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Annual Research Review: Attachment disorders in early childhood – clinical presentation, causes, correlates and treatment

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Abstract

Background—Though noted in the clinical literature for more than 50 years, attachment disorders have been studied systematically only recently. In part because of the ubiquity of attachments in humans, determining when aberrant behavior is best explained as an attachment disorder as opposed to insecure attachment has led to some confusion. In this selective review, we consider the literature on reactive attachment disorder and disinhibited social engagement disorder and describe an emerging consensus about a number of issues, while also noting some areas of controversy and others where we lack clear answers. We include a brief history of the classification of the disorders, as well as measurement issues. We describe their clinical presentation, causes and vulnerability factors, and clinical correlates, including the relation of disorders to secure and insecure attachment classifications. We also review what little is known and what more we need to learn about interventions.

Methods—We conducted a literature search using PubMed, PsycINFO, and Cochrane Library databases, using search terms “reactive attachment disorder,” “attachment disorder,” “indiscriminate behavior,” “indiscriminate friendliness,” “indiscriminate socially disinhibited reactive attachment disorder,” “disinhibited social engagement disorder,” and “disinhibited social behavior.” We also contacted investigators who have published on these topics.

Findings—A growing literature has assessed behaviors in children who have experienced various types of adverse caregiving environments reflecting signs of putative attachment disorders, though fewer studies have investigated categorically defined attachment disorders. The evidence for two separate disorders is considerable, with reactive attachment disorder indicating children who lack attachments despite the developmental capacity to form them, and disinhibited social engagement disorder indicating children who lack developmentally appropriate reticence with unfamiliar adults and who violate socially sanctioned boundaries.

Conclusions—Though many questions remain to be answered, especially regarding appropriate interventions, we know considerably more about attachment disorders than we did only a decade ago.

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Keywords

Attachment; attachment disorder; reactive attachment disorder; disinhibited social engagement disorder; indiscriminate behavior; psychopathology

Introduction

Attachment disorders were first formally defined as a disorder in the 3rd edition of the *Diagnostic and Statistical Manual of Mental Disorders* [(DSM-III) APA, 1980], and the criteria were subsequently revised in DSM-III-R (APA, 1987), DSM-IV (APA, 1994), DSM-5 (APA, 2013) and ICD-10 (WHO, 1992). Still, for almost 20 years after appearing in DSM-III, the disorders attracted little attention from investigators, so until DSM-5, revisions to criteria were made largely in the absence of any relevant research (Zeanah, 1996). In fact, the first study directly addressing the validity of any criteria did not appear until 1998 (Boris et al., 1998).

There is now broad consensus that in early childhood, attachment disorders result from inadequate caregiving environments and encompass two clinical patterns, an emotionally withdrawn/inhibited phenotype and an indiscriminately social/disinhibited phenotype. For purposes of this review, we will use the DSM-5 designations of reactive attachment disorder (RAD) and disinhibited social engagement disorder (DSED) to describe these clinical entities.

In this review, we begin by describing the clinical phenomenology of RAD and DSED, including the historical changes in how these disorders are conceptualized and the rationale for these changes. Next, we consider recent research about the course and correlates of attachment disorders. Finally, we consider the limited data available about intervention and highlight potential new directions for research to enhance our understanding of these disorders.

Clinical presentation: classification and measurement

Research on disorders of attachment in young children has been conducted by assessing signs with continuous measures and by categorically diagnosing RAD and DSED in maltreated children and currently or formerly institutionalized children. Core features of RAD in young children include the absence of focused attachment behaviors directed towards a preferred caregiver, failure to seek and respond to comforting when distressed, reduced social and emotional reciprocity, and disturbances of emotion regulation, including reduced positive affect and unexplained fearfulness or irritability. Core behavioural features of DSED include inappropriate approach to unfamiliar adults and lack of wariness of strangers, and a willingness to wander off with strangers. In DSED, children also demonstrate a lack of appropriate social and physical boundaries, such as interacting with adult strangers in overly close proximity (experienced by the adult as intrusive) and by actively seeking close physical contact. By the preschool years, verbal boundaries may be violated as the child asks overly intrusive and overly familiar questions of unfamiliar adults.

These behaviours have been reported in numerous studies and comprise a coherent set of objectively defined signs of disorder (O'Connor & Zeanah, 2003; Zeanah et al., 2002).

Still, there have been some changes in how the disorders have been described and defined over the years. We turn next to a brief review of those changes and the rationale underlying them.

Historical Background

At least as early as the mid-20th century, behaviors characterizing two distinct types of attachment disorders were evident in descriptive studies of severely deprived institutionalized young children (Goldfarb, 1945; Levy, 1947; Spitz, 1945; Provence and Lipton, 1962). Somewhat later, studies of the social behavior of young maltreated children also described similar patterns of unusual social and emotional behaviors (Gaensbauer & Sands, 1979; Gaensbauer & Harmon, 1982; George & Main, 1979).

The most important study informing the criteria for contemporary nosologies, was a study by Barbara Tizard and her colleagues of young children being raised in residential nurseries in London (Tizard, 1977). These nurseries had lower child to caregiver ratios than many previous studies of institutionalized children. Also, the children were raised in mixed aged groups and had adequate books and toys available. Nevertheless, caregivers were explicitly discouraged from forming attachments to the children in their care. As a result, the usual confound of material privation in previous studies of institutionalized children was eliminated, and the variable of most interest to study of attachment, caregiver-child relationships, was isolated for study.

The investigators examined children who were abandoned at birth and raised in institutional settings. Of the 26 children who remained institutionalized for the first four years of their lives, eight were described as emotionally withdrawn and social unresponsive, 10 others were indiscriminately social, attention seeking and clingy with everyone, including unfamiliar adults, and the remaining eight of the 26 actually formed selective attachments to caregivers (Tizard & Rees, 1975). The two attachment disordered phenotypes in the Tizard study – emotionally withdrawn and indiscriminately social -- were later incorporated into criteria in formal nosologies, all of which defined two basic clinical presentations of disordered attachment in young children.

There was general convergence between the DSM-IV and the ICD-10 criteria for attachment disorders. Common features include cross-contextual aberrant social behavior caused by grossly inadequate care, and the two clinical phenotypes of inhibited and disinhibited behavioural patterns. However, ICD-10 divided the subtypes into two distinct disorders, reactive attachment disorder (RAD), similar to the emotionally withdrawn/inhibited type of RAD in DSM-IV and disinhibited attachment disorder (DAD), similar to the indiscriminately social/disinhibited type of RAD in DSM-IV. DSM-5 followed the lead of ICD-10, separating the disorders into RAD and DSED.

