

Attachment and social behavior in children's autistic disorders

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Abstract

Children with Autism Spectrum Disorder (ASD) have difficulties in the development of social interaction which may be tied to the attachment relationship with their caregivers.

The aim of the study is to explore the quality of relationship of attachments in 10 children with ASD and the differences in attachment classification (Ainsworth, Blehar, Waters, & Wall, 1978) with 10 typically developing children. Furthermore, the Akdemir, Pehlivanlı, Unal, and Ozusta (2009) form was used to investigate attachment-related social behavior between child and adult.

Results suggest that, although children with ASD can develop secure attachment relationships with their caregivers, the quality of social relations during episodes of separation and reunification may be impaired.

Keywords: Attachment; Strange Situation Procedure; Social behavior; Preschool children; Autism.

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1. Introduction

The term “attachment” describes an affective bond that develops between the child and his caregivers (e.g., mother or father) (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1969, 1982; Cassidy & Shaver, 1999). The attachment system is activated when the child is in a state of need, or when it feels threatened by the environment (Rutgers, Bakermans-Kranenburg, van IJzendoorn, & van Berckelaer-Onnes, 2004). In these situations, attachment helps children to communicate with their caregivers, to search for them when they are out of sight, and to pursue physical closeness with them (Akdemir, Pehlivanürk, Unal, & Ozusta, 2009). Therefore, through the attachment behaviors, the child anticipates the responses of the caregiver to the child’s requests for comfort; this has the function of regulating negative emotions and coping with stress (Rutgers, van IJzendoorn, Bakermans-Kranenburg, Swinkels, van Daalen, Dietz, *et al.*, 2007). So, the main function of attachment is the child’s protection (Oppenheim, Koren-Karie, Dolev, & Yirmiya, 2008; Akdemir *et al.*, 2009).

According to Attachment Theory (Bowlby, 1989), children develop four different attachment styles or patterns: secure, anxious-ambivalent, anxious-avoidant, and disorganized attachments. Children feel secure (or insecure) in their attachment to their caregivers according to the quality of care they receive (Ainsworth *et al.*, 1978). In fact, attachment disorders occur in situations of social, physical, and emotional deprivation (Boris, Zeanah, Larrieu, Scheeringa, & Heller, 1998; Smyke, Dumitrescu, & Zeanah, 2002; Boris, Goldblatt, Galanko, & Jill James, 2004).

Ainsworth *et al.* (1978) was developed to formulate the Strange Situation Procedure (SSP) in order to examine the relationship between attachment and exploratory play, and to assess if bond attachments of children are secure or insecure. SSP is the method most widely used to evaluate attachment in infants and toddlers (Oppenheim *et al.*, 2008).

In addition, this procedure has been used in the majority of observational and experimental studies that have examined the (sequential or simultaneous) display of contradictory attachment behavior, expressions of fear or apprehension regarding the parent, stereotypical behavior, undirected movements and expressions, and freezing or stilling of all movement: indicative of disorganized attachment (Main & Solomon, 1990). Stereotypical behavior and freezing or stilling, may be indicative of either disorganized attachment or neurological impairment, or both (Pipp-Siegel, Siegel, & Dean, 1999).

The attachment bond with the caregiver is investigated in studies of ASD because this disease is a disorder of neural development, characterized by compromised social interaction and verbal and non-verbal communication (American Psychiatric Association, 2014).

