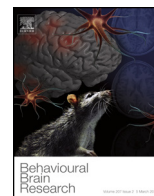




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### Research report

# Autism, attachment, and social learning: Three challenges and a way forward

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### HIGHLIGHTS

- Attachment in Autism Spectrum Disorder (ASD) is poorly understood.
- Abnormal social reciprocity in ASD often co-exists with normative secure attachment.
- Parent-child attachment interventions fail to improve social reciprocity in ASD.
- Selective affiliation is observed in individuals with ASD.
- A model is proposed herein to explain this phenomena.

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### ABSTRACT

We explore three challenges that Autism Spectrum Disorder (ASD) poses to our understanding of the processes underlying early attachment. First, while caregiver-infant attachment and later social-affiliative behavior share common biobehavioral mechanisms, individuals with ASD are able to form secure attachment relationships, despite reduced social-emotional reciprocity and motivation for social interaction. Therefore, disruptions in social affiliation mechanisms can co-exist with secure caregiver-infant bonding.

Second, while early attachment quality is associated with later social outcomes in typical development, interventions targeting caregiver-child interaction in ASD often show positive effects on parental responsiveness and attachment quality, but not on child social behavior. Therefore, improvements in parent-child bonding do not necessarily result in improvements in social functioning in ASD.

Third, individuals with ASD show normative brain activity and selective social affiliative behaviors in response to people that they know but not to unfamiliar people.

We propose a conceptual framework to reformulate and address these three theoretical impasses posed by ASD, arguing that the dissociable pathways of child-parent bonding and social development in ASD are shaped by (1) a dissociation between externally-driven and internally-driven attachment responses and (2) atypical learning dynamics occurring during child-caregiver bonding episodes, which are governed by and influence social-affiliation motives and other operant contingencies.

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## 1. Introduction

From infancy onward, children manifest a visceral desire for social affiliation [14,21,100]. The nature of this phenomenon, its origin in phylogeny and ontogeny, and its role in shaping human

experience and development, have been the subject of scientific and humanistic enquiry for centuries [37,68,78,84,99,124]. When John Bowlby introduced the concept of “attachment” (1969), his landmark proposition that selective social bonding between child and caregivers is the forerunner of later psychological well-being became a prominent organizing construct and a major research focus in developmental and clinical psychology.

Consistent with the theoretical tenets of the attachment theory, empirical research has documented a link between quality of child-caregiver attachment and later social-emotional outcomes across typical and atypical populations [59,101,103,131]. For exam-

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ple, quality of child–mother bonding has been found to moderate adult emotion regulation [28] and adaptive response to stressful events [69]. Interestingly, however, when researchers turned their attention to the attachment behavior of children with Autism Spectrum Disorder (ASD), a disorder defined by social reciprocity impairments (Diagnostic and Statistical Manual of Mental Disorders, 5th edition [DSM-5]; [2], a complex picture of impaired and intact behavioral manifestations of attachment emerged. This picture poses challenges to both constructs of attachment and ASD. In this article we explore three of the open questions that emerged from this literature and we outline an explanatory framework to interpret and advance knowledge in this field.

### 1.1. What are we talking about when we talk about attachment?

We shall begin by examining the multidimensional nature of the attachment construct. As argued by Rutter [98], the concept of attachment has served to increase precision in the field, by translating the fuzzy notion of “love” into a measurable set of behavioral manifestations. Nevertheless, such manifestations include a range of different behaviors, including distress upon separation from the caregiver and selective proximity-seeking. The most influential operationalization of attachment is Ainsworth’s “strange situation” paradigm, which classifies attachment quality based on the child’s response to two episodes of separations from and reunion with the caregiver [1]. While originally conceived to provide a proxy for ordinary situations in which children seek the caregiver in order be soothed when upset, this protocol highlights one particular dimension of attachment, i.e., distress and proximity-seeking behaviors in response to stressors/threats. We will define this phenomenon as an ‘externally-driven’ attachment response.

Other conceptualizations of attachment, however, appear to reflect ‘internally-driven’ attachment responses, that is, selective proximity-seeking that occur in the absence of external threats or stressors. For example, the NIMH Research Domain Criteria (RDoC) matrix, a classification of biologically-based dimensional processes that are relevant to atypical development [49], identifies ‘Affiliation and Attachment’ as a unitary construct within the ‘Social Processes’ domain, according to the following definition “*Affiliation is engagement in positive social interactions with other individuals. Attachment is selective affiliation as a consequence of the development of a social bond*”. As we argue throughout the rest of the paper, consideration of both externally-driven and internally-driven dimensions of attachment might be critical to address the puzzle of attachment behavior in ASD.

