



Attachment disorder and attachment theory – Two sides of one medal or two different coins?



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ABSTRACT

Introduction: Currently, attachment quality and attachment disorder exist in parallel, but the mutual association is still insufficiently clarified. For policy makers and clinical experts, it can be difficult to differentiate between these constructs, but the distinction is crucial to develop mental-health services and effective treatment concepts.

We aimed to investigate the association between attachment representations (AR) and attachment disorders (AD), including Reactive Attachment Disorder (RAD) and Disinhibited Social Engagement Disorder (DSED) in children aged between 5 and 9.

Methods: A total of 135 children aged between 5 and 9 years ($M = 7.17$ years, $SD = 1.40$, 63% male) and their primary caregivers participated in the study. Children were interviewed with the story stem method to assess AR, and the primary caregiver completed diagnostic interviews and questionnaires on mental disorders, AD, emotional and behavioral problems, and intelligence and development.

Results: The prevalence of AR in children with AD was 28.6% for the 'secure' form of AR, 17.1% for the 'insecure-avoidant' form, 25.7% for the 'insecure-ambivalent' form, and 28.6% for the 'disorganized' form. Prevalences of the various AR forms did not differ statistically significantly, indicating that AR is conceptually distinct from AD. Children with disorganized attachment scored significantly lower on language and intelligence skills than children with secure attachment. AD was significantly associated with a higher number of comorbidities, emotional and behavioral problems, and lower language skills.

Conclusions: Longitudinal studies using standardized assessment instruments are needed to systematically provide comparable and reliable empirical findings to improve current understanding of AR and AD as well as their etiological models.

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1. Introduction

Currently, attachment quality and attachment disorder exist in parallel, and clinical interventions and prevention programs [1] are being developed for either constructs [2]. Insufficient caregiving, maltreatment, abuse, and neglect in childhood are risk factors for

the development of attachment insecurity - in particular attachment disorganization is associated with severe mental disorder - and attachment disorders (AD), including Reactive Attachment Disorder (RAD) and Disinhibited Social Engagement Disorder (DSED) [2,3]. For policy makers and clinical experts, it can be difficult to differentiate between these constructs, but the distinction is crucial to develop mental-health services and effective treatment concepts. Both constructs are of considerable importance; on the one hand, the clinical diagnosis of attachment disorder allows direct access to mental-health services. On the other hand, attachment insecurity is associated with severe mental disorders. While research efforts are focusing on neurobiological parameters relevant to attachment

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and affiliation [4], such criteria need yet to gain ground in daily clinical practice.

Although attachment disorders and insecure attachment are established indices of attachment disturbance, debates of their relationship are ongoing [5,6]. Thus, we aimed to investigate the association between AR and AD in middle childhood.

1.1. Attachment representations in middle childhood

Attachment theory mainly bases on the assumption that the infant's early caregiving experiences build the foundation for mental representations of self and others that persist throughout the child's development [7,8]. These internal models guide the child's behavior and affect future relationships as well as his or her self-perception in relation to others [9,10]. Accordingly, attachment is a dynamic process and a possibility of observing and understanding dyads. The majority of attachment research in terms of development and particularly in psychiatric disorders has focused on infants, adolescents, and adults, while children aged between 6 and 12 have largely been neglected [11,12]. As the child's cognitive, emotional, and linguistic abilities mature with increasing age, organization of the attachment system shifts from a behavioral to a representational organization in middle childhood. Traditionally, attachment behaviors in infancy and early childhood are assessed with an observational method referred to as the Strange Situation Procedure [13], while attachment in middle childhood is assessed using story stem methods (for a review see [14]). The story stem methods are assessing the internal working model of attachment through standardized story strains that trigger situations relevant to attachment, such as anxiety, pain or separation, and thus activate the attachment system. These attachment representations are assumed to originate from the child's early experiences of interactions with their caregivers.

The prevalence of AR in middle childhood in the general population ranges from 36.6% to 75.6% for the secure form, 6.7% to 36.8% for the insecure-avoidant form, 0% to 15.4% for the insecure-ambivalent form, and 1.7% to 11.7% for the disorganized attachment form [3,15,16]. In clinical samples and institutionalized children, the proportion of insecure attachment patterns, particularly of the disorganized subtype, is significantly higher [6,15,17].

Attachment patterns may have long-term significance for the socio-emotional development of a child. Studies showed that attachment security is associated with greater social competence and fewer externalizing and internalizing problems compared to insecure and disorganized AR (for a meta-analysis see [18]). In contrast, children with insecure AR exhibit poor sociability, problematic peer relationships, and deficits in emotion regulation [19,20]. Moreover, attachment insecurity appears to be associated with mental disorders in middle childhood [16,20] and poor treatment outcome for a variety of mental disorders in adolescents and adults, including depression, anxiety disorders, and eating disorders [19,21–24]. Particularly children with the disorganized AR subtype may be at increased risk of developing emotional and behavioral difficulties [25,26].