Rationale for DSM-5 Criteria Changes

One Disorder or two?—An implicit controversy concerned the DSM-IV approach of defining the two phenotypes as subtypes of the same disorder or two distinct disorders (as does ICD-10, for example). Part of the original rationale for defining them as subtypes of a unitary disorder was that the phenotypes intended to describe lack of attachment in children who had experienced adverse caregiving -- in inhibited RAD, attachment behaviors were not expressed, and in disinhibited RAD, attachment behaviors were expressed non-selectively. As a result, it seemed reasonable to group these two syndromes together, as part of a broad disorder of attachment.

Other than arising in similar conditions of social neglect, however, the two disorders differ in most other important ways, including phenotypic characteristics, correlates, course and response to intervention (Rutter et al., 2009; Zeanah & Smyke, in press). The phenotypes of the two disorders are in stark contrast to each other. Their psychiatric co-morbidities differ, with depressive signs seen in children with RAD and patterns of impulsivity more commonly associated with DSED. For example, RAD resolves nearly completely with access to an adequate attachment figure, whereas DSED can persist in the context of adequate caregiving and a selective attachment relationship. This evidence suggests that these disorders are best conceptualized as two distinct disorders rather than as two subtypes of a single disorder (APA, 2013; Rutter et al., 2009; Zeanah & Gleason, 2010).

Reactive attachment disorder—In DSM-5, the criteria for RAD focus more specifically on absent or aberrant attachment behaviors across settings rather than on social behaviors more generally described in earlier nosologies (see DSM-IV and ICD-10 for contrasts). The change in criteria was guided by evidence from multiple investigations of currently and formerly institutionalized children (Gleason et al., 2011; Smyke et al., 2002; Tizard & Rees, 1975; Zeanah et al. 2005), of children in foster care (Oosterman & Schuengel, 2007; Zeanah et al., 2004), and of children in impoverished groups at risk for aberrant parenting behavior (Boris et al., 2004) demonstrating that lack of attachment behaviors is the core deficit of the disorder, and the absence of attachment behaviors directed towards putative primary caregivers that is pathognomonic. Observing a child interacting only with an unfamiliar adult without evidence of how the child interacts with the caregiver would be insufficient to attribute the observed behaviors to RAD.

“Pathogenic care” in DSM-IV and “parental abuse, neglect or serious mishandling” in ICD-10 was replaced by “insufficient care” in DSM-5 in order to emphasize that social neglect that seems the key necessary condition for the disorder to occur. To date, there are no case reports of young children exhibiting the RAD phenotype as defined by ICD-10 or DSM-5 without at least a reasonable inference of serious emotional neglect, and no cases of the RAD phenotype from abuse without neglect.

DSM-5 also requires that a child have a cognitive age of at least 9 months to ensure that an attachment disorder is not diagnosed in children who are developmentally incapable of demonstrating a focused attachment.

Disinhibited social engagement disorder—Guided by extant literature, the DSED phenotype in DSM-5, focuses more on aberrant social behavior. The rationale for defining the indiscriminate behavior phenotype as DSED in DSM-5 as opposed to disinhibited attachment disorder as in ICD-10, is that the data indicate that the core deficit of the disorder is not non-selective attachment behaviors, but more about unmodulated and indiscriminate social behavior, especially initial approaches to and interaction with unfamiliar adults. The justification for the change is supported by the assessment of indiscriminate behavior in numerous studies of institutionalized (Soares et al., 2014; Tizard & Rees, 1975; Zeanah et al., 2002, Zeanah et al., 2005) post-institutionalized (Bruce, Tarullo, & Gunnar, 2009; Smyke et al., 2010; Lawler et al., in press) and deprived children in foster care (Bruce, Tarullo & Gunnar, 2009; Oosterman & Schuengel, 2007; Pears et al., 2010; Zeanah et al., 2004). In these studies, what is disinhibited is children's behavior with unfamiliar adults rather than with their putative attachment figures, for whom they may show focused attachment behaviors and preferential comfort seeking.

This point is not without controversy, however. In the Tizard study, for example, institutionalized children were reported as showing separation protest and comfort seeking from strangers in the residential nurseries (Tizard & Rees, 1975). If attachment behaviors were indiscriminately focused on strangers and familiar caregivers alike, then that suggests disinhibition of attachment. Importantly, however, this conceptualization was developed from observations of affected children living in institutions who may well have had no opportunity to develop focused attachments (see Zeanah et al., 2005). This confound raises the question of whether the indiscriminate behaviors in these studies actually reflected a non-selectivity of attachment behaviors, since many of the studied children may not have had the opportunity to demonstrate selective attachment behaviors. More recent research with children adopted out of institutions has demonstrated that indiscriminate behavior may persist even after children form attachments to adoptive parents (Chisholm, 1998; O'Connor et al., 2003). If a child is adopted and turns selectively to parents for comfort and protection but continues to approach and engage strangers non-selectively, it is less clear that these approaches represent attachment behaviors. What is unresolved is the meaning of approach to strangers—whether that represents and is motivated by attachment, or whether it is motivated by another goal (or not inhibited by stranger wariness as in typical development).

DSM-5 indicates that DSED includes socially disinhibited behavior that must be distinguished from the impulsivity that accompanies ADHD because several lines of evidence suggest that some signs of ADHD and of DSED overlap. Nevertheless, it is clear that children may have ADHD without socially indiscriminate behavior, or socially indiscriminate behavior without ADHD, but there are often moderately strong correlations between the two symptom profiles (Gleason et al., 2011; Roy, Pickles & Rutter, 2004). Rather than make ADHD an exclusion criteria for DSED, it seems more useful to direct attention to its distinction from ADHD.

Tying the phenotype to grossly inadequate caregiving was retained in DSM-5 for the important reason that children who have Williams syndrome -- a chromosome 7 deletion syndrome -- have been reported to demonstrate phenotypically similar behavior to those with DSED (Dykens, 2003), even though the children are receiving adequate care. This criterion

ensures that children with a known biological abnormality do not qualify for the diagnosis of DSED.

In fact, in keeping with the suggestions of social cognitive and behavioral abnormalities of the disorder (Green, 2003; Minnis et al., 2006; Rutter et al., 2009; Tarullo & Gunnar, 2005), there is now evidence that DSED is predictive of functional impairment, difficulties with close relationships, and more need for special education services (Gleason et al., 2011; Rutter et al., 2007).