### 1.2. Autism, social attachment and social behavior: research findings and conceptual swings

“Autism” is the diagnostic concept originally articulated by Leo Kanner [55] to describe a clinical syndrome characterized by early emerging social communication abnormalities and behavioral rigidity. His emphasis on reduced social engagement, restricted/repetitive behaviors, and early onset of symptoms as the hallmarks of this condition has proven enduring, with current diagnostic definitions of ASD substantially adhering to Kanner’s diagnostic concepts [2].<sup>1</sup> While engagement in restricted and repetitive behaviors can be observed across a number of disorders [12], the social reciprocity impairments originally described by Kanner are unique to ASD. Compared to typically developing

children, children with ASD show fewer behaviors aimed at creating and maintaining social exchanges (e.g. vocalizing, mutual gaze, pointing to request or express interest, sharing emotions, showing objects to others, imitating, sharing attention, helping), as well as difficulties in understanding others’ communication and social cues. The centrality, earliness, and distinctiveness of these social impairments have lead scholars to view ASD as a disorder of social attachment since the early conceptualizations of this condition. For example, Mahler’s influential theory [67] posited that autism was caused by a pathological lack of child–caregiver attachment, whereby the child “*devoid of emotional ties to the person of the mother, is unable to cope with external stimuli*” [67], p. 682). The view that “unhealthy” parent–child attachment caused autism (explicitly endorsed by [14], p. 346) was later discredited, partly in response to emerging evidence that caregiving behavior in parents of children with ASD was indistinguishable from that of parents of children without ASD [27,31]. Nevertheless, the notion of autism as a disorder characterized by lack of social attachment continued to be embraced in the following three decades, but this was based on the premise that symptoms of ASD were the cause of impaired attachment, rather than the other way around (e.g. [18,96]). This notion is reflected in the current diagnostic definition of autism originally proposed in 1993 by the International Classification of Diseases (ICD-10; [130]), which lists, among other diagnostic criteria: “abnormal or impaired (...) development of selective social attachments”.

As the body of experimental research on attachment in ASD grew, the intuitive idea that the unique social reciprocity deficits defining this disorder must interfere with attachment formation turned out to be unsupported. The seminal study by Sigman and Ungerer [111] and subsequent research documented that ASD can, and in most cases does co-exist with secure attachment [17,19,32,45,58,91,92,95,94,108,110,117,118]. Key-findings from this body of literature include the following: 1) children with ASD respond preferentially to familiar people versus strangers (e.g. [56], 2) they seek proximity with caregivers after a separation in a way that in most cases does not differ from mental-age matched peers (e.g. [110], 3) the presence of a stranger causes children with ASD to engage in more proximity-seeking and less explorative behavior (e.g. [32], 4) when the quality of child–caregiver attachment relationship is assessed using the Strange Situation Procedure, the majority of children with ASD can be classified as having a “secure attachment” [94], 5) the proportion of children with ASD classified as having a “disorganized” attachment is higher compared to the normal population, but similar to mental-age matched children without ASD who have other (non-social) delays (e.g. [76]). Therefore, it appears that ASD does not preclude the establishment of secure social attachments. Importantly, this body of literature is based mostly on externally-driven attachment responses, i.e., behavioral manifestations of selective proximity-seeking that occur in response to stress/external threats.

At the same time a growing body of experimental research has pointed to the centrality of social motivation as a framework to describe and, according to some scholars, explain the core deficit of ASD [23,30]. Specific findings supporting the “social motivation” theory of ASD include the following: 1) a lack of preferential orienting toward social stimuli (e.g. human faces and voices) versus non-social stimuli (e.g. geometric patterns, non-human noises), with diminished social attention manifesting as early as in the first six months of life [53], and interest in non-social stimuli in toddlerhood predicting the developmental of ASD symptoms [85], 2) diminished engagement in social and cooperative activities throughout the lifespan [65,109,123], and 3) decreased expressions of pleasure in social situations, suggesting that individuals with ASD

<sup>1</sup> Currently, however, autism is conceptualized as a spectrum disorder (Autism Spectrum Disorder; ASD), a notion that reflects the homogeneity in the core impairments, as well as the continuum of variability in the clinical presentation of the symptoms.

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