1.2. Attachment disorder

Attachment disorders are rare and controversial, and they represent one of the least evidence-based disorders in the field of mental health. Nevertheless, attachment disorders are associated with the most negative and prolonged impact on social participation and functioning as well as significant psychiatric morbidity over the entire life span [27–29]. The International Classification of Diseases (ICD, [30]) distinguishes two subtypes of attachment disorders: an emotionally withdrawn/inhibited subtype termed reactive attachment disorder (RAD), and an indiscriminately friendly, disinhibited

subtype termed disinhibited attachment disorder (DAD). However, current research indicates that the two subtypes are conceptually and statistically discrete dimensions of child malfunctioning [27,31]. Therefore, the Diagnostic and Statistical Manual of Mental Disorders (DSM-5 [32],) now separates the previous diagnosis of RAD (consisting of both the inhibited and disinhibited types) into two distinct disorders, i.e. RAD and disinhibited social engagement disorder (DSED). Since the current study was conducted before the introduction of the DSM-5 criteria, we used the terminology of AD for this paper.

Prevalence rates of AD reported in the available studies vary widely because the symptoms are subtle and measures used to determine them are variable. Based on current epidemiologic studies, prevalences in the general population range from 0.9% to 1.4% [28,33]. Of the children suffering from AD, approx. 30% are psychiatric in- and outpatients [34], and 3% to around 40% live in residential or foster care [35,36]. Children with AD show cognitive and developmental impairment, language problems, a broad range of psychiatric comorbidities, and many physical disorders such as skin and infectious diseases as well as genetic disorders [37,38].

Given the complex symptomatology of AD [36,39,40], the many comorbid psychiatric disorders, and cognitive and linguistic impairment, thorough examination is necessary to ensure accurate detection and treatment [38]. However, there is evidence that attachment-related problems are poorly understood by clinicians. A study by Woolgar & Baldock [41] shows that adopted children and foster children with conduct problems are frequently misdiagnosed with attachment disorder by community professionals. In fact, some authors argue that the current diagnostic system for attachment disorders is of limited utility for clinicians [41,42], and some suggest a change of terminology or even to completely eliminate the term AD from the clinical dictionary [5].

1.3. Association between attachment representations and attachment disorder

Because attachment insecurity as well as AD pertain to a continuum of attachment disturbances and are both thought to originate from poor-quality caregiving [3,32], the question arises how these two domains are related to each other. So far, only a few studies have been published on the association between AR and AD, and their results remained inconclusive. Three studies reported no association between AR and indiscriminative friendliness, a hallmark symptom of DAD [3,35,43] but found a moderate correlation between a continuous rating of AR and the emotionally withdrawn subtype of AD. There was, however, no similar association with the disinhibited subtype. Dobrova-Krol et al. [44] reported that indiscriminative friendliness showed no correlation with disorganized attachment but moderate correlation with secure attachment. Another study reported that preschoolers with disorganized attachment were no more likely to have a AD diagnosis than preschoolers with insecure and secure attachments [45].

Interestingly, several studies have shown that a significant proportion of children with a confirmed diagnosis or features of AD were categorized as having secure AR [6,36,38,43,46], indicating that features of AD are not related to the child's concurrent attachment behavior. There is growing evidence that AD may be conceptually and theoretically different from AR, as AD describes a broad socially aberrant behavior rather than a specific behavior in parent/child interactions thus exhibiting a different form of impairment of social functioning [1,6,47].

Consequently, research findings indicate that AD and AR may be different indices of attachment disturbance, as several studies found only marginal association between these two constructs. However, previous studies included primarily preschoolers [36,43,46] and thus applied different methods. Moreover, the

majority of studies examined indiscriminate friendliness which represents only a symptom of DAD, while there is a lack of studies investigating AD. Up to now, only three studies assessing AR in middle childhood using the story stem method were published [3,6,38]. Barone et al. [3] reported a weak association between disorganized attachment and indiscriminate friendliness, while the results of Minnis et al. [6] and Pritchett et al. [38] indicated no association between AD and AR.

The aims of our study were twofold. First, given the lack of attachment research in middle childhood, we aimed to examine clinical and developmental correlates separately for children with different forms of AR and children with AD. Second, we wanted to explore the phenomena between AR and AD. Specifically, we aimed to answer the following questions: (1) Do children with and without AD differ with respect to intelligence and development, psychopathological symptoms, and mental disorders? (2) Are there any differences among children with different forms of AR with respect to intelligence and development, psychopathological symptoms, and mental disorders? (3) How high is the overlap between each form of AR and AD?

2. Methods

2.1. Participants

Participants in the current study were 135 children consecutively recruited from child and adolescent inpatient and outpatient units (clinical controls [CC]: $n=69$), children in foster care (foster care [FC]: $n=32$), and children from the community (community sample [48]: $n=34$). To ensure an adequate sample size of children with attachment disorder (AD), we oversampled for AD by including children from child and adolescent psychiatric in- and outpatient units and foster children, as these populations show higher rates of AD than community samples [40,49,50]. Predefined exclusion criteria were insufficient intelligence ($IQ \leq 70$) and autism spectrum disorders.

The children aged between 5 and 9 years ($M=7.17$ years, $SD=1.40$) and 63.4% of the participants were male. Boys and girls did not differ significantly with respect to age ($U=2.326.50$, $p=.16$), prevalence of AD ($\chi^2(1, n=133)=0.73$, $p=.25$), and patterns of attachment representation (AR) ($\chi^2(3, n=134)=7.65$, $p=.05$).