Measurement issues

Studies using continuous measures (Chisholm, 1998; Gleason et al., 2011; O'Connor & Rutter, 2000; O'Connor et al., 2003; Oosterman & Schuengel, 2007; Rutter et al., 2007; Smyke, Dumitrescu, & Zeanah, 2002; Smyke et al., 2012; Zeanah et al., 2005), and studies using categorical measures (Boris et al., 2004; Gleason et al., 2011; Zeanah et al., 2004) have demonstrated repeatedly that emotionally withdrawn/inhibited and indiscriminately social/disinhibited patterns of behaviour can be reliably identified in maltreated, institutionalized, and formerly institutionalized children. Research on international adoptees has focused primarily on indiscriminate behaviour, but studies of children being reared in institutions (Zeanah et al., 2005) and maltreated children in foster care (Boris et al., 2004; Oosterman & Schuengel, 2007; Zeanah et al., 2004) have included signs of RAD, as well. Taken as a whole, these studies support their construct validity, but a number of important questions have arisen regarding how these disorders are measured.

Parent report measures of RAD and DSED as defined by DSM-5 have shown acceptable to strong interrater and test-retest reliability in young children who have experienced adverse caregiving (Boris et al., 1998; Boris et al., 2004; Bruce & Gunnar, 2009; Chisholm, 1998; Gleason et al., 2011; O'Connor & Rutter, 2000; Oosterman & Schuengel, 2007; Pears et al., 2009; Rutter et al., 2007; Smyke et al., 2002; Zeanah et al., 2004; Zeanah et al., 2005). Variables assessed by three different interview measures of indiscriminate behavior showed substantial convergence on indiscriminate behavior (Zeanah et al., 2002). In addition, a factor analysis of the items from a parent interview about signs of RAD and DSED in young children identified the two clinical disorders as distinct in a sample of maltreated children in foster care (Oosterman & Schuengel, 2007). Third, among institutionalized young children who were followed longitudinally, signs of RAD and DSED were internally consistent across four years (Gleason et al., 2011).

Even stronger evidence of convergence is provided by comparisons between caregiver reports and behavior coded in observational procedures. In the Bucharest Early Intervention Project (BEIP), for example, Zeanah et al. (2005) rated the degree to which the child had developed an attachment to a caregiver during interaction with the caregiver in the Strange Situation Procedure (SSP) (Ainsworth et al., 1978). As predicted, in children 12–31 months of age, more signs of RAD were inversely correlated with the degree to which a child had developed an attachment.

Regarding DSED, Gleason and colleagues (Gleason et al., 2011) demonstrated substantial levels of agreement between an interview measure of indiscriminate behavior and an

observational procedure designed to assess a young child's willingness to "go off" with a stranger. Indiscriminate behavior with an unfamiliar adult also has been demonstrated during the SSP both in young children in foster care (Lyons-Ruth et al., 2009) and in institutionalized children and has converged with caregiver report (Oliveira et al., 2012). In children adopted out of foster care and out of institutions, an observational and parent report measure also converged moderately (Bruce, Tarullo & Gunnar, 2009).

A recent short-term longitudinal study used a structured laboratory procedure to observe the behavior of young children who were adopted from 13 different countries at ages 16–36 months and then assessed 1–3 months and 8–11 months following adoption (Lawler et al., in press). As part of a larger assessment protocol, children's behavior during a 10-minute interaction with a female adult stranger was coded. Three groups studied included children adopted from institutions, children adopted from foster care and non-adopted children. In the paradigm, the mother was assigned a paperwork task and discouraged from interacting with the child or commenting on the stranger. The child was provided with a picture book. The stranger entered the playroom, and at scripted intervals, she made increasing social overtures to the child. Factor analysis of the child's behavior at both time points yielded a non-physical social engagement factor (e.g., more responses to stranger overtures, reduced latency to approach), which did not distinguish the groups, and a physical social engagement factor (e.g., more physical intimacy with stranger and shorter latency to touch), which distinguished both adopted groups from the non-adopted group. The investigators concluded that physical social engagement may reflect the core of DSED. Of course, physical engagement in this context *is* social, and more intrusive than non-physical engagement, so this finding may reflect more extreme sociability, a greater social boundary violation or greater lack of expected reticence to approach. Of course, this physical and social engagement occurred in a laboratory situation in the *presence* of the child's mother. The context in which the social engagement occurs undoubtedly is related to the meaning of the child's sociable behavior and may affect the degree to which it may be considered excessive or deviant.

Although there are some differences among criteria sets and measures used to assess RAD and DSED, these differences appear to be modest. Further, refinements in definitions will no doubt be developed as more is learned. Nevertheless, the preponderance of evidence to date suggests that the two phenotypes are robust and that similar constructs are being identified across studies of different samples in different locations conducted by different research groups. Therefore, in this review we focus less on the nuances of differences among measures and instead accept that their similarities allow considering findings both from studies that have and have not explicitly set out to define attachment disorders. We include studies that have examined "indiscriminate behavior" to describe signs of DSED and "inhibited behavior" to describe signs of RAD, whether these are from interviews with parents or from observed behaviors.

Beyond early childhood

Although this review focuses primarily on RAD and DSED in early childhood, where they have been best studied, we note that other investigators have conducted studies of school age

children and adolescents. Because of important phenotypic differences between the disorders in early childhood and in these alternative approaches, we mention this body of work by noting that it is an exception to the general consensus about measurement noted above.

For example, Kay and Green (2013) assessed looked after adolescents (with histories of neglect, emotional abuse and sexual abuse) and controls and found significantly more signs of indiscriminate behavior with impairment among the looked after children. In advocating for a broader phenotype, they found in addition to the indiscriminate behavior described in DSM-5, factors reflecting attention seeking behavior and superficial relationships. Although they suggested that the broader phenotype resulted from studying a never institutionalized (but still maltreated) sample, this is not clear. Since the phenotype of RAD and DSED in DSM-5 has been demonstrated in young children living in foster care (with no histories of placement in institutions), the different phenotype could reflect developmental differences that emerge in older children.

Minnis and her group have conducted a series of cross sectional studies relying on various combinations of parent report, standardized observation and structured psychiatric interviews to identify RAD in school aged children (Millward et al., 2006; Minnis et al., 2007; Minnis et al., 2009; Minnis et al., 2013). These studies have demonstrated reliable identification of RAD in middle childhood, but the measures they used to identify RAD include a broader phenotype and have an unclear relationship to measures used to assess RAD in early childhood. It remains unclear, therefore, whether the findings of population prevalence of 1.4% in a disadvantaged area (Minnis et al., 2013) or high heritability of inhibited and disinhibited types in a large twin study (Minnis et al., 2007) apply to the phenotypes under review.

Given that the definition of RAD differs in these studies in important ways from the disorders as defined in DSM-5 and ICD-10, it is not clear whether the differences reflect developmental changes in RAD and DSED in middle childhood and adolescence or whether what is being described are different disorders altogether. Longitudinal studies from early to middle childhood and adolescence could address this question.

Causes and risk

Along with other trauma and stress related disorders, attachment disorders include specification of etiology in the criteria. Thus, social neglect is noted as a necessary though not sufficient requirement for the diagnosis to be entertained.

