Validity of Evidence-Derived Criteria for Reactive Attachment Disorder: Indiscriminately Social/Disinhibited and Emotionally Withdrawn/Inhibited Types

Mary Margaret Gleason, M.D., Nathan A. Fox, Ph.D., Stacy Drury, M.D., Ph.D., Anna Smyke, Ph.D., Helen L. Egger, M.D., Charles A. Nelson III, Ph.D., Matthew C. Gregas, Ph.D., Charles H. Zeanah, M.D.

Objective: This study examined the validity of criteria for indiscriminately social/disinhibited and emotionally withdrawn/inhibited reactive attachment disorder (RAD).

Method: As part of a longitudinal intervention trial of previously institutionalized children, caregiver interviews and direct observational measurements provided continuous and categorical data used to examine the internal consistency, criterion validity, construct validity, convergent and discriminant validity, association with functional impairment, and stability of these disorders over time.

Results: As in other studies, the findings showed distinctions between the two types of RAD. Evidence-derived criteria for both types of RAD showed acceptable internal consistency and criterion validity. In this study, rates of indiscriminately social/disinhibited RAD at baseline and at 30, 42, and 54 months were 41/129 (31.8%), 22/122 (17.9%), and 22/125 (18.0%), respectively. Signs of indiscriminately social/disinhibited RAD showed little association with caregiving quality. Nearly half of children with indiscriminately social/disinhibited RAD had organized attachment classifications. Signs of indiscriminately social/disinhibited RAD were associated with signs of activity/impulsivity and of attention-deficit/hyperactivity disorder and modestly with inhibitory control but were distinct from the diagnosis of attention-deficit/hyperactivity disorder. At baseline, 30, 42, and 54 months, 6/130 (4.6%), 4/123 (3.3%), and 2/125 (1.6%), respectively, met criteria for emotionally withdrawn/inhibited RAD. Emotionally withdrawn/inhibited RAD was moderately associated with caregiving at the first three time points and strongly associated with attachment security. Signs of this type of RAD were associated with depressive symptoms, although two of the five children with this type of RAD at 54 months did not meet criteria for major depressive disorder. Signs of both types of RAD contributed independently to functional impairment and were stable over time.

Conclusions: Evidence-derived criteria for indiscriminately social/disinhibited and emotionally withdrawn/inhibited RAD define two statistically and clinically cohesive syndromes that are distinct from each other, show stability over 2 years, have predictable associations with risk factors and attachment, can be distinguished from other psychiatric disorders, and cause functional impairment. J. Am. Acad. Child Adolesc Psychiatry, 2011;50(3):216–231. Clinical trial registration information—The Bucharest Early Intervention Project, URL: http://www.clinicaltrials.gov, unique identifier: NCT00747396.

Key Words: Reactive attachment disorder, early childhood
indiscriminant type, in which children exhibited social boundary violations and were nonselective in their use of adult caregivers for comfort-seeking and overly engaging with relative strangers. The second was an emotionally withdrawn type, in which children showed limited social responsiveness, little positive affect and emotion dysregulation, and a failure to seek comfort when distressed. The two behavioral phenotypes were later defined as reactive attachment disorder (RAD), with a requirement that the signs result from pathogenic care.\(^6,7\) Despite appearing in DSM since 1980 and in the DSM-IV\(^8\) and the ICD-10, there was little formal study of the disorders until the past 10 to 12 years. Recently, there has been a growing literature examining indiscriminant social behaviors in children exposed to caregiving adversity (reviewed elsewhere\(^8,10\)), but the validation of the two disorders is incomplete. Questions remain about the conditions necessary for the two disorders to develop. Other questions include the degree to which these syndromes represent distinct disorders that impair functioning, how they relate to the developmental construct of selective attachment relationships, and the validity of the diagnostic criteria. The criteria have been criticized for being insufficiently informed by the substantial developmental literature on selective attachments, and there are questions about the relation between RAD and selective attachments.\(^11,12\)