2.2. Procedure

Participants in the community sample (CS group) were recruited via announcements in day-care centers, play groups, kindergartens, primary schools, and sport clubs. Foster children (FC group) were recruited via collaborations with different stakeholders in foster care by newsletters and references to highly frequented websites. In addition, the study team contacted a number of child and adolescent in- and outpatient units and invited potential candidates to participate in the study by information letters (CC group). After obtaining written informed consent from the caregivers, children underwent the German Attachment Story Completion Procedure (GASCP; [51]), which was videotaped and transcribed. Simultaneously, the primary caregiver completed questionnaires and clinical interviews. The GASCP was used at the hospitals in Berlin, Germany, as well as St. Gallen and Basel, Switzerland for the CC, and at either their homes or in the offices of the Department of Child and Adolescent Psychiatry, Basel, for the CS and FC. Before conducting the clinical interviews and GASCP, all interviewers underwent intensive standardized training. All procedures were performed in accordance with the GASCP manual, and the coders were blinded to the type of group (i.e. CS, CC, or FC) to which the children belonged. All 135 transcripts were coded by two certified raters, both with

accreditation for the coding of the GASCP. All participants and their caregivers were thoroughly informed about the study, and all gave written informed consent. The Ethics Committee Northwest and Central Switzerland approved the study before commencement.

2.3. Measures

2.3.1. Diagnostic assessments

To assess the DSM-IV-TR [52] diagnoses, we conducted a structured interview (Diagnostisches Interview psychischer Störungen im Kindes- und Jugendalter; K-DIPS [53]) for axis-I disorders. The K-DIPS assesses the most frequent mental disorders in childhood and adolescence. The current study used the unpublished research version of the KDIPS because it obtains further information from the primary caregiver on particular aspects of AD, namely inhibited (A1 criterion of DSM-IV-TR) or disinhibited (A2 criterion of DSM-IV-TR) subtypes as well as C-criterion for pathogenic care in form of continuous disregard of the emotional (C1) and physical (C2) basic needs of children, as well as repeated changes of the most important caregivers (C3) before the age of five. Only if this combination of the A criterion and at least one of the C criteria according to DSM-IV-TR occurred, children with an attachment disorder were characterized. The K-DIPS has good validity and reliability for axis-I disorders (parent version, $\kappa=0.88$ to 0.95 ; [54]).

2.3.2. German attachment story completion procedure (GASCP)

The GASCP is a doll-play story stem narrative method developed by Gloger-Tippelt and Koenig [51] designed to assess AR in children in middle childhood. The coding of content and structure of the stories was adapted from Bretherton et al. [55]. Through shifts from a behavioral to a representational organization of attachment in middle childhood, the GASCP is particularly well suited to assess the internal working model of attachment because it allows good access through the combination of playful and narrative aspects. When applying the GASCP, children are given the beginning of five story stems with attachment-related themes, i.e. spilled juice, hurt knee, monster in the bedroom, over-night separation from parent, and reunion. The GASCP includes a global attachment security score and categorical classification of four attachment classification groups. Interrater reliability of the GASCP in several German samples ranges from $\kappa=.77$ to $\kappa=.92$. [15]. In the present study, we used the transcripts of 28 children to obtain adequate interrater reliability between two certified raters (total sample: $\kappa=0.838$). The four-fold concordance between GASCP and Child attachment interview resulted in 61.3% convergence ($\text{Kappa}=.41$) [15]. These moderate associations are comparable to other studies [56]. Convergent validity was also significant for the MacArthur Story Stem Battery [57] coherence scale as well as for the Attachment Story Completion Task Q-Set [58] transformed into classifications [15,59].

2.3.3. Child Behavior Checklist (CBCL)

The German version of the CBCL [60] was administered to assess current psychopathological symptoms. The CBCL is a widely used caregiver instrument measuring a broad range of emotional and behavioral problems in children and adolescents aged 4–18 years. Internal consistency of the CBCL within the present sample was good (internalizing score: $\alpha=0.80$, externalizing score: $\alpha=0.89$, total score: $\alpha=0.90$).

2.3.4. Intelligence and Developmental Scale (IDS)

The IDS [48] is a standard tool widely used for the assessment of intelligence and general development in school psychology services, special education counseling, and child and adolescent psychiatry. Apart from assessing general intelligence, the IDS provides a profile for five developmental domains (i.e. psychomotor skills, social-emotional competences, language, mathematics,

and achievement motivation) in children aged 5 to 10 years. In the current study, we analyzed only general intelligence, social-emotional competences, and language. The IDS was standardized in German-speaking countries (Austria, Germany, and Switzerland), and reliabilities for general intelligence (Cronbach's $\alpha = 0.92$), social-emotional competences (Cronbach's $\alpha = 0.59-0.79$), and language (Cronbach's $\alpha = 0.81-0.88$) was moderate to good.