Caregiving environments

Children who have experienced seriously adverse, neglectful caregiving environments have demonstrated clear increased risk for RAD and DSED compared to children who are not exposed to adverse caregiving environments (Boris et al., 2004; Bruce, Tarullo, & Gunnar, 2009; Chisholm, 1998; Gleason et al., 2011; O'Connor & Rutter, 2000; Oosterman & Schuengel, 2007; Pears et al., 2010; Smyke et al., 2002; Ven den Dries et al., 2010; Zeanah et al., 2004; Zeanah et al., 2005).

One study, for example, demonstrated that increasing signs of RAD and DSED was associated with increasingly adverse caregiving environments. Two groups of young children living in an institution were compared. Those children living on a special unit that restricted the number of caregivers each child encountered in a day had significantly fewer signs of both types of RAD than young children living on a standard unit in the same institution. Thus, the poorer caregiving condition on the standard unit was associated with more signs of RAD and DSED (Smyke et al., 2002).

A threshold of neglect may be necessary for signs of these disorders to appear, but more detailed evaluations of the caregiving environments are needed to determine which components are caregiving are specifically associated with risk. In this regard, Zeanah et al. (2005) examined naturalistic interactions between institutional caregivers and young children in the BEIP, a randomized controlled trial of foster care as an alternative to institutional care (Zeanah et al., 2003). They found a composite variable of caregiving quality was associated with signs of RAD, even after controlling for other child and environmental characteristics. In the same study, however, there was no relationship between caregiving quality and signs of DSED after placement into a family.

In fact, evidence about the relation between concurrent caregiving quality and signs of DSED in young children is mixed. Dobrova-Krol et al. (2010) found higher levels of positive caregiving among institution-reared children with indiscriminate behavior, an association in the opposite direction as that seen in home-reared controls. In another cross-sectional study, Chinese girls whose adoptive mothers were more sensitive showed less indiscriminate behavior (Van Den Dries et al., 2012). In a study of post-institutionalized toddlers, Garvin et al. (2012) found that initiation of joint attention at 18 months was inversely correlated with indiscriminate behavior in post-institutionalized toddlers at 30 months if adoptive parents had lower levels of emotional availability. At higher levels of parents' emotional availability, however, there was no longer a relationship between joint attention and indiscriminate behavior..

Lyons-Ruth and colleagues (2009), on the other hand, showed that indiscriminate behavior was present in high-risk, family reared infants only if they had been maltreated or if their mothers had had psychiatric hospitalizations. They also found that mothers' disrupted emotional interactions with the infant mediated the relationship between caregiving adversity and indiscriminate behavior.

In a study of institutionalized toddlers in Portugal, Oliveira & colleagues (Oliveira et al., 2012) found that experiences prior to institutionalization predicted indiscriminate behavior. Specifically, a composite score of maternal prenatal risk, operationalized as having a physical disease, abusing substances, limited prenatal care and preterm birth, predicted indiscriminate behavior, as did emotional neglect. They also demonstrated that neglect mediated the association between maternal prenatal risk and indiscriminate behavior. The same group demonstrated that having a preferred caregiver predicted indiscriminate behavior over and above prenatal and family characteristics (Soares et al., 2014).

Pears et al. (2010), studying children in foster care, founds signs of DSED were related to the number of placement disruptions rather than severity of maltreatment. This is in keeping with the inclusion in DSM-5 of repeated changes in caregivers as a type of insufficient care.

Child vulnerability factors

Although severe caregiving deficiencies seem necessary for RAD or DSED to develop, they clearly are not sufficient (Bakersman-Kranenberg et al., 2011; Soares et al., 2013; Zeanah & Smyke, in press). Although the majority of maltreated children and children raised in institutions have insecure or disorganized attachments to biological parents or institutional caregivers (Carlson et al., 1989; O'Connor et al., 2003; Vorria et al., 2003; Zeanah et al., 2005), most do not develop attachment disorders (Boris et al., 2004; Gleason et al., 2011; Zeanah et al., 2004). This raises the question of vulnerability and perpetuating factors that might render some individuals more susceptible to the effects of deprivation or to more persistent social difficulties subsequently.

Most adoption studies have demonstrated that signs of DSED are related to length of time that the child lived in institutional deprivation (Bruce, Tarullo & Gunnar, 2009; O'Connor & Rutter, 2000; O'Connor et al., 2003; Rutter et al., 2007). In the English and Romanian Adoptees Study (ERAS), evidence of a sensitive period with regard to adequate caregiving emerged, as 27 of 29 children who showed persistence of indiscriminate behavior through 15 years were adopted after six months of age (Rutter et al., 2010).

Mixed results have been reported with respect to IQ, with the ERAS showing no association between mental age at entry into the UK (majority < 24 months) and indiscriminate behaviors at 6 years old, whereas BEIP reported a moderate association between baseline (mean of 22 months) developmental quotient and indiscriminate behaviors at 54 months (Gleason et al., 2014).

Studying children adopted internationally from foster care and from institutions, Johnson et al. (2011) found that only those with stunted growth were at risk for indiscriminate behavior. On the other hand, in the ERAS, there was no clear association between subnutrition and indiscriminate behavior, although some suggestion that head growth partially mediated the association between institutional care and deprivation specific psychological problems including indiscriminate behaviors (Rutter & O'Connor, 2004; Sonuga-Barke, Schlotz, & Rutter, 2010; Sonuga-Barke et al., 2008).

Using logistic regression, BEIP investigators reported that early disorganized attachment behaviors to caregivers were the sole independent predictor of signs of DSED at 54 months (Gleason et al., 2014). Since disorganized attachment is the most common attachment classification in institutionalized children (Dobrova-Krol et al., 2009; Vorria et al., 2003; Zeanah et al., 2005), these findings raise questions about what early contributors beyond early caregiving in institutionalized young children might be.

Determining whether genetic factors might moderate the effects of deprivation on attachment disorders is another approach to vulnerability factors. Individual differences in genetic polymorphisms plausibly may increase or decrease the risk of children exposed to

substantial deprivation developing attachment disorders. No reports to date have identified genetic risks for RAD, but preliminary studies have explored them for DSED.

As noted, indiscriminate behavior has been described anecdotally as occurring in Williams syndrome, though this has not been systematically studied. Soares and colleagues (2013) have argued that the phenotypic similarities between social behavioral manifestations of Williams' Syndrome and signs of DSED suggest that children will be most likely to manifest persistent indiscriminate behavior when they carry specific polymorphisms within the critical region for Williams syndrome (region 7q11.23) and experience deprivation in the first year of life.