To address disordered attachment, it is important to understand the construct of attachment. By 7 to 9 months of age, a young child begins to direct attachment behaviors selectively toward a parent figure in times of distress. This process occurs cross-culturally, and a large literature describes variations and perturbations in attachment under species-typical rearing conditions.\(^13\) When securely attached, a young child approaches the parent for comfort and is effectively calmed by physical proximity to the parent and the parents’ soothing.\(^14,15\) Secure attachment is more likely to develop with higher-quality caregiving. A securely attached child is more likely to have normal physiologic status and more positive psychological outcomes.\(^16-18\) Conversely, disorganized attachment patterns describe the most disturbed classifications of selective attachments, although they are not in and of themselves evidence of psychopathology and occur in roughly 15% of low-risk dyads.\(^19\) This classification describes behaviors that demonstrate that the child lacks a coherent strategy for eliciting comfort from a caregiver. Disorganized attachment is associated with a substantially increased risk for subsequent psychopathology.\(^16-21\) In contrast to these normal variants of formed attachments, extreme violations of the expectable environment, such as institutional rearing, which limit opportunities for a young child to form selective attachments, create conditions in which disorders of attachment may develop.

Unlike classifications of attachment security, which are specific to the relationship between a child and caregiver, the diagnostic criteria for the two types of RAD describe cross-situational, within-child disorders. The DSM-IV-TR\(^8\) indiscriminately social/disinhibited type of RAD includes criteria describing attachment behaviors (“lack of selectivity in choice of attachment figures”) and generalized social behaviors of the child with strangers (“excessive familiarity with relative strangers”). The emotionally withdrawn type of RAD is defined by problems in “most social interactions.”

Research Diagnostic Criteria for RAD
In 2003, a task force of early childhood mental health researchers proposed empirically derived research diagnostic criteria (RDC) modified from the DSM-IV-TR.\(^22\) The modified diagnostic criteria for RAD maintain the requirement for pathogenic caregiving for both diagnoses, but the criteria more closely adhere to focused attachment behaviors than the DSM-IV-TR or ICD-10. In the RDC, the indiscriminately social/disinhibited type is defined by the child’s lack of selective approaching of caregivers in situations that should activate attachment behaviors and by the presence of nonselective attachment behaviors toward strangers, such as proximity-seeking.\(^22,23\) The inhibited type of RAD is defined by a pervasive lack of active attachment behaviors, with the child failing to seek proximity, obtain comfort, or share positive affect with adult caregivers. These two distinct patterns of RAD have been identified in institutionalized and maltreated children.\(^7,10,24,25\)

Establishing the Validity of a Psychiatric Disorder
This study examined the validity of the RDC for the two types of RAD in a young children with a history of institutional care, using an approach derived from Robins and Guze’s criteria\(^26\) for defining a psychiatric disorder. A clinical disorder
must demonstrate internal consistency, that is, the clinical signs cluster together, and criterion validity, that is, the clinical signs predict a specific measurable outcome or gold standard. The clinical presentation, including associations with putative etiologic factors, should be part of the characterization of a psychiatric disorder. A disorder also must show discriminant validity, that is, the clinical signs reflect a disorder that can be differentiated from other known disorders. This is particularly important when a disorder has some apparent overlap with more established disorders. In addition, a disorder must show some stability over time. Although not required by Robins and Guze, the criteria must define a clinical entity associated with functional impairment. Although the two types of RAD are linked in the *DSM* nomenclature, they are defined as two distinct disorders in *ICD-10*.²⁷ and extant research suggests that the research describing aspects of the disorders’ validity ought to be examined independently.

One Disorder or Two Disorders

Several studies have examined the two types of RAD concurrently and provided some evidence that they represent separate clinical entities due to distinctive symptoms, divergent relation with quality of caregiving, and differing courses.²⁴,²⁸,²⁹ In a study of signs of RAD in institutionalized young children (mean age, 39 months), four clusters of disordered attachment patterns were identified. Although the vast majority of the group demonstrated no signs of attachment disorder, the remainder were nearly equally divided among three groups: children demonstrating the signs of emotionally withdrawn/inhibited RAD, children with signs of indiscriminately social/disinhibited RAD, and children who demonstrated signs of both types of RAD.²⁹ Other studies of previously institutionalized children have suggested that the two types of RAD have significantly different courses. The emotionally withdrawn/inhibited type is virtually nonexistent in large follow-up studies of children placed in adoptive homes, whereas the persistence of RAD indiscriminately social/disinhibited is much higher.²⁴,³⁰ There is growing agreement within the field that these two syndromes should be considered distinct disorders.⁶,³¹