Several studies have demonstrated that in spite of the impairments in the social and communication skills of children with Autism Spectrum Disorder (ASD) and in their capacity to initiate interaction and engagement with others (Sigman & Capps, 1997), approximately 50% develop secure attachments to their mothers (Shapiro, Sherman, Calamari, & Koch, 1987; Rogers, Ozonoff, & Maslin-Cole, 1991; Capps, Sigman, & Mundy, 1994; Dissanayake & Crossley, 1997; Willemsen-Swinkels, Bakermans-Kranenburg, Buitelaar, van IJzendoorn, & van Egeland, 2000; Rutgers *et al.*, 2004). In contrast with Kanner's theory (Kanner, 1943), research studies conducted with 76 mothers and 30 fathers, show that children with autism may establish attachment bonds to their caregivers (Goodman & Glenwick, 2012), in fact in SSP they display social behavior (i.e., the search for closeness and physical contact with their caregivers) (Sigman & Ungerer, 1984; Sigman, Mundy, Sherman, & Ungerer, 1986; Sigman & Mundy, 1989). Subsequently, some studies of 30 children have shown that individuals diagnosed with autism spectrum disorders have distorted reciprocity compared to typical development children, but not a lower level of secure attachment (Shapiro *et al.*, 1987; Rogers *et al.*, 1991; Rogers, Ozonoff, & Maslin-Cole, 1993; Buitelaar, 1995; Dissanayake & Crossley, 1996, 1997; Naber, Swinkels, Buitelaar, Dietz, van Daalen, Bakermans-Kranenburg *et al.*, 2007; Chandler & Dissanayake, 2014).

The most recent studies on the attachment relationship in autistic children have investigated the relationship between severity of autism (i.e., in terms of language development and cognitive development) and attachment level, in order to provide clarity of discordant results. In fact, while previous studies (Sigman & Ungerer, 1984; Shapiro *et al.*, 1987; Sigman & Mundy, 1989; Rogers & DiLalla, 1990; Rogers *et al.*, 1991, 1993; Willmsen-Swinkels *et al.*, 2000) report that there is no relationship between attachment and cognitive development in children with ASD, other studies, with a mean of 80 children as participants, show that the severity of autism is positively related to a lower level of secure attachment (Naber *et al.*, 2007; van IJzendoorn, Rutgers, Bakermans-Kranenburg, Swinkels, van Daalen *et al.*, 2007; Beurkens, Hobson, & Hobson, 2013) and that variables such as child diagnosis and child cognitive skills have significant main effects on attachment behaviors (Grzadzinski, Luyster, Spencer, & Lord, 2014). It is

also important to analyze autistic social behavior in the attachment process. Akdemir *et al.* (2009) have assessed attachment behavior in this regard to investigate differences in attachment-related social behavior in 19 autistic and developmental disability infants, with an “Attachment Behavior Form”. Researchers have created this instrument with observation of attachment behavior of typically developing children evaluated in an adapted version of the SSP (Ainsworth *et al.*, 1978) in which separation and reunion were conducted only once. While the coding system of the eight episodes of the SSP refers to four categories of analysis: (1) proximity seeking; (2) contact maintenance; (3) contact resistance; (4) avoidance, each of which then becomes a scale along which to classify the behaviors produced in terms of intensity (e.g.: Very Active Effort and Initiative in Achieving Physical Contact; Some Active Effort to Maintain Physical Contact; Very Intense and Persistent Resistance; Very Marked and Persistent Avoidance), the “Attachment Behavior Form” consists of four episodes: (a) mother and child are together, or mother, child and stranger are together; (b) separation from mother; (c) reunion with the mother. This is because, as a general rule, children with autism have difficulties dealing with disruptions of daily routines (Van Berckelaer-Onnes, 1983), and for some of these children, unexpected separations are quite distressing.

The observation of these situations helps identify attachment behaviors that a child makes, and then to identify the reactions and the type of relationship with the mother. The form developed by Akdemir *et al.* (2009) shows in more detail the type of conduct assumed by the child towards the mother and the stranger, thus highlighting a qualitative level of the behavioral problems of autistic children during these relational exchanges. Using this observational procedure, Akdemir *et al.* (2009) observed that children with ASD exhibited secure attachment behaviors to their mothers but showed relationships more distant and less reciprocal with their mothers than children with developmental disabilities. Finally, children with ASD showed attachment behaviors that were similar to those of children with developmental disabilities during the separation and reunion with their mother; however, there is a difference between those with developmental disability in joint attention, giving or showing an object to their mother and/or a stranger.