2.4. Data analyses

Statistical analyses were performed using SPSS for Windows, version 25. Categorical variables were analyzed using Pearson's Chi-square or Fisher's exact test. Spearman correlations were computed to test the relationship between age and attachment patterns. Kolmogorov-Smirnov testing for normal distribution ($p < 0.05$) indicated that the continuous variables were not normally distributed. Therefore, we used Mann-Whitney U test and Kruskal-Wallis test to calculate group differences. Bonferroni-Holm-corrections were used in group comparisons to avoid accumulation of alpha errors. Significance level for all analyses was set at $\alpha = 0.05$.

3. Results

3.1. Sociodemographic variables

Table 1 shows the sociodemographic variables as well as study variables assessing intelligence and development, psychopathology, and attachment for the participants in the three different groups. With respect to mental disorders, we only reported the most frequent disorders in the total sample, namely depressive disorders, anxiety disorders, attention deficit hyperactivity disorder (ADHD), conduct disorder, nonorganic sleep disorders, and excretion disorders. Groups differed significantly with respect to age ($H = 14.319$, $p = .001$), as the children in the community sample (CS) (mean age = 6.36 years, $SD = 1.06$ years) were significantly younger than those in either the clinical controls (CC) ($H = 27.775$, $p < .01$, mean age = 7.26 years [$SD = 1.40$ years]) or the foster children (FC) ($H = 30.159$, $p < .01$, mean age = 7.52 years [$SD = 1.42$ years]). There were significantly more male participants among the CC than the CS (76.5% vs. 40.6%; $\chi^2[1, n = 100] = 12.29$, $p < .01$).

Children in the CS scored significantly higher on the IDS-IQ than the CC ($H = -31.059$, $p < 0.01$) and the FC ($H = -32.591$, $p < .01$). Furthermore, children in the CS scored significantly higher on the Intelligence and Developmental-language scale compared to CC ($H = -33.273$, $p < .01$). Compared to CS, CC showed a significantly higher prevalence of anxiety disorders (19.1% vs. 2.9%, $p = .03$, Fisher's exact test) and conduct disorder (22.1% vs. 2.9%, $\chi^2[1, n = 102] = 6.26$, $p = .01$), and a significantly higher prevalence of ADHD than the other two groups (CC vs. CS: 45.6% vs. 0.0%, $\chi^2[1, n = 102] = 22.26$, $p < .01$; CC vs. FC: 45.6% vs. 12.5%, $\chi^2[1, n = 100] = 10.47$, $p < 0.01$). The CS had a significantly lower prevalence of attachment disorder (AD) compared to CC (5.9% vs. 30.9%, $\chi^2[1, n = 102] = 8.11$, $p = .01$) and FC (5.9% vs. 37.5%, $\chi^2[1, n = 66] = 9.86$, $p = .01$). The CC showed a significantly higher frequency of disorganized attachment representation (AR) than the CS ($\chi^2[1, n = 103] = 7.23$, $p < .01$), while no differences between groups were found for the remaining attachment patterns. The CC scored significantly higher on the internalizing scale of the Child Behavior Checklist (CBCL) than the CS ($H = 44.191$, $p < 0.00$) and the FC ($H = 23.188$, $p = .01$), and all three groups differed significantly from each other on the externalizing scale and total scale of the CBCL, with the CC scoring highest, followed by the FC and the CS (see Table 1).

3.2. Correlates of attachment disorder

Among the children with AD, 28.6% were allocated to the inhibited subtype and 34.3% to the disinhibited subtype, while 37.1% fulfilled the criteria of both subtypes. As shown in Table 2, children with AD had a significantly higher prevalence of depressive disorders (11.4% vs. 2.0%, $p = .04$, Fisher's exact test) and reported an average of 1.57 ($SD = 1.03$) mental diagnoses, which was significantly higher than in children without AD who had 0.89 ($SD = 1.00$) diagnoses ($U = 2352.50$, $p < .01$). Furthermore, children with AD achieved significantly higher scores on the internalizing scale, externalizing scale, and total scale of the CBCL than children without AD (see Table 2). Compared to children without AD, children with AD scored significantly lower on the IDS language subscale ($U = 769.00$, $p < .01$). No significant differences between the groups were found with respect to the remaining IDS subscales (Table 2).

3.3. Distribution of attachment representations and association between attachment representations and attachment disorder

Distribution of AR in the total sample was fairly well balanced (i.e. secure: 30.4%, insecure-avoidant: 23.7%, insecure-ambivalent: 25.2%, disorganized: 20.7%). Among children with AD, the distribution was similar (i.e. secure: 28.6%, insecure-avoidant: 17.1%, insecure-ambivalent: 25.7%, disorganized: 28.6%). Spearman correlations revealed no significant association between age and AR (secure: $r_s = 0.13$, $p = .12$; insecure-avoidant: $r_s = -0.08$, $p = .33$; insecure-ambivalent: $r_s = -0.09$, $p = .28$; disorganized: $r_s = 0.03$, $p = .67$). The most common overlap with AD was seen for secure and disorganized AR (both 28.6%), followed by insecure-ambivalent (25.7%) and insecure-avoidant (17.1%) representation. Cross tables showed that the prevalence of AD did not differ significantly between the four patterns of AR ($\chi^2[3, n = 134] = 2.26$, $p = .51$, see Table 3). Boys and girls with AD did not differ significantly with respect to AR ($p = .75$, Fisher's exact test).