*Indiscriminately Social/Disinhibited RAD.* Previous research has demonstrated a link between history of caregiving adversity, including institutional care, and indiscriminately social/disinhibited RAD.⁹,¹⁰,³²,³³ Although the specific nature or threshold of caregiving adversity required is only vaguely defined in diagnostic criteria, it is a critical requirement for the diagnosis because it distinguishes these children from those with indiscriminant sociability related to abnormalities of chromosome 7 (i.e., Williams syndrome). Conversely, internal consistency and criterion validity have not been established, and there are substantial inconsistencies in reports of associated clinical findings, especially regarding attachment security and externalizing behaviors.¹⁰-¹²,³⁴-³⁷ Stability of the signs over time beginning after removal from adverse caregiving has been demonstrated in postadoption studies, but the trajectory from the time of institutional care and the influence of potential selection bias in adopted children remain unaddressed.¹¹,¹⁸,²⁰

*Emotionally Withdrawn/Inhibited RAD.* Compared with the literature focused on the indiscriminately social/disinhibited type of RAD, the literature focused on emotionally withdrawn/inhibited RAD is quite small. Cross-sectional studies in the United States, Great Britain, and Romania have demonstrated acceptable statistical internal consistency of the criteria,²⁵,²⁹ an association with caregiving adversity including institutional rearing,²⁵,²⁹,³²,³⁴ and an association between emotionally withdrawn/inhibited RAD and completely developed attachment.²⁸ Beyond these scattered findings, there has been limited study of emotionally withdrawn/inhibited RAD.

**Goals of This Study**

To address these inconsistent findings and examine the validity of each of the two types of RAD, the clinical signs and trajectory of RAD signs in children enrolled in the Bucharest Early Intervention Project (BEIP) were examined. In this study, the clinical presentation was examined by assessing the internal consistency of the signs and criterion validity of the two types of RAD, comparing adult-reported signs of RAD with the diagnosis as determined by a diagnostic interview and, for indiscriminately social/disinhibited RAD, with observed behaviors. The construct validity was assessed by examining the predicted associations between caregiving quality, a putative risk factor for each type of RAD, and attachment security, which is inconsistently linked to indiscriminately social/disinhibited RAD and more consistently linked with emotionally withdrawn/inhibited RAD.
RAD in the existing literature. Next, convergent and discriminant validity were examined. Specifically, indiscriminately social/disinhibited RAD was hypothesized to have some overlap with signs of attention-deficit/hyperactivity disorder (ADHD) but diverge from an ADHD diagnosis and emotionally withdrawn/inhibited RAD was hypothesized to be distinct from major depressive disorder, although some shared clinical characteristics were hypothesized. In sum, the two RAD disorders were hypothesized as separate from more established disorders in young children. The signs of each type of RAD were predicted to show moderate stability and over time and be associated with functional impairment, as would be expected for a clinically relevant disorder.

**METHOD**

Participants
This study presents data from the BEIP, which has been described in detail elsewhere. BEIP is the first randomized, controlled trial of foster care as an alternative to institutional care. Children were followed from baseline (mean age, 21 months) to 54 months. Initially, 187 children younger than 31 months (range, 6–30 months) living in six institutions for young children in Bucharest, Romania, were screened for participation in the study. Figure 1 presents the flow diagram for the study. Children in the study spent a mean of 86% of their lives in institutional care. For most, specific details of their early experiences were unavailable. Children were excluded from BEIP if they had genetic syndromes, dysmorphic features of fetal alcohol syndrome, or microcephaly. Eligible children were assessed comprehensively and then randomly assigned to care as usual (continued institutional care) or placement in foster care. The foster care network was created and supported by the research team because of limited foster care availability in Bucharest at the time of the study. Foster parents were trained by a Romanian nongovernmental organization and received ongoing support from social workers with the project, with consultation from U.S. consultants with expertise in foster care, a process described in detail.
elsewhere. For children in the study, all placement decisions after randomization were made by the Romanian National Authority for Child Protection in accordance with Romanian law. The only difference from the usual practice was a negotiated commitment that any child placed in foster care by the study would never return to an institution.

Children in the care-as-usual group and foster-care group were at risk of developing RAD by virtue of their experience in institutional caregiving and are the focus of this article. Table 1 lists the demographic characteristics of the participants, and Figure 1 presents the gender and placement of children at baseline and 54 months.

