reunion condition could not be evaluated.

There was a statistically significant difference between the 2 groups in terms of "giving something or showing something" when both groups were compared on social behaviors demonstrated when the mother and child, or the mother, child, and stranger stayed together in the playroom (when mother and child stayed together $P < 0.01$; $\chi^2 = 22.954$; when mother, child, and stranger stayed together $P < 0.01$, $\chi^2 = 7.709$). When mother and child stayed together, one of the children with autism (5.3%) and 15 (83.3%) of children with developmental disability gave or showed something to their mother. When mother, child, and stranger stayed together, one of the autistic children (5.3%) and 8 (44.4%) of the children with developmental disability gave or showed something to the stranger.

The correlation between the two researchers that evaluated the attachment behaviors while blind to each other's ratings was 0.90 when the child and mother stayed together, and was 0.89 when the mother, child, and stranger stayed together. It was 0.98 during separation from mother and 100.00 during the reunion with the mother.

Mothers' Evaluation of the Child's Attachment Behavior

There was a group difference in terms of the mothers' correct predictions of their children's attachment behaviors only when the mother and the child stayed together ($P \leq 0.05$, $\chi^2 = 4.014$). More mothers of children with developmental disability correctly predicted their child's attachment behaviors than study group mothers (study group: 35.3%; control group: 71.4%). In all, 76.5% of the study group mothers predicted that their children would form a reciprocal relationship with them; however, only 29.4% of the children established a reciprocal relationship with their mother.

Variables Related to Attachment Behaviors in Children with Autism

The relationships between age and Stanford-Binet intelligence score, and attachment style of the mother, language development, CARS score, and attachment behavior was evaluated only in the study group. In all, 8 (42.1%) of the study group mothers reported that their attachment style was secure, whereas 11 (57.9%) reported that it was insecure. There were no statistically significant relationships between age, Stanford-Binet intelligence score, mother's attachment style, language development, CARS score, or attachment behaviors when the mother and child stayed together, when mother, child, and stranger stayed together, or when separation/reunion occurred. Moreover, there wasn't a relationship between the mothers' RSQ scores for each attachment style and attachment behaviors. Mother's attachment style and the predicted attachment behaviors of their children were statistically significantly related only when the mother, child, and stranger stayed together ($P \leq 0.05$, $\chi^2 = 9.143$). In this respect, mothers that predicted their child would be physically remote and indifferent were securely attached, while mothers that predicted their child would establish physical contact with them were insecurely attached.

There were no relationships between age, Stanford-Binet intelligence score, attachment style of the mother, and the children's attachment behaviors when the children were separated from their mothers. There was a statistically significant relationship between language development and attachment behaviors; and, CARS score, and attachment behaviors. The children with higher levels of language development showed less indifference when their mothers left the playroom, called more for their mothers, and exhibited more behaviors to prevent

their mothers from leaving. Similarly, during separation from mother, CARS scores of children that were indifferent to their mother's leaving and CARS scores of those that made distant contact with their mother were significantly higher than CARS scores of children that went after the mother and CARS scores of those that called to their mother or did not let her leave. The results of the analysis of the relationship between attachment behaviors and the related variables are illustrated in Table 3.

DISCUSSION

In the present study we observed that children with autistic disorder exhibited attachment behaviors to their mothers that were similar to those of children with developmental disability. Nonetheless, the autistic children established relationships that were more distant and less reciprocal with their mothers than did the children with developmental disability. In terms of social behavior towards mothers and strangers, unlike the control group children, those in the study group established closer relationships with their mothers than with strangers. This observation could be related to differences in children with autism in forming relationships, as well as the inability of children with developmental disability to show appropriate behavior to strangers. Normally developed children generally remain distant from strangers during the SSP, but in the present study, children with developmental disability did not remain distant from them even though they saw these strangers for the first time in their lives during the test. Cognitive development in the control group might not have progressed sufficiently enough for the children to perceive strangers as dangerous and, therefore, they might have remained closed to the strangers. Alternatively, they might have approached the strangers confidently due to their secure attachment with their mothers or other cultural variables.