According to the above considerations, the present study aims to evaluate the behavior exhibited during the SSP in order to explore the quality of the attachment relationship in children with autism and, based on the results of

Akdemir *et al.* (2009), to investigate the type of social behavior exhibited during the four episodes described in the Attachment Behavior Form.

The basic hypothesis is that, in situations of atypical development such as autism, although children with autism can develop secure attachment relationships with their caregivers, the quality of social relations during episodes of separation and reunification may be impaired.

2. Methods

2.1. Participants

The study group consisted of 10 children diagnosed with ASD or PDD-NOS according to DSM-V criteria (American Psychiatric Association, 2014) and 10 typically developing children. Only males were included in order to minimize the within-group variability and because the ratio of ASD in the population is four to five boys to one girl. The children were between 32 and 54 months of age (mean age 43.2 months \pm 15,13) and in order to be included in the study had to be residing at home, have a mental age above 13 months and not have any known medical problems (Tab. 1).

Children with ASD were recruited through the Department of Child Neuropsychiatry in a Policlinic Hospital in Sicily, a region of Southern Italy. The control group was recruited through Sicilian nursery schools. In these nursery schools, letters were distributed to the children's parents who met the inclusion criteria: 1) chronological age from 32 and 54 months; 2) absence of medical or pathology conditions which could interfere with the study; 3) written consent of the parents.

2.2. Assessments of children's level of functioning

Depending on the child's chronological age and cognitive level, the following developmental test was used: the Italian edition of Griffith's Mental Development Scales-ER (GMDS-ER) (Luiz, Barnard, Knoesen, Kotras, Horrocks, McAlinden *et al.*, 2006). This is a translation from the original English version but there is no Italian standardization; standards norms are English.

Furthermore, a control group of typically developing children was matched with the study group in terms of developmental level. Based on parental reports and the observations of psychologists, the control group children ($n = 10$; mean age 31.0 months \pm 17.0 and mean developmental

level 28.5 ± 6.6) were free from any child psychiatric disorder (Tab. 1). This group was matched in terms of developmental level to clinical group; Student's t-test showed no significant differences between the two groups [$t(18) = -.64, p = .94$].

Table 1 - Characteristics of research participants

Groups	Measures	Values
ASD/PDD-NOS	<i>N</i> of males	8/2
	Months	$M = 43.20; SD = 15.13$
	Developmental level	above 13 months
Control	<i>N</i> of males	10
	Age	$M = 31.00; SD = 17.00$
	Developmental level	$M = 28.50; SD = 6.60$

2.3. Assessments of autistic children's diagnosis

In order to observe the occurrence or non-occurrence of important behaviors in the diagnosis of autism and other pervasive developmental disorders across developmental levels and chronological ages, the Italian adaptation of the Autism Diagnostic Observation Schedule (ADOS-2) (Lord, Rutter, DiLavore, Risi, Luyster, & Gotham, 2013) and the Italian adaptation of the Autism Diagnostic Interview – Revised (ADI-R; Rutter, Le Couteur, & Lord, 2005) were used (Tab. 2). The clinical group was evaluated using module one of the ADOS. Both the ADOS and the ADI-R were administered by two trained and certified clinicians. Reliability was maintained on an ongoing basis by researchers/clinicians who were blind to any other information about the children.

Children were classified as having ASD if they fulfilled the criterion for ASD on the ADI-R and the ADOS, and as having PDD-NOS if they fulfilled the criterion for PDD-NOS in both assessments. Eight of the children were diagnosed with ASD, and two were diagnosed with PDD-NOS.

The participants were evaluated clinically and a final classification based on the best clinical judgment was made by researchers/clinicians who were blind to any other information about the children.