**Measurements**

All measurements used in this study were originally developed in English and were translated into Romanian and back-translated to confirm accuracy by bilingual Romanian research team members. For children living in a family, the foster mother reported on caregiver report measurements. If a child in an institution had a favorite caregiver, that caregiver completed the measurements. For children who had no known favorite caregiver, a caregiver who knew the child well and worked with the child regularly completed the measurements.

**Disturbances of Attachment Interview.** The Disturbances of Attachment Interview (DAI) is a semistructured examiner-based interview of a caregiver who reports on signs of RAD in very young children. The complete DAI items are included as supplemental online material (Supplement 1, available online). Responses to each item are coded on a three-point scale, where 0 is “clearly demonstrates” a behavior, 1 is “sometimes or somewhat” demonstrates a behavior, and 2 is “rarely or minimally” demonstrates a behavior. The DAI includes three items focused on signs of indiscriminately social/disinhibited RAD and five items focused on signs of emotionally/withdrawn inhibited signs of RAD.

The indiscriminately social/disinhibited items examine how the child uses the caregiver in unfamiliar settings, whether the child exhibits reticence with unfamiliar adults, and whether the child is likely to leave with a stranger. This total score on this scale can range from 0 to 6, with higher scores indicating more signs of indiscriminately social/disinhibited RAD. The emotionally withdrawn/inhibited items focus on how well the child differentiates among adults and includes whether the child shows a clear preference for a particular caregiver, seeks comfort from a preferred caregiver, and responds to comforting when offered and the degree to which the child shows developmentally appropriate levels of emotional regulation. The emotionally withdrawn/inhibited scale produces scores of 0 to 10, with higher scores representing increasing signs of emotionally withdrawn/inhibited RAD.

The DAI scales have demonstrated strong internal validity in previous research for both types of RAD (Cronbach α = 0.83 and 0.80, respectively). Inter-rater reliability for the DAI was demonstrated to be excellent (κ = 0.88). Both scales of the DAI distinguish between institutionalized and never-institutionalized children and vary as predicted in children experiencing differing levels of caregivers. The indiscriminately social/disinhibited scale of the DAI has been shown to converge with other measurements of this construct. The emotionally withdrawn/inhibited scale was moderately associated with the degree to which attachment had formed in very young children (mean age, 22 months).

The RDC for RAD were applied to the DAI items to create categorical variables for each type of RAD. For indiscriminately social/disinhibited RAD, two or more DAI items must be endorsed, and for emotionally withdrawn/inhibited RAD, at least three items must be endorsed.

The DAI was administered at baseline (mean, 22 months) and at 30, 42, and 54 months of age by interviewers trained to reliability (κ = 0.80). In this study, the respective DAI scales for indiscriminately social/disinhibited RAD and emotionally withdrawn/inhibited RAD were used to examine continuous ratings of the signs of RAD at each time point. Scores on this measurement are presented in Table 1.

**TABLE 1** Demographic Characteristics of Participants, Caregiving Conditions, and Disturbances of Attachment Scores

<table>
<thead>
<tr>
<th>Ethnicity, n (%)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Romanian</td>
<td>75</td>
<td>(53.9)</td>
</tr>
<tr>
<td>Roma</td>
<td>39</td>
<td>(28.9)</td>
</tr>
<tr>
<td>Other</td>
<td>21</td>
<td>(15.6)</td>
</tr>
<tr>
<td>Gender, n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Girl</td>
<td>68</td>
<td>(50.4)</td>
</tr>
<tr>
<td>Boy</td>
<td>67</td>
<td>(49.6)</td>
</tr>
<tr>
<td>Age at randomization, mean (SD)</td>
<td>20.7 (7.2)</td>
<td></td>
</tr>
<tr>
<td>Percentage of life in institution at baseline, mean (SD)</td>
<td>86.5 (20.6)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Disturbances of attachment</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Indiscriminately social/disinhibited, range</td>
<td>0–6</td>
<td></td>
</tr>
<tr>
<td>Baseline, mean (SD)</td>
<td>2.6 (1.8)</td>
<td></td>
</tr>
<tr>
<td>30 mo, mean (SD)</td>
<td>1.9 (1.8)</td>
<td></td>
</tr>
<tr>
<td>42 mo, mean (SD)</td>
<td>1.6 (1.9)</td>
<td></td>
</tr>
<tr>
<td>54 mo, mean (SD)</td>
<td>1.8 (2.1)</td>
<td></td>
</tr>
<tr>
<td>Emotionally withdrawn/inhibited, range</td>
<td>0–10</td>
<td></td>
</tr>
<tr>
<td>Baseline, mean (SD)</td>
<td>2.6 (2.5)</td>
<td></td>
</tr>
<tr>
<td>30 mo, mean (SD)</td>
<td>1.5 (2.0)</td>
<td></td>
</tr>
<tr>
<td>42 mo, mean (SD)</td>
<td>1.2 (1.9)</td>
<td></td>
</tr>
<tr>
<td>54 mo, mean (SD)</td>
<td>1.1 (2.2)</td>
<td></td>
</tr>
</tbody>
</table>