3.4. Associations between attachment representations and intelligence and development, psychological symptoms, and mental disorders

Table 3 shows the differences between the four patterns of AR with respect to intelligence and development, and mental disorders, and psychopathological symptoms. Children with secure AR showed a significantly higher IDS-IQ ($H = 10.231$, $p = .01$) and IDS-language scores ($H = 9.601$, $p = .02$) than children with disorganized AR. No group differences were found with respect to mental disorders and psychopathological symptoms.

4. Discussion

The aim of the present study was to investigate developmental and clinical correlates of attachment disorder (AD) and attachment representation (AR) as well as to examine the association between AD and AR in middle childhood.

4.1. Correlates of attachment disorder

Our findings indicated that AD was significantly associated with general psychopathology such as depressive disorders, internalizing symptoms, and externalizing symptoms, which is in line with previous studies showing a significant association between AD and psychopathology and behavioral problems [6,26,37,38]. However, in contrast to previous research, we failed to show an association between AD and common comorbid disorders such as attention deficit hyperactivity disorder (ADHD), conduct disorder, and anxiety disorders [28,38,61]. Furthermore, our sample had an average of

Table 1

Intelligence and developmental scales, mental diagnoses, attachment representations and psychopathological symptoms among children in the general population, the clinical sample and foster children.

	Sample			Test statistic	
	General population (n = 34)	Clinical controls (n = 69)	Foster children (n = 32)		p
Age M (SD)	6.36 (1.06)	7.26 (1.40)	7.52 (1.42)	H (df) 14.319 (2)	<.01
Gender n (%)					
Male	20 (58.8)	52 (75.4)	13 (40.6)	X ² (df) 12.471 (2)	<.01
Female	14 (41.2)	17 (24.6)	19 (59.4)		
Intelligence and developmental scales M (SD)					
IDS-IQ	111.44 (10.90)	100.93 (12.90)	100.78 (11.45)	H (df) 16.805 (2)	<.01
IDS-Social-emotional competence	9.91 (1.31)	9.03 (1.92)	9.09 (1.40)	H (df) 4.712 (2)	.09
IDS-language	12.51 (1.57)	10.60 (6.17)	11.07 (2.46)	H (df) 20.024 (2)	<.01
Mental diagnoses (%)					
Any disorder	20.6	86.8	50.0	X ² (df) 44.01 (2)	<.01
Depressive disorders	0.0	8.8	0.0	F 4.68	.08
Anxiety disorders	2.9	19.1	6.3	F 6.41	.03
ADHD	0.0	45.6	12.5	X ² (df) 28.45 (2)	<.01
CD	2.9	22.1	9.4	F 7.46	.02
Nonorganic sleep disorders	5.9	11.8	9.4	F 0.79	.69
Excretion disorders	14.7	27.9	18.8	X ² (df) 2.60 (2)	.27
AD	5.9	30.9	37.5	X ² (df) 10.16 (2)	<.01
Attachment representations (%)					
Secure	38.2	26.1	31.3	X ² (df) 1.60 (2)	.42
Avoidant	20.6	24.6	25.0	X ² (df) 0.24 (2)	.89
Ambivalent	35.3	20.1	25.0	X ² (df) 2.72 (2)	.25
Disorganized	5.9	29.0	18.8	X ² (df) 7.49 (2)	.02
Psychopathological symptoms M (SD)					
CBCL INT	51.35 (8.40)	63.72 (10.79)	56.81 (10.77)	H (df) 30.579 (2)	<.01
CBCL EXT	53.71 (7.20)	66.63 (10.79)	60.31 (10.62)	H (df) 33.227 (2)	<.01
CBCL Total Score	52.76 (7.62)	67.93 (9.64)	60.41 (11.23)	H (df) 40.384 (2)	<.01

Note. IDS = Intelligence and developmental scales, ADHD = Attention-deficit hyperactivity disorder, CD = Conduct disorder, AD = Attachment disorder, CBCL = Child behavior checklist, INT = Internalizing Scale, EXT = Externalizing scale, Df = Degrees of freedom, H = Kruskal Wallis test, F = Fisher's exact test.

Table 2

Clinical and developmental correlates of AD.

	AD	No AD	Test Statistics	df = 1	p
IDS M (SD)					
IQ	101.31 (10.83)	104.35 (13.45)	U = 1472.00		.18
Socioemotional competence	9.14 (1.70)	9.29 (1.75)	U = 1114.50		.68
Language	9.55 (11.14)	11.70 (5.39)	U = 769.00		<.01
Mental diagnoses %					
Depressive disorders	11.4	2.0	n/a		.04 F
Anxiety disorders	8.6	13.1	n/a		.56 F
ADHD	37.1	22.2	X ² = 2.983		.08
CD	17.1	13.1	n/a		.57 F
Nonorganic sleep disorders	17.1	7.1	n/a		.10 F
Excretion disorders	31.4	19.2	X ² = 2.228		.13
Number of diagnoses M (SD)	1.57 (1.03)	0.89 (1.00)	U = 2352.50		<.01
CBCL M (SD)					
INT	63.89 (10.76)	57.21 (10.94)	U = 2333.00		<.01
EXT	67.37 (9.73)	59.76 (11.14)	U = 2441.50		<.01
Total Score	68.06 (10.74)	60.10 (10.99)	U = 2429.50		<.01

Note. AD = Attachment disorder, IDS = Intelligence and developmental scales, IQ = Intelligence quotient, ADHD = Attention-deficit hyperactivity disorder, CD = Conduct disorder, F = Fisher's exact test, U = Mann Whitney-U-test, df = degrees of freedom, CBCL = Child behavior checklist, INT = Internalizing Scale, EXT = Externalizing Scale, n/a = not applicable.