Table 2 - *Diagnostic evaluation characteristics*

Characteristic	ASD	PDD-NOS
<i>N</i> of males	8	2
ADOS Social Affect Total	<i>M</i> = 10.44; <i>SD</i> = 3.78	<i>M</i> = 4.22; <i>SD</i> = 3.66
ADOS Restricted/Repetitive Behavior Total	<i>M</i> = 4.68; <i>SD</i> = 2.11	<i>M</i> = 1.30; <i>SD</i> = 1.36

2.4. Measures

2.4.1. Strange Situation Procedure

Children's attachment was assessed using the SSP (Ainsworth *et al.*, 1978), a validated procedure for assessing child-mother attachment in typically developing children. It has also been used in studies of children with developmental disabilities including ASD (Rutgers *et al.*, 2004). Children's behavior in the SSP was classified into the four-fold attachment classification system (A – Avoidant, B – Secure, C – Resistant, or D – Disorganized) based on the coding systems developed by Ainsworth *et al.* (1978) and Main and Solomon (1990), while taking into consideration the distinction between neurological and non-neurological D behaviors (Pipp-Siegel *et al.*, 1999).

2.4.2. Attachment-related Social behavior

During the SSP, the behavior of the children toward their mothers and the strangers was checked on an Attachment Behavior Form (Akdemir *et al.*, 2009). In this form, attachment behavior was evaluated by taking the child's highest scoring behavior level during observation. Each child's behavior at different stages of the SSP (e.g., mother and child alone; mother, child and stranger) was evaluated by his/her highest behavior score and the attachment behavior was compared with those of typically developing children.

The observation schedule prepared by Akdemir *et al.* (2009) shows all the types of relationships that the child establishes with the caregiver in different situations proposed by the SSP. The attribution to a specific type is allowed by observation of attachment behaviors reported in the schedule. In this schedule, for each of the four episodes (mother and child are together, or mother, child and stranger are together; separation from mother; reunion with the mother), four types of behavior are described: indifferent (e.g.:

Indifference: Indifferent, not interested), distant (e.g.: Look: Child's gaze is oriented towards the caregiver), close (e.g.: Child stays one step away from the caregiver), and reciprocal relationship (e.g.: Reciprocal play: Child plays with the adult with/without toys) (for more details see Akdemir *et al.*, 2009).

The distinction of the type of relationship is made possible by the observation of the behaviors listed above. In particular, the research of the categories of relationship attributed to each child was made possible through the identification of the observed behavior for each situation in the SSP to which the subject was submitted.

2.5. Procedure

Children's parents were informed about the content and duration of current research and all gave their consent to participate in the study and be videotaped in the playroom.

In the second phase, the SSP and the ADOS were included and the entire visit was videotaped. In the third phase, the children were administered a developmental test.

3. Data analysis

Study data were analyzed using SPSS (Statistical Package for Social Sciences) 14.0 for Windows. In order to evaluate the categorical variables, chi-squared (χ^2) was carried out; in order to evaluate the significance of the difference between means of the two groups, Student's t-test was used.

4. Results

4.1. Attachment

Attachment classifications did not differ between the group with ASD and the group without ASD whether considered at the two-way (secure-insecure), or three-way (secure, resistant, avoidant) levels (Tab. 3).

Table 3 - *Frequencies of attachment classifications*

Attachment types	Groups		
	N (%)		
	With ASD	Without ASD	Totals
A	2 (20%)	1 (10%)	3 (15%)
B	7 (70%)	8 (80%)	15 (75%)
C	1 (10%)	1 (10%)	2 (10%)
Totals	10	10	20