*Note. SD = standard deviation.*
Measurements of Convergent Validity. Preschool Age Psychiatric Assessment. The Preschool Age Psychiatric Assessment (PAPA) is a comprehensive parent-report psychiatric diagnostic interview for preschool children. Based on responses to the PAPA, an algorithm generates diagnoses, scale scores, and scores reflecting the number of domains in which the child is impaired. For this study, DSM-IV criteria were applied for all diagnoses except RAD, for which the RDC for preschool age criteria were used. The test-retest reliability of the PAPA is similar to the reliability of structured psychiatric interviews focused on older children and adults. The interview was administered when children were 54 months of age. For this study, each RAD diagnosis, categorical and symptom count measurements of ADHD, disruptive behavior disorder, major depressive disorder, and continuous scores of functional impairment were examined.

Stranger at the Door. This procedure was developed specifically for this study as an observational measurement of indiscriminate behavior at 54 months. Caregivers were instructed ahead of time to be at the door with the child when a research assistant who was unknown to the child (stranger) arrived. When the parent/caregiver opened the door, this stranger looked at the child and said, “Come with me. I have something to show you.” The parent/caregiver was instructed to look at the child but not to signal any directions. The child’s behavior was coded as 0 (“stayed with parent”) or 1 (“left with the stranger”). If the child left with the research assistant, they walked around the corner, where they found a familiar research assistant who said, “Hello, I am here to play with you again,” and then resumed the visit. Raters coded written descriptions of the child’s behavior that were composed by the research assistant at the time of the procedure. The \( \kappa \) value was 1.0 on the coding of stayed versus left using two coders blinded to the child’s placement.

Measurements of Construct Validity. Observational Record of the Caregiving Environment. The Observational Record of the Caregiving Environment, with adaptations for institutional use, was used to assess the quality of the caregiving environment at baseline and at 30 and 42 months. Children were videotaped during naturalistic interactions in their caregiving setting with their preferred caregiver for 1½ hours. The caregiving quality score was calculated by averaging the score on each of five factors (sensitivity, stimulation of development, positive regard for child, flat affect [reversed], detachment [reversed]), which were rated from 1 (not at all characteristic) to 4 (highly characteristic) and averaged. The training process, which included an overview of the Observational Record of the Caregiving Environment items used in the BEIP and coding and discussion of practice tapes, led to excellent internal and inter-rater reliability (Cronbach \( \alpha = 0.86 \) and 0.88–0.99, respectively) and has been described elsewhere.

Strange Situation Procedure. Strange situations were administered at 42 months and coded using the MacArthur Preschool Attachment Classification System, as described elsewhere, with the categories of secure, avoidant, ambivalent, disorganized, controlling, and insecure-other. Coding is based on the same principles as the Ainsworth Infant Strange Situation coding but involves developmental modifications. For example, secure attachment behaviors in preschoolers include positive engagement and attention to verbal and nonverbal interactions. Physical proximity-seeking is less commonly seen than in infants. The Preschool Attachment Classification System has been validated in studies that have demonstrated predicted associations between attachment classifications and observed parent–child interaction qualities, parental internal representations and well-being, and a child’s narrative qualities. Stability of these classifications is moderate to high (44%–78%) over 2.5 years, and stability from infant classifications to preschool classifications is variable but associated with exposure to stressful life events. Native Romanian coders were blind to a child’s group status. In addition, 75% of the procedures were double coded to assess inter-rater reliability, which was more than acceptable (for every classification, \( \kappa \geq 0.87 \)).