One study that investigated attachment behaviors in normally developed children in Turkey reported that the children exhibited attachment behaviors, yet they did not exhibit the age-relevant expected reaction to strange situations, which was posited to be the result of the children's decreased anxiety about strangers due to the increased number of people that make direct contact with babies and their mothers in Turkey (Atasoy, 1997).

Children with autism disorder displayed attachment behaviors that were similar to those observed in the control group during separation and reunion with their mother, which is similar to previous findings (Shapiro et al., 1987; Rogers et al., 1991, 1993; Dissanayake and

Crossley, 1996, 1997; Naber et al., 2007a). Children with autism disorder exhibit behaviors towards their mothers that are more social than those directed towards strangers, and they search for closeness with their mother similarly to control groups (Buitelaar, 1995). However, a meta-analysis investigated attachment in autism and reported that children with autism were less securely attached compared to those without autism, and it was suggested that autism has a moderate level of effect on the attachment style of children with the disorder (Rutgers et al., 2004).

The present study shows that children with autism differed from those with developmental disability in terms of joint attention—giving or showing an object to their mother and/or a stranger. Although past studies indicate that there is a relationship between joint attention, and language development, social relatedness, the ability to pretend, and the severity of autistic symptoms (Charman, 1997; Delincolas and Young, 2007; Naber et al., 2007c), no relationship was observed between joint attention and attachment in other studies (Naber et al., 2007c). Impairment in understanding others' behaviors and intentions seen in autism is suggested to disturb the development of internal working models related to self and parents, which leads to the inability to establish emotionally close relationships with parents (Baron-Cohen, 1989). Joint attention behaviors, including giving/showing an object to someone and bringing an object to someone, are basic to social life and any impairment in these behaviors might disturb attachment, which involves the understanding of others' emotional expressions and intentions. More studies on the relationship between attachment and joint attention are needed. We did not observe any statistically significant differences between the children with autism and those with developmental disability, in terms of attachment behaviors, except joint attention, when the mother and child or the mother, child, and stranger stayed together in the playroom. Nevertheless, we did observe that the children with autism formed different relationships with their mothers and strangers. These children looked at their mothers for short periods of time and tried to remain close to them, but rarely looked at their mother's faces, generally went to their mother while turning back to them, rather than playing with them, establishing reciprocal relationships with them, and wanting help from them. They sometimes made physical contact with their mother and remained closer to their mother after the stranger entered the playroom. They almost did not make any contact with the stranger. Unlike the children with developmental disability, they did not engage in pretend play.

In the present study statistically significant relationships between age, and intelligence score and attachment behavior in the study group were not observed. Rogers et al. (1991, 1993) suggested that secure attachment in autism is related to cognitive development of the child; developmental level is the most powerful predictor of attachment and, therefore, rather than autism itself, developmental delay is responsible for attachment disturbances. Nonetheless, most studies that investigated attachment in autism included children older than 4 years of age. Recent studies have shown that secure attachment is less prevalent among smaller autistic children compared to clinical control groups (Rutgers et al., 2007; van Ijendoorn et al., 2007), whereas others indicate there is no difference between the two groups in terms of secure attachment (Naber et al., 2007a). A meta-analysis that investigated attachment in autism studies indicates that children with only mental retardation and children with autism have less secure attachment (Rutgers et al., 2004). Other researches showed that there is no relationship between secure attachment and cognitive development in autism (Sigman and Ungerer, 1984; Shapiro et al., 1987; Sigman and Mundy, 1989; Rogers and Dilalla, 1990). One study showed that compared children with mental retardation and autism, those with mental retardation and language disabilities and a control group, children with high functioning autism have less secure attachment (Rutgers et al., 2007). Moreover, both cognitive development and the sensitivity of parents predict attachment security in children with developmental disorders (Moran et al., 1992; Atkinson et al., 1999). We recommend additional research to compare autistic children in different age groups and with different cognitive developmental levels, in terms of secure attachment.