1.57 mental disorders, which was considerably lower than the average of 4.0 mental disorders reported by Mayes et al. [62]. Consistent with the literature, the children with AD in our sample showed weaker language abilities than children without AD [63,64]. However, we found no differences with respect to intelligence, which deviates from published studies [65].

Overall, the partly discrepant findings with regard to clinical and developmental correlates of AD may be explained by the variable study samples and methodological issues used in studies of AD. Throughout the AD literature, highly varying results were found with respect to the prevalence and comorbidities of AD, which reflect inconsistent terminology and considerable methodological issues which have not yet been resolved [66]. Accordingly, comorbidity is the rule rather than the exception in AD. This requires more

detailed knowledge for a valid differential diagnosis, since conspicuous attachment behavior in combination with early childhood neglect and maltreatment can have many life-long consequences. While these consequences do not necessarily lead to AD, they may, however, be misdiagnosed [41].

We found a high percentage (37.1%) of children who fulfilled the diagnostic criteria for both subtypes of AD and were therefore classified as the mixed subtype. Several authors have previously reported that mixed subtypes are common [49,62]. This higher proportion of children with mixed clinical profiles of AD may indicate that this disorder is not yet optimally manualized in the DSM and ICD. Thus, further research in children with mixed clinical profiles is needed to provide new information on the controversy "of defining the two phenotypes as subtypes of the same disorder or two distinct

Table 3
Association between attachment representations and intelligence and development, mental diagnoses, and psychopathological symptoms.

	Attachment representations				Test statistic	
	Secure (n = 41)	Avoidant (n = 32)	Ambivalent (n = 34)	Disorganized (n = 28)		p
IDS M (SD)						
IQ	107.35 (11.43)	101.56 (15.64)	105.47 (9.75)	98.11(12.88)	H (df) 10.231 (3)	.01
Social-emotional competence	9.77 (1.45)	8.76 (1.85)	9.47 (1.54)	8.72 (2.00)	H (df) 7.328 (3)	.06
Language	11.50 (1.89)	12.46 (9.06)	11.00 (2.30)	9.28 (3.09)	H (df) 9.601 (3)	.02
Mental diagnoses (%)						
Any disorder	52.5	68.8	58.8	67.9	X ² (df) 2.64 (3)	.45
Depressive disorders	2.5	6.3	5.9	3.6	F 1.10	.89
Anxiety disorders	10.0	12.5	17.6	7.1	F 1.73	.62
ADHD	20.0	25.0	23.5	39.3	X ² (df) 3.43 (3)	.33
CD	12.5	21.9	11.8	10.7	F 1.91	.56
Nonorganic sleep disorders	10.0	9.4	11.8	7.1	F .49	.97
Excretion disorders	22.5	31.3	17.6	17.9	X ² (df) 2.21 (3)	.52
AD	25.0	18.8	26.5	35.7	X ² (df) 2.26 (3)	.51
Number of diagnoses M (SD)	.90 (.95)	1.28 (1.14)	1.00 (1.04)	1.17 (1.09)	H (df) 2.382 (3)	.49
Psychopathological symptoms M (SD)						
CBCL INT	58.44 (10.37)	58.28 (10.37)	59.00 (10.79)	60.32 (13.76)	H (df) 0.875 (3)	.83
CBCL EXT	60.32 (11.24)	62.91 (9.88)	62.30 (13.27)	62.32 (11.27)	H (df) 1.475 (3)	.68
CBCL total score	60.98 (10.69)	63.06 (10.64)	62.03 (12.09)	63.61 (12.09)	H (df) 0.744 (3)	.86

Note. IDS = Intelligence and developmental scales, IQ = Intelligence quotient, ADHD = Attention-deficit hyperactivity disorder, CD = Conduct disorder, AD = Attachment disorder, CBCL = Child behavior checklist, INT = Internalizing Scale, EXT = Externalizing scale, Df = Degrees of freedom, H = Kruskal Wallis H test, F = Fisher's exact test.

disorders" [27]. Accordingly, it is necessary to develop methods for dealing with the mixed type. Given its considerable prevalence, it should at least be mentioned in the guidelines for AD or, even better, should be included in the diagnostic manuals. This was previously suggested by Mayes et al. [62].

4.2. Distribution and correlates of attachment representations

The proportions of the four AR subtypes in our sample amounted to 30.4% for the secure form, 23.7% for the avoidant form, 25.2% for the ambivalent form, and 20.7% for the disorganized form. Our findings are partly in line with the results of a large German study in children in middle childhood [15]. The study also included no-risk and risk samples, with comparable results for secure attachment (30.4% vs. 33.5%) and disorganized attachment (20.7% vs. 17.5% [15]). Interestingly, we found a slightly lower rate of avoidant attachment (23.7% vs. 35.9%) and a somewhat higher rate of ambivalent attachment (25.2% vs. 13.2%). In the literature, highly differing prevalence rates and large ranges within each AR subtype have been reported, depending on the sample characteristics and methodology used [15,16,67].