A continuous rating of the child’s security of attachment to the caregiver was also coded (1 = “no security evident” and 9 = “most secure”). Inter-rater reliability for this scale was excellent (\( r = 0.87 \)).

In this study, the continuous rating of security and classifications of attachment were examined.

Measurements of Convergent and Discriminant Validity. Wechsler Preschool Primary Scale of Intelligence. The Wechsler Preschool Primary Scale of Intelligence was used to measure cognitive development at 54 months. The 14 subtests of the Wechsler Preschool Primary Scale of Intelligence, used to measure cognitive development at 54 months. The 14 subtests of the Wechsler Preschool Primary Scale of Intelligence assess intellectual functioning in verbal and performance domains. In this study, a measurement of a child’s general intellectual ability (full-scale IQ) was included as a potential factor that contributed to functional impairment.

Infant Toddler Social Emotional Assessment. The Infant Toddler Social Emotional Assessment (ITSEA) uses caregiver reports to assess social and emotional well-being and behavior problems. The ITSEA includes 166 items rated on a three-point scale. U.S. normative scores can be converted to T scores for children 12 to 48 months of age. The ITSEA’s psychometric properties are well-established, with strong test-retest reliability, convergence with the Child Behavior Checklist, and observed parent–child interactions. The ITSEA was administered at baseline and at 30 and 42 months.

In this study, the ITSEA scales of activity/impulsivity and aggression/defiance were examined as predicted correlates of indiscriminately social/disinhib-
**Informed Consent**

The institutional review boards of Tulane University School of Medicine, University of Maryland, and University of Minnesota (institutions of the three principal investigators) and the commissions on child protection in each sector (city district) of Bucharest and by the Romanian Institute of Maternal Child Health reviewed and approved the study. In 2002, the Romanian Ministry of Health established an ad hoc ethics committee that reviewed and approved the project.

Informed consent was obtained from each child’s legal guardian. For children in institutions or foster care, the local child protection commission for the sector in which the child lived, who was the child’s legal guardian, gave consent. In addition, institutional caregivers and foster parents provided assent at the time of each procedure.

**Data Analyses**

Because of preliminary research suggesting that the two types of RAD have different patterns of association with attachment, with concurrent caregiving quality, and vastly different responses to adoption, the syndromes were predicted to show different patterns of associations. Thus, although the overall analytic approach was similar with each type of the disorder, different hypothesis-driven analyses were done when examining associations between the RAD signs and other clinical signs.

For most analyses, the sum of scores on the indiscriminately social/disinhibited scale of the DAI provided the continuous measurement of indiscriminately social/disinhibited RAD and the sum of the emotionally withdrawn/inhibited items on the DAI provided the continuous measurement of emotionally withdrawn/inhibited RAD. The categorical DAI variable for each type of RAD derived from the RDC were used for categorical analyses at baseline and at 30 and 42 months. The PAPA RAD diagnoses were used in analyses at 54 months because this measurement is a more extensive interview than the DAI and could be considered closer to a “gold standard.” For continuous variables (DAI sum scores, ITSEA scores, sums of PAPA symptoms, and incapacity scores), two-tailed Pearson moment correlations were applied. Associations among categorical variables were assessed using $\chi^2$ analyses. Fisher exact test was applied when cells had fewer than five subjects.

For baseline analyses, children 10 months of age and older were included because focused attachment behaviors would not be expected in younger children, making measurements of attachment disorders inappropriate.

For analyses that involved longitudinal analyses (predictive validity), only children randomized to the care-as-usual group were included to avoid potential confound of the experimentally induced changes in caregiving. Repeated measurement analysis, using a mixed model approach, was used to examine predictive validity, a longitudinal measurement. For each type of RAD, the DAI score at each time point was entered, with time as a fixed effect and within-subjects effect. For these analyses, a random intercept was used. Model covariance structure for each type of RAD was selected based on model fit as demonstrated by $-2$ restricted log likelihood after testing autoregressive and unstructured models. For indiscriminately social/disinhibited RAD, an unstructured model demonstrated the best fit ($-2$ restricted log likelihood $= 994.0$) and an autoregressive covariance model showed the best fit for emotionally withdrawn/inhibited RAD ($-2$ restricted log likelihood $= 1114.7$).