In the present study the attachment behaviors of the children with autism were not correlated with the attachment style of their mothers, but were significantly correlated with the severity of autism and level of language development.

To the best of our knowledge this is the first study to investigate the relationship between autistic children's attachment behaviors and their mothers' attachment style. One study showed that although parents of children with autism are as sensitive to their children as the parents of children with developmental disability, their children's reciprocity was less than the control group's reciprocity with their parents (van Ijendoorn et al., 2007). Thus, the sensitivity of parents predicted secure attachment only for children without an autism spectrum disorder. Secure attachment in this study's autistic group was related

to socializing symptoms. Similarly, a study conducted with 2-year-old autistic children showed that as the severity of autism increases, secure attachment decreases (Naber et al., 2007a). A meta-analysis that investigated attachment in autism reported that the severity of autism has an effect on the level of attachment (Rutgers et al., 2004). Similar to the findings of this study there is a connection between secure attachment and language development (Rogers and Dilalla, 1990; Rogers et al., 1991, 1993; Dissanayake and Crossley 1997). Studies that investigated attachment security and mentalizing language use reported that children with secure attachment during reunion with the mother used words that have cognitive and emotional components in their conversations with their mother, but insecurely attached and disorganized children used a limited range of words and could not speak fluently (Etzion-Carasso and Oppenheim, 2000; Lemche et al., 2004).

There seems to be a connection between language development and behaviors that are important in attachment and social communication, such as following an adult's gaze, pointing behavior and imitation in normally developed children (Brooks and Meltzoff, 2005, 2008) and in babies with autism disorder (Toth et al., 2006; Delincolas and Young, 2007). When all these data are compared with the effects of a mother's sensitivity and attachment style, the severity of symptoms in the social and communication realm could be regarded as a strong determinant of child's attachment patterns or the severity of symptoms might be effected by the child's attachment security. Nevertheless, in the present study RSQ, which was the measure of the mothers' attachment styles and evaluated the mothers' attachment tendency in close relationships, romantic relationships, and other adult relationships, did not evaluate the mother's attachment style with her child. Future studies should be conducted with large samples to specifically evaluate the attachment style of mothers to their autistic children.

We observed that the mothers of autistic children correctly predicted their children's attachment behaviors similarly as the mothers of children with developmental disability, except for attachment behaviors that were exhibited by the children when they were with their mother alone in the playroom. The mothers of autistic children had expectations that their children would establish more reciprocal relationships with them during free play. Mothers who with secure attachment reported that their children would be indifferent to them in the situation when they, their child, and a stranger stayed together, whereas mothers with insecure attachment specified that their chil-

dren would be in physical contact with them. These findings imply that the mothers of autistic children perceived attachment behaviors in their children and despite their children's disability were hopeful about their children's relationship with them. Mothers in the study group incorrectly predicted that their children would establish reciprocal relationships with them and make more physical contact with them. Some of these mothers had an insecure attachment style. Regarding these findings, some of the autistic children may in fact have had reactive attachment disorder. Patients with reactive attachment disorder might be misdiagnosed with pervasive developmental disorder; a differential diagnosis could be made with regard to their response to treatment and care (Richters and Volkmar, 1994; Mukaddes et al., 2000). In the present study autism disorder was diagnosed based on detailed clinical examinations, and none of the patients had a history of unfulfilled emotional and physical needs, or of frequent caregiver changes that would have interfered with attachment to a permanent caregiver.