In a study exploring genetic vulnerability to indiscriminate behavior in children who experienced deprivation, Bakersman-Kranenberg et al. (2011) examined whether the serotonin transporter gene (5HTT) moderated the association between institutional care and both disorganized attachment or indiscriminate behavior among young children raised in Ukrainian institutions. They found that the long allele of the genotype protected against development of disorganized attachment but did not protect against development of indiscriminate behavior.

Drury et al. (2012), taking another approach, examined vulnerability within the context of BEIP. They examined the effect of the interaction between group status and functional polymorphisms in the serotonin transporter gene (5HTT) and in brain derived neurotrophic factor (BDNF) on levels of indiscriminate behavior over time. They demonstrated that children with the s/s 5httlpr genotype and the met66 carriers of BDNF ("plasticity genotypes") demonstrated the lowest levels of indiscriminate behavior in the children randomized to foster care but the highest levels in children randomized to care as usual (meaning more prolonged institutional care). Children with either the long allele of the 5httlpr or val/val genotype of BDNF demonstrated no difference in levels of indiscriminate behaviors over time and no group by genotype interaction. Though replication is needed, these findings support a "differential susceptibility" model of gene x environment interactions in children exposed to deprivation (Belsky et al., 2007). The findings also suggest why only some children exposed to serious adversity might develop indiscriminate behavior.

Correlates of RAD and DSED

Selective attachment and attachment disorders

A central construct with which attachment disorders must be compared is the presence of and quality of selective attachment to caregivers. Typically, selective attachments are characterized by infant and young child behavior in the Strange Situation and classified as secure, avoidant, resistant or disorganized. Before considering how this approach maps onto disorders, however, we note studies that have looked at the more basic question of whether children even have a preferred caregiver. The validity of asking institutional caregivers whether or not young children show preferences is not established, but these caregivers in our experience generally converge in their opinions about which children prefer which caregivers if at all.

In a study of institutionalized Romanian children, Zeanah and colleagues (2002) found that children 11–68 months who had a “favorite” caregiver showed similar rates of indiscriminate behavior as their peers without an identified preferred caregiver. In contrast, Soares et al. (2014), studying young children in Portuguese institutions, found that those with a “preferred caregiver” were less likely to display indiscriminate behavior, after controlling for prenatal and family risk conditions that preceded the child’s institutionalization. In neither study was attachment to caregivers formally assessed.

Studies that have assessed attachment using the Strange Situation in currently institutionalized children (Dobrova Krol et al., 2010; Vorria et al., 2003; Zeanah et al., 2005) have demonstrated children have high levels of disorganized and unclassifiable attachments in the Strange Situation when assessed with their institutional caregivers. Unclassifiable means that the child exhibited so little attachment behavior that it was not possible to identify a pattern of attachment.

With regard to RAD, the only study that has examined both classifications and disorders of attachment is the BEIP (Zeanah et al., 2003). Children between the ages of 11 and 31 months (cognitive age) who were living in institutions following abandonment were assessed with their favorite caregiver. If no favorite was identified, they were seen with a caregiver who worked with them regularly and knew them well. Signs of RAD were assessed by caregiver report. Of children with elevated scores for RAD, 53% were disorganized, 23% were secure, 22% were unclassifiable, and 5% were avoidant. There was no relationship between organized attachment and signs of RAD.

In addition to SSP classifications, investigators in the BEIP assigned a 5-point continuous rating of the degree to which attachment had formed based on behavior in the SSP. As predicted, there was convergence between ratings of fewer attachment behaviors in the SSP and signs of RAD as reported by caregivers. In addition, all of the young children living in institutions who were “unclassifiable” in the SSP because they demonstrated no attachment behaviors were rated as having elevated signs of RAD (Zeanah et al., 2005). This is strong evidence that the phenotype of RAD is equivalent to lack of selected attachment.

Research relating signs of DSED to selective attachment has yielded a more complicated picture. Lyons-Ruth et al. (2009) studied an impoverished sample and found more indiscriminate behavior (coded from behavior towards the stranger in the SSP) in association with non-secure attachment. Even so, they found that some securely attached children also exhibited indiscriminate behavior.

In the BEIP, for toddlers living in institutions, classifications of attachment were unrelated to indiscriminate behavior. In the same study, however, at 42 months, security of attachment was moderately and inversely associated with signs of DSED (Gleason et al., 2011). However, there were still some children with secure attachments who also showed high levels of indiscriminate behavior. When attachment classifications in preschool children were dichotomized into typical (secure, avoidant, or ambivalent) vs. atypical (disorganized, controlling, or insecure-other), atypical attachment was moderately associated with signs of DSED.

These findings are similar to reports that focused on children adopted out of Romanian institutions. Marcovitch and colleagues (Marcovitch et al., 1997) reported that almost half of 3–5 year old adoptees from Romanian institutions who were securely attached to their mothers also exhibited indiscriminate behavior with the stranger, but none of the securely attached control children did so. Chisholm and colleagues also reported some children rated as securely attached also had high levels of indiscriminate behavior (Chisholm et al., 1995; Chisholm, 1998). In the ERAS, although there was an association between insecure-other and indiscriminate behavior, there also were securely attached children who also had high levels of indiscriminate behavior (O'Connor et al. 2003). In a study of girls adopted from China out of institutions and foster care, on the other hand, indiscriminate behavior was elevated compared to non-adopted children, but there was no relationship between indiscriminate behavior and either a secure or a disorganized attachment (Van den dries, 2012).

To summarize, children with fully formed selective attachments do not appear to exhibit signs of RAD. Children with RAD exhibit few or minimal behaviors suggesting that they have formed selective or organized attachments to anyone. Although children with avoidant attachments may seem to lack comfort seeking, and children with resistant attachments may seem to display emotion regulation problems, neither shows the pervasive lack of preference, affective disturbance and lack of responsiveness that is seen in RAD. Further, one would not base a diagnosis solely on a child's behavior in a brief, contrived laboratory paradigm.

In contrast, children with signs of DSED may or may not have selective attachments. In fact, children with DSED may have no attachments, disorganized attachments, insecure attachments or even secure attachments (Bakersman-Kranenberg et al., 2011; Zeanah & Gleason, 2010). This is one of the major reasons that DSED is not conceptualized as an attachment disorder, though some have argued that the presence of indiscriminate behavior in securely attached children may indicate a lack of true security. Longitudinal studies of securely attached children with and without indiscriminate behavior and insecurely attached children with and without indiscriminate behavior could contribute to our understanding of the relative significance of these patterns of behavior. In children with more extreme or aberrant forms of attachment, such as disorganized or insecure-other, the prevalence of DSED is increased, but attachment disordered behaviors are largely distinct from behaviors seen in different attachment classifications.