**RESULTS**

**Rates of RAD**

Mean scores for both types of RAD on the DAI are presented in Table 1. As presented in Tables 2 and 3, at baseline and at 30, 42, and 54 months, 41 of 129 (31.8%), 22 of 122 (17.9%), 22 of 122 (18.0%), and 22 of 125 children (17.6%) met criteria for indiscriminately social/disinhibited RAD. At the same ages, 6 of 130 (4.6%), 4 of 123 (3.3%), 2 of 125 (1.6%), and 5 of 122 children (4.1%) met criteria for emotionally withdrawn/inhibited RAD.

**Internal Consistency**

At baseline and at 30, 42, and 54 months, the internal consistencies of the indiscriminately so-
social/disinhibited RAD criteria analyzed using Cronbach $\alpha$ were 0.68, 0.68, 0.72, and 0.75, respectively. The same analyses for emotionally withdrawn/inhibited type of RAD revealed Cronbach $\alpha$ values of 0.69, 0.70, 0.70, and 0.84.

Association Between Two Types of RAD
Signs of indiscriminately social/disinhibited RAD and emotionally withdrawn/inhibited RAD were moderately and significantly correlated at baseline and at 30, 42, and 54 months ($r = 0.40, 0.34, 0.41,$ and 0.43, respectively; $p \leq .001$). However, as would be anticipated by extant research on the two types of RAD, there was no association between the two categorical diagnoses at baseline or 30, 42, or 54 months using Fisher exact test analyses.

Criterion Validity
The criterion validity of each type of RAD was examined by comparing the DAI results with the concurrent PAPA diagnoses, thereby using two different approaches to measurement the same outcome. For indiscriminately social/disinhibited RAD, the diagnosis was also compared by observed social indiscriminance.

Using categorical diagnoses, the diagnosis of indiscriminately social/disinhibited RAD on the DAI at 54 months and indiscriminately social/disinhibited RAD on the PAPA showed concordance in 85.8% of cases (103/120; Fisher exact test, $p \leq .001$). Of the children who completed the stranger-at-the-door procedure, 85.0% (51/60) behaved as predicted by indiscriminately social/disinhibited RAD status on the DAI (Fisher exact test, $p \leq .001$). That is, 13 children met criteria for RAD and left with the stranger and 38 children neither met diagnostic criteria nor left. Of the 15 children who met diagnostic criteria for RAD on the DAI, 86.7% (13/15) left with the stranger and 13.3% (2/15) did not.

As presented in Table 3, the diagnosis of emotionally withdrawn/inhibited RAD on the DAI at 54 months showed 98.3% concordance with the corresponding PAPA RAD diagnosis (118/120; Fisher exact test, $p \leq .001$).

Construct Validity: Caregiving Quality
All children in the study experienced institutional care, thus meeting the pathogenic care criteria of RAD. There was, however, no association between duration of exposure to institutional care, measured as percentage of life in the institution, and signs of either type of RAD at baseline.

The association between signs of the two types of RAD and concurrent caregiving quality is presented in Table 4. There was no significant association between concurrent caregiving quality and indiscriminately social/disinhibited RAD at baseline or at 30 months. At 42 months, there was a small association between caregiving quality and signs of indiscriminately social/disinhibited RAD. For the emotionally withdrawn/inhibited type of RAD, signs of RAD were associated with concurrent caregiving at baseline and 30 months.

### Table 2: Criterion Validity: Rates of Children Meeting Criteria for Indiscriminately Social/Disinhibited Reactive Attachment Disorder (RAD) by Disturbances of Attachment Interview (DAI) and Preschool Age Psychiatric Assessment (PAPA) at 54 Months

<table>
<thead>
<tr>
<th>RAD Indiscriminately Social/Disinhibited (DAI)</th>
<th>No</th>
<th>Yes</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAD indiscriminately social/ disinhibited (PAPA)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>90</td>
<td>14</td>
<td>104</td>
</tr>
<tr>
<td>Yes</td>
<td>3</td>
<td>13</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>93</td>
<td>27</td>
<td>120</td>
</tr>
</tbody>
</table>

Note: Concordance 103/120 = 85.8%, associations significant by Fisher exact test at $p \leq .001$.