Unexpectedly, we failed to find an association between AR, mental disorders, and emotional and behavioral problems. However, the empirical results of previous studies are also inconsistent. This may be due, in particular, to the sometimes very small samples, the lack of long-term studies / data and different assessment instruments of AR in the age range of middle childhood [68,69]. Nevertheless, a more recent meta-analysis by Groh et al. reported significant associations between insecure and disorganized attachment patterns and externalizing and internalizing problems [18] as well as for emerging psychotic symptoms [70] and psychopathic traits [71]. The authors also pointed to the limited value of their analyses because of methodological difficulties like the issue of using different instruments for assessing attachment patterns. Systematic and consistent empirical studies investigating the association between specific types of AR and clinical symptoms are still lacking. Thus, further research is also warranted in this field.

In line with previous studies, we found an association between AR and intelligence and language skills [61,72–74], as children with secure attachment scored significantly higher on the intelligence and language subscales than children with disorganized attachment. The association between AR and intelligence might

be age-specific, since attachment studies among adults showed no association between AR and intelligence [75–77]. Given a lack of studies in this age group, further studies are needed that explore this association, also in adolescents, and control for additional covariates such as psychiatric disorders and socioeconomic status of the primary caregivers. Secure attachment is hypothesized to influence academic achievement and good coping and emotion regulation skills [78]. A recent longitudinal study found that early attachment security in toddlerhood promotes effortful control, a key skill for academic success, which in turn predicted higher academic achievement in adolescence [79]. Future studies assessing the effects of interventions that enhance attachment security on academic outcomes would be of interest.

4.3. Overlap between attachment representations and attachment disorder

The results of this study clearly show that there is little association between AR and AD in line with previous work. Thus, there are more and more findings that show a lack of overlap, so that the metaphor already mentioned in the title supports two different coins of the same currency or even the extension of the metaphor as coin and banknote.

Our findings reflect previous literature suggesting that AR are distinct from AD [3,6,43,45]. Children with AD did not differ with respect to the prevalence of AR and showed a fairly balanced distribution of AR subtypes, with secure and disorganized attachment being the most common patterns (both 28.6%). These results support published findings indicating that AD may not be related to the child's concurrent attachment behavior but may be conceptually and theoretically different from AR [1,6,47]. According to O'Connor et al. [46], there are substantial differences between attachment theory and AD, which does not allow to conclude AR based on the presence of AD, and *vice versa*. As outlined earlier, there are methodological issues when assessing AR and AD, leading to diverging and contradictory findings with respect to prevalence, correlates, and overlap between these two domains. In addition, the highly heterogeneous study samples make comparisons difficult.

Our own findings emphasize the concerns with the concept of AD that have been raised earlier [5,42]. The diagnosis of AR was developed from a developmental psychological perspective and was repeatedly shown to be of importance in the development of

psychopathology with respect to a broad range of mental disorders in different age groups [80,81]. In contrast, the concept of AD originates from a developmental psychopathological perspective as a description of a specific group of patients who had experienced severe neglect and maltreatment [30]. Accordingly, the respective concepts of AR and AD are different lenses through which to assess attachment patterns. In the light of the different theoretical backgrounds the heterogeneous results are not surprising. Due to the actual research among the association of the research domain criteria, cumulative childhood trauma [37,83,84], high comorbidity and multitude of symptoms [85,86] as well as the focus on interactional problems and interpersonal trust, it is reasonable that AD is associated with many other disorders.

Thus, there is a substantial need to improve current understanding of comorbidity in the context of attachment disorders. The approach using Research Domain Criteria (RDoC) developed by the American National Institute of Mental Health appears to be promising [4,84]. In contrast to the DSM maintained by the American Psychiatric Association, RDoC is a new kind of taxonomy for mental disorders, applying genetics, neuroscience, and behavioral science to the problem of mental illness [87]. By the use of RDoC, it is hoped to clarify the neurobiological and psychosocial etiology of the many comorbidities associated with AD, or to establish whether AD is just one cluster of different symptoms of a complex or developmental trauma [85]. In view of these unresolved questions, suggestions by experts range from reconceptualization [46] up to complete elimination of AD from the clinical dictionary [5]. On the grounds of this ongoing debate, lack of clarity in accurate diagnosis and effective treatment become clearer.

Another important research question in future studies with children with comorbid symptoms from high-risk samples will be if they also show a high proportion mixed subtype of inhibited and disinhibited forms of attachment. In addition, further research with children suffering from a broadband of mental disorders in school age children who are living at home, is also needed like children staying in clinical settings to validate RAD and DSED and not only in young children in foster care.