What distinguishes disorders of attachment from classifications or patterns of attachment is that the former are clinical conditions that are evident cross-contextually and describe profound disturbances in the child's behavior with caregiving as well as unfamiliar adults (AACAP, in press; O'Connor & Zeanah, 2003; Zeanah et al., 1993; Zeanah, Berlin & Boris, 2011). Insecure or disorganized attachments may be associated with interpersonal difficulties concurrently or subsequently, but they are relationship specific patterns of behavior, so the child's behavior with one adult may be secure and with another insecure. Signs of attachment disorders may have some fluctuations of intensity, but they are present across interactions with different individuals and in different situations. Essentially patterns

of attachment operate as risk factors for maladjustment rather than having maladjustment as intrinsic features.

Clinical correlates and co-morbidity

Developmental delays—Serious caregiving adversity is required for a diagnosis of RAD or DSED, and the same deprivation often concomitantly leads to cognitive delays in affected children (Nelson et al., 2007). The extant literature, however, indicates that developmental delays explain neither the signs of RAD nor DSED. In BEIP, RAD was only modestly associated with DQ/IQ in children at 22, 30, and 42 months, and not associated at 54 months. Generally in studies of DSED, cognitive development has either not been associated or only modestly associated with indiscriminate behaviors in young children (Bruce, Tarullo, & Gunnar, 2009; Chisholm, 1998; O'Connor, Bredenkamp, & Rutter, 1999).

Autistic spectrum disorders—The presence of autistic spectrum disorders (ASD) is considered an exclusionary condition for diagnosing RAD (APA, 2013; WHO, 1992). This exclusionary criterion is intended to distinguish between aberrant social behavior induced by severe neglect and deprivation from that induced by intrinsic central nervous system abnormalities such as autistic spectrum disorders (WHO, 1992; Zeanah, 1996). Both RAD and ASDs are characterized by limited social reciprocity, although RAD is not associated with atypical language development and children with autism may demonstrate focused attachment behaviors (Gleason et al., 2011; Rutgers et al., 2004). The ICD-10 indicates that children with RAD have the capacity for social reciprocity, may have delayed but not stereotyped language (WHO, 1992).

The clinical differential diagnosis is complicated by the findings that 9.2% of previously institutionalized adopted children can demonstrate “quasi-autism,” in which they meet the diagnostic criteria for autism on the Autism Diagnostic Inventory (Rutter et al., 2007). Quasi-autism is differentiated by normal head circumference, the equal distribution by sex, and most notably, improvement when the child is placed in families. In fact, at age 11, one-quarter of children with quasi-autism at 6 no longer had signs of autism (Rutter et al., 2007). Curiously, in ERAS, children with quasi-autism also showed high rates of co-occurring indiscriminate behavior (Rutter et al., 2010).

Internalizing and externalizing symptomatology—Given the emotional impairments in RAD and the intrusive behaviors in DSED, it is reasonable to consider a possible convergence between signs of RAD and internalizing problems and between signs of DSED and externalizing problems. Several studies have identified modest to moderate correlations between signs of RAD and DSED and internalizing and externalizing behavior problems in the predicted directions (Smyke et al., 2002; O'Connor et al., 2003; Zeanah et al., 2002).

The clinical phenotypes of RAD and depression share reduced or absent positive affect and social withdrawal, but few studies have examined this specific association. In BEIP, children showed moderate-high associations between signs of RAD and depression at multiple time points from 22 months to 54 months, but most children with a depressive disorder did not meet criteria for RAD at 54 months (Gleason et al., 2011).

More studies have examined the association between DSED and externalizing behaviors, but findings on this question, have been mixed. Among institutionalized toddlers, Zeanah et al. (2002) found no relationships between caregiver reports of indiscriminate behavior and global ratings of aggression. Similarly, in the BEIP, there was no association between indiscriminate and aggressive behaviors in children 42 months and below (Zeanah et al., 2005; Gleason et al., 2011).

In older children, however, signs of DSED have been more consistently associated with inattention/overactivity and other externalizing behaviors. For example, in BEIP, signs of DSED were associated with signs of ADHD and modestly associated with signs of disruptive behavior disorders at 54 months (Gleason et al., 2011). This outcome replicates similar findings in Romanian adoptees with mean ages of 54 – 72 months (Chisholm, 1998; Rutter et al., 2007; Stevens et al., 2008). However, despite these correlations, it seems clear from these findings that ADHD and DSED are distinct clinical entities. For example, in BEIP, only 4 of the 20 children who met criteria for ADHD also met criteria for DSED and only 4 of the 16 children who met criteria for DSED also met criteria for ADHD (Gleason et al., 2011).

Neurobiology

To understand the neurobiology of attachment disorders, we first consider the context provided by recent findings about the neurobiological effects of deprivation from studies of children raised in institutions (see Nelson et al., 2011; Nelson, Fox & Zeanah, 2014, for more detailed reviews). Briefly, both structure and functioning of the brain have shown to be altered in currently and formerly institutionalized children, at least for those who were raised in these settings for significant periods of time and beyond six months of age. Consistent structural findings are reductions in both gray and white matter volumes in children who experienced institutional deprivation (Eluvathingal et al., 2006; Mehta et al., 2009; Sheridan et al., 2012), compatible with reduced electrical activity in higher frequencies and increased electrical activities in lower frequencies (Marshall & Fox, 2004; Marshall et al., 2008; Tarullo et al., 2009; Vanderwert et al., 2010). These changes may be lasting, but for children placed with families before 24 months, Vanderwert and colleagues demonstrated normalization of brain functioning by age 8 years (Vanderwert et al., 2010). In addition, specific disruptions in connectivity between amygdala and prefrontal cortex have been demonstrated in post-institutionalized children (Govindan et al., 2010).

Because of demonstrated associations between signs of ADHD and indiscriminate behavior (Roy, Pickles & Rutter, 2004; Gleason et al., 2011), several studies have examined inhibitory control, a construct demonstrated to be dependent upon ventral frontostriatal circuitry (Durstun et al., 2002). Using laboratory assessments such as the Stroop, go-no-go, or Bear-Dragon task, independent studies have demonstrated predicted inverse associations between inhibitory control and indiscriminate social behaviors in young children, though the convergence has been modest to moderate (Bruce et al., 2009; Gleason et al., 2011; Pears et al., 2010).

Tarullo et al. (2011) assessed in three groups of children: 18-month-old adopted post-institutionalized children, non-adopted children, and children adopted internationally from

foster care. Post-institutionalized children had an atypical EEG power distribution, with relative power increased in lower frequency bands compared with non-adopted children. Both internationally adopted groups had lower absolute alpha power than non-adopted children. Atypical EEG power distribution at 18 months predicted indiscriminate behavior and poorer inhibitory control at 36 months. Both post-institutionalized and foster care children were more likely than non-adopted children to exhibit indiscriminate behavior. They proposed that cortical hypo-activation from early deprivation might explain both reduced EEG power and the association with indiscriminate behavior.