A = Avoidant; B = Secure; C = Resistant

However, because of the higher percentage of secure attachment in both groups, the frequencies of secure sub-classifications were compared: B1- More distal signals when the mother returns (rather than seeking contact, the children make use of vocalizations and smiles and show toys), little distress to the separation, some signs of avoidance; B2 - Children avoid the mother in the first reunion, seeking proximity to the second reunion. (before, they avoid the mother, then seek her strongly); B3- Children are very secure, do not show any resistance to contact, they calm down easily in the reunion and then begin to play; B4 - Children maintain contact more strongly than children B3, show much distress to the separation and need more time to calm down (for more information see Waters, 2002). Only in B3 secure sub-classifications were the frequencies significantly different [$\chi^2_1 (N = 15) = 8.07, p = .02$], because this sub-classification was not present in children with ASD, but was present in 67% of typically developing children. In the other subcategories the frequencies were not significant [B1: $\chi^2_1 (N = 15) = .07, p = .80$; group with ASD = 56%, group without ASD = 22%. B4: $\chi^2_1 (N = 15) = .60, p = .44$; group with ASD = 22 %, group without ASD = 11%]. In both groups, no child showed B2 secure sub-classification.

According to the behavioral rating scales scored during SSP (e.g.: avoidance, proximity seeking, contact maintenance and resistance) that identify infant classification, attachment security was observed in this dimensional perspective (Fraley & Spieker, 2003). The results underlined only a difference between two groups on the avoidance dimension when infants were with a stranger (Tab. 4).

Table 4 - Differences between two groups in behavioral rating scales of SSP

	Groups	<i>N</i>	<i>M</i>	<i>SD</i>	<i>t</i>	Sig. (2-tailed)
Proximity seeking	with ASD	7	32.86	7.15	-.88	.40
	without ASD	8	35.38	3.66	-.84	.42
Contact maintenance	with ASD	7	23.86	5.96	-1.11	.29
	without ASD	8	27.63	7.03	-1.12	.28
Avoidance	with ASD	7	11.71	5.25	2.43	.03
	without ASD	8	6.50	2.88	2.34	.04
Resistance	with ASD	7	7.71	2.06	.48	.64
	without ASD	8	6.88	4.22	.50	.63

More specifically, children with ASD ($M = 11.71$; $SD = 5.25$) showed significantly higher overall scores than typically developing children [$(M = 6.50$; $SD = 2.87$); $t_{13} = 2.43$, $p < .05$].

No differences were observed on the proximity seeking, contact maintenance and resistance dimensions.

Moreover, duration of the reaction time and eye contact were observed during SSP. Within the secure attachment classification, children with and without ASD did not differ in reaction time of the relationship with their interaction partner ($t_{13} = .40$, $p > .05$). Two groups differed on eye contact ($t_{13} = -4.33$, $p < .05$). Two groups differed on eye contact. In particular, in duration of eye contact with their mother, typically developing children ASD ($M = 477.14$; $SD = 78.88$) showed significantly higher overall scores than children with ASD ($M = 275.00$; $SD = 213.60$).

4.2. Attachment – related Social behavior

Statistically significant differences were observed between autistic children and children without autism on attachment–related social behavior (Akdemir *et al.*, 2009).

When the mother and child stayed together, children with ASD established a closer relationship [$\chi^2_1 (N = 20) = 7.50$; $p < .01$] and fewer

reciprocal relationships with their mothers ($\chi^2_1 = 9.89$; $p < .01$) compared to the typically developing children.

Similarly, a difference was observed in the situation when the mother, child, and stranger stayed together in the playroom. Children with ASD established a closer relationship ($\chi^2_1 = 5.05$; $p < .05$) and fewer reciprocal relationships ($\chi^2_1 = 10.76$; $p < .001$) with the mother and stranger than typically developing children.

Also, statistically significant differences were observed between the two groups, when separation from the mother occurred. Children with ASD established a more distant relationship with their mother than typically developing children ($\chi^2_1 = 6.66$; $p < .05$).

In terms of “giving something or showing something” there was a difference between the two groups. Specifically, typically developing children established a relationship with their mother ($\chi^2_1 = 9.90$; $p < .05$) or stranger ($\chi^2_1 = 10.77$; $p < .05$) by giving or showing something or playing with them, whereas children with autism gave or showed nothing.

5. Discussion and conclusions

The aim of this study was to explore the quality of relationship of attachment in autistic children.