4.4. Study limitations and strengths

Several limitations of the current study have to be mentioned. Assessment of AR is based on a projective measure, which may introduce respondent and interpretation bias. Furthermore, to include as many children with AD as possible, we oversampled by recruiting children through mental health services and the foster care system in addition to children from the general population. Therefore, our study sample is heterogeneous, which might have influenced the results. Because of the young age of the children in our study, we assessed AD using a structured clinical interview based on parental or caregiver reports of the child's behavior. We did not include any observational measures that would have increased the validity of AD diagnosis. The additionally behavioural observation of attachment behaviour could improve the ecological validity of attachment theory and underline the clinical usefulness of attachment theory. Furthermore, the results of the study are based on the nosology of the DSM-IV-TR and therefore we cannot fully implement the adjustment of the attachment disorder of DSM-V, which is why further studies are required. With the far-reaching changes in nosology in the DSM-V as well as the current research [72,88,89] and reviews [5,90,91], the orientation towards DSM-IV and the overall presentation of AD due to a lack of DSM-V compatible interviews in German is a severe limitation of the current study. Due to the small group size of the respective subtypes through the mixed type which make the subtypes even smaller, we cannot present the pathology for each subtype. Since the cells per subtype (inhibited: 10, disinhibited: 12, mixed type: 13) are too

small for analysis, no statistical analysis are permissible or possible according to scientific methodological standards. Based on the DSM-V, future studies will have to make more differentiated statements about the two separate forms or the mixed type of AD.

An additional study limitation is the participation of different types of caregivers. Caregivers were the biological parents in the community sample and clinical controls but foster parents in the foster care sample. This might have influenced the results because foster parents, particularly experienced foster parents, are better trained to identify (attachment) disorder (behavior) in their foster children and are less stigmatized to report them than are biological parents. Moreover, foster parents suspecting AD in their foster child might have been more highly motivated to refer their child to this study. This might explain the higher prevalence of AD in the FC sample. While biological parents would be expected to know their child's attachment behavior better than do foster parents, the primary caregiver, irrespective of biological descent, who spends most of the time with the child, tends to be the most valid source of information for AD (behaviors). Several studies showed that foster parents describe the behavioral problems of their children very realistically and that their description correlates highly with expert reports/diagnoses [92,93]. In our study we had a uncommon high prevalence of AD in the CS (5.9%), while in epidemiologic studies the prevalence ranged from 0.9% to 1.4% [28]. This higher prevalence rate of AD should be discussed even when it is not statistical significant in our sample. One potential explanation for this non-significant deviation could be a selection effect because we outlined the topic attachment in the advertising for the study. Accordingly, parents who are sensitized for attachment topics or have already perceived an attachment problem in their children are probably higher motivated to participate, so that distortions may have occurred as a result of a selection bias in the CS of our study. Nevertheless, this subsample still meets the expected parameters of the general population regarding dimensional and categorical psychopathology (see Table 1). Lastly, our study had a sufficiently large sample size for the analysis of the whole sample, but the statistical power of subsample analyses was limited. Therefore, studies with larger (sub)samples and instruments more specifically focusing on the interaction between child and caregiver are needed.

Nonetheless, this study had several strengths. We included children in middle childhood who are currently underrepresented in attachment research. We assessed AD diagnoses rather than symptoms of AD or suspected AD diagnoses. Furthermore, we recruited children with AD from three different populations, enabling to investigate group differences with respect to the prevalence of AR and AD.

5. Conclusions

Determination of the association between AR and AD represents a major challenge in attachment research [94]. To fill this gap, empirical findings help to distinguish between insecure attachment, in particular disorganized attachment, and AD as a separate clinical diagnosis. On the one hand, this differentiation helps to avoid premature diagnosis of AD in children with insecure attachment, in particular disorganized attachment [1].

Our study shows the necessity of an in-depth differential diagnosis and improved understanding of comorbidities. To better understand the association of AD and AR, the main research domain criteria in this diagnosis and the most common comorbidities should be assessed. Longitudinal studies are needed to conceptualize assessment methods for AR and/or attachment/affiliation and RDoC for different age groups. To overcome the gap between attachment research and clinical practice, useful assessment tools for AR with a direct impact for treatment planning are needed [95].

Consequently, longitudinal studies with standardized assessment instruments in various samples are needed to systematically provide comparable and reliable empirical findings for the further development of the two constructs AR and AD as well as their etiological models. These efforts are urgently indicated if attachment research continues to be regarded as a substantial construct for human development.

Ethics approval and consent to participate

The current study was reviewed and approved by the Ethics Review Committees of the cantons of Basel-Stadt and Basel-Landschaft (53/12). Children and their primary caregivers were individually approached and fully informed about the study aims by trained staff of the research department of the Child and Adolescent Psychiatry Basel. Following Swiss legislation, active informed consent was collected, videotaped and transcribed from the children and primary caregiver informed consent was obtained as well.

Consent for publication

Not applicable.

Availability of data and material

The used and analysed dataset are available from the corresponding author on reasonable request.

Declaration of Competing Interest

The authors declare that they have no competing interests.

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Criteria for authorship

MSCH, MB, GGT, GJS, and MS contributed to the design, patient recruitment, survey, data collection, and evaluation of the study. MSCH, JL, EF, YI, GGT, and MS completed data analyses and substantially contributed to the interpretation of data. MSCH and JL drafted the manuscript, and EF, MB, YI, GGT, GJS, and MS revised it critically. All authors read and approved the final manuscript.

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