Another approach to exploring the neurobiology of indiscriminate behavior has been functional MRI. Olsavsky and colleagues (Olsavsky et al., 2013) used fMRI to demonstrate that children adopted from institutions showed reduced amygdala discrimination between mothers and strangers compared to children with no history of institutional rearing or adoption. Further, reductions in mother-stranger discriminations were moderately associated with indiscriminate behavior, and those children with more prolonged institutional rearing showed reduced amygdala discrimination and more indiscriminate behavior.

All of these findings must be considered preliminary and in need of replication, but they do point to neurobiological susceptibility to the effects of deprivation on signs of DSED. More studies of neurobiological effects of deprivation should include signs of RAD and DSED as an outcome of interest.

Course and outcomes

Stability of signs of RAD

Research is limited that addresses the natural course of RAD. The most relevant data is from BEIP. In this study, children were assessed for signs of RAD and DSED at baseline (mean of 22 months) and again at 30, 42 and 54 months of age (Gleason et al., 2011). Because the design included a care as usual group, it is possible to examine the stability of signs of these disorders in children who did not receive intervention beyond whatever child protection authorities provided for them.

There was at least moderate stability of the level of signs of RAD between each time point in the study for children randomized to care as usual for all comparisons except between 30 and 54 months. By age 54 months, when the trial ended, about half of these children were still living in institutional settings. For those children who remained continuously in institutions, stability of signs was even greater (Gleason et al., 2011).

More studies have examined the stability of signs of DSED, however. In BEIP, signs of DSED were moderately stable from 30 months to 54 months for children with a history of institutional care (Gleason et al., 2011). Among the continuously institutionalized group, stability was slightly higher. Tizard and colleagues reported significant stability in “over-friendly” and attention seeking behavior from age 4 to 8 years in formerly institutionalized children, and noted that once established, over-friendly behavior was especially resistant to change (Tizard & Rees, 1975; Tizard & Hodges, 1978). At age 16, indiscriminate behavior with caregivers was reduced but evident with peers. Relations with peers were conflicted

and superficial, for example, naming a recent acquaintance as a close friend (Hodges & Tizard, 1989).

For children who are adopted out of institutions, signs of DSED seem to show at least modest stability even years after adoption (Chisholm, 1998). In the ERAS, for example, there was modest stability in signs of indiscriminate behavior from six to eleven years of age (Rutter et al., 2007). Further, Rutter et al. (2010) identified a group of 29 children who show continuously elevated signs of DSED from early childhood through 15 years of age. Lawler et al. (in press) showed diminution in signs of physical (but not non-physical) social engagement with a stranger in young children adopted internationally from institutions and foster care over an 8-month beginning one to three months after adoption.

Functional impairment and RAD and DSED

A number of longitudinal studies of children raised in institutions, many of whom have signs of RAD, have implicitly described functional impairment years later, particularly with regard to problematic interpersonal relationships (Chisholm, 1998; Hodges & Tizard, 1989; Rutter et al., 2007). The most direct evidence on this point at least in early childhood, comes from BEIP, in which signs of RAD were associated with concurrently assessed lack of social competence at 30 and 42 months and with functional impairment at 54 months. Signs of RAD at each age predicted future functional impairment in the children randomized to continued institutional care, especially in the children who remained institutionalized through 54 months of age (Gleason et al., 2011).

Similarly, signs of DSED in the same study were concurrently associated with lack of social-emotional competence at 30 and 42 months and with functional impairment at 54 months. Signs of DSED at 42 months predicted impairment at 54 months, but signs at 22 months and 30 months did not (Gleason et al., 2011). The peer relational abnormalities in adolescents in the Tizard study also reflect functional impairment associated with indiscriminate behavior (Hodges & Tizard, 1989).

Rutter et al. (2007) reported an increase in use of mental health services and more special education in children with histories of institutional rearing who showed indiscriminate behavior. Additionally, children showed impaired peer relationships and higher rates of psychopathology. Lyons-Ruth also showed that toddlers who were indiscriminate with strangers showed more aggressive and hyperactive behavior problems in kindergarten (Lyons-Ruth et al., 2009).

Effects of intervention

Studies designed as interventions for RAD and DSED are limited. Primarily, the research that has been conducted is the natural experiment provided by adoption of children from deprived institutions into advantaged families. Since signs of RAD and DSED have been identified in young children being raised in institutions (Tizard & Rees, 1975; Smyke et al., 2002; Zeanah et al., 2005), the “intervention” in these studies is being adopted into families. Implicit in these studies is the notion that the enhanced caregiving following adoption will ameliorate signs of attachment disorders. Because inadequate care is etiologic, it is

reasonable to consider that fostering or adoption will lead to elimination or at least substantial reduction of signs of the disorders.

Intervention for RAD

A striking finding in studies of children adopted out of institutions is that there are no reports of children with RAD. In the Tizard study, although indiscriminate behavior persisted in some children after adoption or return to biological parents, the inhibited phenotype that was evident in institutionalized children at age 4 years was no longer present at age 8 or 16 years (Tizard & Rees, 1975; Tizard & Hodges, 1978; Hodges & Tizard, 1989). In the Canadian and English studies of children adopted from Romanian institutions, signs of DSED were readily apparent, but there were no reports of children with RAD, even in the initial assessments (Chisholm et al., 1995; O'Connor et al., 1999). This suggests that signs of RAD diminish or disappear once the child is placed in a more normative caregiving environment.

A more intentional intervention for RAD was undertaken in BEIP. This RCT demonstrated that signs of RAD were evident in young children living in institutions (average age 22 months) (Zeanah et al., 2005) and that they persisted through 54 months of age (endpoint of the trial) in children randomized to care as usual (Smyke et al., 2012). In contrast, for those randomized to foster care, signs of RAD diminished by the first follow-up at 30 months of age to levels comparable to never institutionalized children, and remained so at 42 and 54 months of age (Smyke et al., 2012). In contrast, those in the care as usual group remained significantly higher than signs of RAD in children in foster care at every follow-up point. For the subset of children in the care as usual group who remained institutionalized through 54 months of age, there was no diminution in signs of RAD over time.

Taken together with the adoption findings, the implication is that once children are placed in families and receive adequate care, signs of RAD in affected children diminish substantially and disappear in most cases. Still more research could be useful. For example, we lack longitudinal studies that could address whether signs of RAD diminish weeks or months after placement in foster care.