The present study has various strengths and limitations. This is the first study in Turkey to evaluate attachment in autistic children. Both children with autism disorder and developmental disability were evaluated in detail; findings of autism and attachment behaviors were evaluated by two researchers, and the inter-rater reliability was high. In future studies of attachment in autism, researchers trained to use SSP could evaluate attachment styles. The small study and control groups limit generalization of the study's findings. Only the mother's attachment styles were evaluated in this study; the fathers' attachment styles were not. Because the attachment object of a child might also be its father, future research should evaluate fathers' attachment. The existence of motor development delays in the children with developmental disability might have negatively affected the mother-child relationship by delaying the individualization process of the child, which might have negated any differences between the study and controls groups in terms of attachment behaviors during separation from and reunion with their mothers.

During the SSP we explained the expected attachment behaviors to the mothers and asked for their predictions of their children's behavior; this might have affected the mothers attitudes towards their children, which in turn might have affected their children's attachment behaviors. Studies should be conducted with large samples of children who differ in terms of the severity of autism and cognitive development; these studies might provide more information on the relationships between

attachment, and cognitive development and severity of autism. Multiple observations of attachment behaviors in different environments might also provide more consistent results, in terms of attachment behaviors.

In the present study autistic children exhibited attachment behaviors and exhibited more attachment behaviors towards their mother than towards a stranger that were similar to those of the children with developmental disability. The two groups differed in terms of joint attention; autistic children had poorer performance on joint attention. As there is a relationship between the

severity of autism and language development, early diagnosis and treatment of autism are important for reducing symptoms, and enhancing secure attachment and language development in relation to secure attachment. In the early phase of autism parents of these children are able to deal with difficulties more easily (Rutgers et al., 2007). Because children with autism have limitations in establishing reciprocal relationships, the understanding and responding of the attachment behaviours and attachment needs of these children would enhance child's secure attachment patterning and hence child's social development.

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Appendix 1. Attachment behavior form

A. Mother and child are together, or mother, child, and stranger are together.		Yes	No
Indifferent	1. Indifference: Indifferent, not interested.		
Distant relationship	2. Look: Child's gaze is oriented towards the caregiver.		
Close relationship	3. Look and smile: Child looks at the caregiver while smiling.		
Reciprocal relationship	4. Close relationship: Child stays one step away from the caregiver.		
	5. Giving/showing something: Child gives an object to the adult, brings the object for the adult to see, or makes the adult to look at the object by pointing to the object or by making noises.		
	6. Reciprocal play: Child plays with the adult with/without toys.		
	7. Physical contact: All physical contact is initiated by the child (touch, kiss, sit on lap).		
B. Separation from mother.			
Indifference	1. Child looks at the mother for a while, or does not look at her and continues with the play.		
Distant relationship	2. Child looks frequently at the door during separation.		
Going back to mother	3. When mother is leaving the room the child looks at the door, makes noises, or says something. Child looks at the door after she leaves and then continues to play.		
Calling the mother or not letting her go	4. When mother is leaving and the child orients towards the door, but his/her attention shifts to another direction or continues to play when understanding that the mother has left the room.		
	5. Child stays in front of the door for a while after the mother leaves.		
	6. Child stays still, cries, calls for the mother, makes noises, or goes after her while crying or saying something when the mother leaves.		
	7. Child goes back to the mother, starts physical contact with the mother when she turns towards the door.		
	8. Child does not let the mother go or makes her return and sits on her lap.		
C. Reunion with the mother.			
Indifference	1. Child does not look at the mother and is indifferent to her return.		
Distant relation	2. Child looks at the mother and continues to play without making any other contact.		
Close relationship/approaches the mother	3. Child looks at the mother, smiles, makes noises, says something, or shows her something.		
Reciprocal relationship	4. Child moves to approach the mother, but his/her attention shifts elsewhere.		
	5. Child approaches the mother without any physical contact and remains close to her whenever the mother enters the room.		
	6. Child approaches the mother and gives her a toy or shows her an object.		
	7. Child cries while approaching the mother, smiles, makes noises, or says something.		
	8. Child approaches the mother and makes physical contact with her whenever she enters the room.		