No differences were found in the secure/insecure classification rates between the group with ASD and without ASD. However, a group difference emerged in how secure attachment was expressed in the two groups. Although children with ASD showed a good capacity for attachment as well as the typically developing children, in comparison, children with ASD do not show typical behaviors of the subcategory B3, which is the subtype of more secure attachment. These data seem to confirm the difficulty in relating to the caregivers of children with autism, but do not eliminate the possibility of building relationships and developing secure attachment.

Also, this study underlines that when autistic children are with a stranger, they show significantly higher overall scores than typically developing children on the scale of avoidance of contact and interaction. Unexpectedly, for the duration of the reaction time of the relationship, no differences were detected between children with and without autism. The two groups differed on eye contact. In particular, in the duration of eye contact with their mother, typically developing children showed significantly higher overall

scores than infants with ASD. This reveals that children with ASD show difficulties in maintenance but not in relationship seeking.

In addition, the present study focused attention on behavior showed by children during episodes of interaction with the mother and stranger in order to investigate what behavior was prevalent, focusing attention above all on behavior to give or show something similar to joint attention. The analysis conducted through the Attachment Behavior Form (Akdemir *et al.*, 2009) has allowed us to focus attention on the behavior that children showed during the SSP, which in turn allowed the reactions reserved for each specific episode to be identified. In particular, the analysis allowed the researchers to observe that children with ASD did not search for proximity through behavior such as “giving or showing something”, as has been observed in typically developing children.

The absence of this behavior in children with ASD to regulate the interaction, supports one of the assumed difficulties of autism: absent or deficit joint attention. This difficulty does not allow them to interact through the capacity to establish and maintain their attention toward what adults observe, expanding dyadic relations in triadic relations.

The data obtained using the Attachment Behavior Form (Akdemir *et al.*, 2009), together with the SSP, have confirmed the initial hypothesis, namely that, although children with ASD can develop secure attachment relationships with their caregivers, the quality of social relations during episodes of separation and reunification, may be impaired.

This study also investigated the reactions that children show during separation from their mothers. Children with ASD remain indifferent and they continue to play, while typically developing children search for a relationship by asking for something from the stranger or making a noise, to demonstrate their awareness of their mother’s absence.

This further analysis, conducted using the Attachment Behavior Form (Akdemir *et al.*, 2009), has enabled us to deepen our understanding of the social behaviors that are deficient in children with ASD, and should become an object of rehabilitative intervention.

The present study contains points of strength and points of weakness. One of the strengths is represented by an interest in the field of investigation that has only recently obtained attention from the experimental world; a recent study (Hudry, Aldred, Wigham, Green, Leadbitter, Temple *et al.*, 2013) about children with ASD has revealed a fundamental importance for parent-child interaction, in the initial phase of development, because this promotes the best developmental outcomes, so in this field of investigation

there is an evident expansion and application. Another strength is represented by the integration of the research exploring the style of attachment in children with ASD, compared to typically developing children, through the SSP and the analysis of attachment behavior, with subsequent reactions that children reserved for specific episodes of SSP. In this way, reference to a study by Akdemir *et al.* (2009) allowed, through the observation grid used by the authors, more information to be obtained about the relationship of attachment, using the SSP, validating this new grid of observation which is still not in widespread utilization.

One point of weakness is the small number of participants in the study. The sample consisted of 10 participants and, therefore, there are issues related to power analysis and the lack of ability to generalize findings from this sample due to this small size. This study should be replicated with a greater number of subjects to confirm the results.

The aim of these further studies should be to acquire a more complete overview of this experimental field, and achieve greater knowledge of it through contributions that are ever more valid and reliable. Furthermore, this field of investigation focuses on social deficit as a more evident and compromising deficit of autism, thus promoting an increase of interest in this new field of investigation, with the aim of allowing achievable intervention that can improve social ability in children with ASD, and so guarantee an improvement in their quality of life.

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