Less clear is whether additional interventions beyond family placement may be necessary in children who develop RAD in order to promote secure and healthy attachments. Dozier et al. (2001) found that maltreated young children placed in foster care could form secure attachments to their caregivers at rates comparable to never maltreated children but only if foster mothers were themselves securely attached. If the mothers were not securely attached, the probability of disorganized attachments increased substantially. Steele et al. (2008) reported similar findings about maltreated children adopted out of foster care. Since research indicates that secure attachment in young children is fostered by caregivers who are emotionally available and sensitively responsive, evidenced based interventions aimed at these targets are reasonable starting points for augmenting adoptions or fostering for children with RAD (see Bernard et al., 2012; Juffer et al., 2007; Hoffman et al., 2006).

Intervention for DSED

Tizard's longitudinal study demonstrated both the persistence of indiscriminate behavior and its reduction following adoption (Tizard & Rees, 1975; Tizard & Hodges, 1978; Hodges & Tizard, 1989). Subsequent longitudinal adoption studies have yielded similarly mixed results about the effectiveness of enhanced caregiving in studies of young children adopted out of institutions (Chisholm, 1998; Rutter et al., 2010).

Two longitudinal studies of young children adopted from Romanian institutions in the post-Ceausescu era both demonstrated the persistence of signs of DSED in some children even after they had formed attachments to their adoptive parents. The first was a longitudinal study of young children adopted into Canada from Romanian institutions that found significant increases in parent reports of attachment during the first several years following adoption but no comparable decreases in indiscriminate behavior over time (Chisholm, 1998). Similarly, in the ERAS of children adopted into U.K. families from Romanian institutions, investigators assessed signs of DSED at ages 4, 6, 11 and 15 years (O'Connor & Rutter 2000; O'Connor et al. 2003; Rutter et al. 2007; Rutter et al. 2010). They reported little change in the numbers of children with high levels of indiscriminate behaviors between 4 and 6 years, but some decline by age 11 years (O'Connor & Rutter 2000; Rutter et al. 2007). Curiously, however, they did not find that quality of care in adoptive homes was related to indiscriminate behavior. This could mean that there is a threshold of caregiving quality after which remediation of DSED is not further enhanced.

In the BEIP, there was a modest, but statistically significant decline in signs of DSED with the foster care intervention, although rates were significantly lower in the never institutionalized group (Smyke et al., 2012). Importantly, within in the foster care group, placement before 24 months of age predicted the lowest level of DSED, compatible with a timing of intervention effect.

As with RAD, the caregiving that should be provided for children with DSED, as best we can determine, is the same caregiving that is known to lead to secure attachment formation. That is, sensitive and responsive care, in which the parent identifies and responds to the child's needs. Evidenced based interventions with maltreated children have been shown to enhance attachment and should be attempted with children with DSED (Bernard et al., 2012; Cicchetti et al., 2006).

Although adequate caregiving seems both to prevent and to ameliorate DSED, the persistence of signs of DSED in some children indicates that additional strategies and approaches beyond an enhancement of caregiving are needed. Given that social cognitive abnormalities plausibly underlie the social boundary violations and disinhibition that characterize the disorder, interventions that target these features seem promising areas to explore.

Conclusions about interventions for RAD and DSED

In summary, virtually all children with RAD seem to respond to enhanced caregiving, whereas only some with DSED respond to enhanced caregiving. The incomplete remediation for those with DSED could reflect individual differences in responsiveness to

caregiving (see Drury et al., 2012) or incomplete remediation in those who were most severely affected initially. The degree to which enhanced care and symptom reduction in these children reduces subsequent social and emotional problems is not yet established. In our view, augmented and additional interventions should be explored both for children diagnosed with RAD and especially DSED.

Future directions

RAD and DSED have been subjected to more systematic research in the past 10 years than in the 25 years that followed their original description in DSM-III (APA, 1980). Though there is now an emerging consensus about the basic phenomenology of the disorders, much remains to be determined. Several directions for research seem promising for illuminating remaining questions:

1. Given that severe social neglect seems necessary for these disorders to occur, a vexing question is what vulnerability factors might give rise to the very different phenotypes in RAD and DSED. There has been speculation about temperamental differences that might predispose to one or another phenotypes, since both behavioral inhibition and high sociability are known temperamental dispositions (Zeanah & Fox, 2004), but this is exceedingly difficult to study since it is hard to assess temperament in children who will subsequently develop attachment disorders. Also, the underlying neurobiological substrates of these dispositions are not known. In fact, vulnerability has only begun to be explored in DSED, and as yet, no studies have addressed vulnerability to RAD. There is a question of a sensitive period in the vulnerability to DSED, as deprivation that occurs before the first 6 months and after 24 months of age seem far less likely to lead to the clinical picture, but the data remain thin on which this preliminary conclusion rests.
2. Related to the first point, we have little understanding of the mechanisms by which insufficient care or social neglect lead to the phenotypes defined by RAD and DSED. In particular, although some initial findings about the neurobiology of DSED have appeared, no clear story has yet emerged about either disorder. No studies have addressed the neurobiology of RAD. Progress in understanding the circuitry involved in symptomatology could prove quite useful in better developing more effective interventions.
3. Although social neglect is broadly implicated in etiology, the specifics of the caregiving insufficiencies that give rise to the two disorders—how similar or different they are—is not known. This is a challenging issue to study for many reasons, but better understanding these features would be useful both for treatment and prevention.
4. RAD appears exceedingly responsive to enhanced caregiving. Less clear is whether children who recover from RAD remain at risk for subsequent interpersonal difficulties. More longitudinal studies of children diagnosed in the early years with RAD would help us determine which factors increase risk for problematic trajectories.

5. DESD is less responsive to enhanced caregiving, and additional interventions to remediate signs of the disorder seem indicated, at least in children for whom the disorder persists after placement in a stable family setting. Better elucidation of putative social cognitive abnormalities in affected children could be an important contribution to effective interventions.
6. These disorders have been studied most systematically in younger children. Follow-ups of the sequelae of these disorders in later childhood, adolescence or adulthood are needed, including peer relationships and interpersonal competence. Also, the question of if and how their symptomatology changes in middle childhood and adolescence needs more careful study. Also, reconciling the different views of the phenomenology of attachment disorders in older children should be a priority. These are additional areas in which longitudinal studies could prove especially valuable.

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Key points

- RAD and DSED represent disorders that appear in some children with histories of living in contexts that limit opportunities to form selective attachments, such as being raised in impersonal institutional settings, social neglect, and frequent changes in foster care.
- Much has been learned in the past decade, although little is known about mechanisms by which insufficient caregiving leads to the two phenotypes of RAD and DSED and also about the longterm sequelae of these disorders.
- RAD is very responsive to enhanced caregiving, but DSED is somewhat less responsive for reasons that are unclear.
- Although high-quality caregiving is an important ingredient to help children recover from both of these disorders, additional interventions may be needed and much remains to be learned about what those additional components should be. More studies of intervention are needed to address these questions.