### Table 3: Criterion Validity: Rates of Children Meeting Criteria for Emotionally Withdrawn/Inhibited Reactive Attachment Disorder (RAD) by Disturbances of Attachment Interview (DAI) and Preschool Age Psychiatric Assessment (PAPA) at 54 Months

<table>
<thead>
<tr>
<th>RAD Emotionally Withdrawn/Inhibited (DAI)</th>
<th>No</th>
<th>Yes</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAD emotionally withdrawn/ inhibited (PAPA)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>114</td>
<td>1</td>
<td>115</td>
</tr>
<tr>
<td>Yes</td>
<td>1</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>115</td>
<td>5</td>
<td>120</td>
</tr>
</tbody>
</table>

Note: Concordance 118/120 = 98.3, associations significant by Fisher exact test at $p \leq .001$. 

---

**TABLE 2: Criterion Validity: Rates of Children Meeting Criteria for Indiscriminately Social/Disinhibited Reactive Attachment Disorder (RAD) by Disturbances of Attachment Interview (DAI) and Preschool Age Psychiatric Assessment (PAPA) at 54 Months**

**TABLE 3: Criterion Validity: Rates of Children Meeting Criteria for Emotionally Withdrawn/Inhibited Reactive Attachment Disorder (RAD) by Disturbances of Attachment Interview (DAI) and Preschool Age Psychiatric Assessment (PAPA) at 54 Months**
Construct Validity: Selective Attachment Patterns

Signs of indiscriminately social/disinhibited RAD were moderately and inversely associated with security of attachment at 42 months, as presented in Table 4. Of the 22 children who met the RDC for indiscriminately social/disinhibited RAD at 42 months, two (9%) were classified as secure, four (18.2%) as avoidant, one (4.5%) as ambivalent, three (13.6%) as disorganized/controlling, and 12 (54.6%) as insecure-other. Overall, 7 of 15 (46.7%) who met criteria for indiscriminately social/disinhibited RAD showed an organized attachment pattern.

In comparison, 39 of the 101 (39%) who did not meet the RAD criteria were classified as secure and an additional 22 were avoidant (22%), 11 were ambivalent (11%), seven were disorganized/controlling (7%), and 22 were insecure-other (22%). When attachment classification was dichotomized into organized and disorganized, children who met criteria for indiscriminately social/disinhibited RAD were less likely to be classified as having an organized attachment pattern ($\chi^2 = 12.3; p \leq .001$), but one third of them were classified as having an organized attachment pattern.

Signs of emotionally withdrawn/inhibited RAD were negatively correlated with concurrent level of observed attachment security at 42 months. The two children who met the RDC for emotionally withdrawn/inhibited RAD at 42 months were classified as insecure-other on the Macarthur Preschool Attachment Classification, although there was no statistical difference in distributions (Fisher exact test, $p > .1$).

Convergent and Discriminant Validity: ADHD Patterns and Inhibitory Control

Signs of indiscriminately social/disinhibited RAD showed no association with activity level or aggression on the ITSEA at the first three assessment points but showed a substantial relation with signs of ADHD on the PAPA at 54 months. There was a modest association between concurrent signs of indiscriminately social/disinhibited RAD with low levels of inhibitory control as assessed by the Bear-Dragon task at 54 months (Table 5).

To assess discriminant validity, diagnoses of RAD indiscriminately social/disinhibited were compared with ADHD. Only four of the 16 children who met RDC for indiscriminate/disinhibited RAD on the PAPA also met criteria for ADHD, and there was no statistical association between the two.

Discriminant Validity: Depression

As predicted and reported in Table 6, signs of emotionally withdrawn/inhibited RAD were as-

---

### Table 4: Construct Validity: Correlations between Signs of Reactive Attachment Disorder (RAD) and Caregiving Quality and Security of Attachment

<table>
<thead>
<tr>
<th></th>
<th>Caregiving Quality</th>
<th>Security of Attachment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indiscriminately social/disinhibited RAD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>-0.11</td>
<td></td>
</tr>
<tr>
<td>30 mo</td>
<td>-0.11</td>
<td></td>
</tr>
<tr>
<td>42 mo</td>
<td>-0.21*</td>
<td>-0.39***</td>
</tr>
<tr>
<td>Emotionally withdrawn/inhibited RAD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>-0.33***</td>
<td></td>
</tr>
<tr>
<td>30 mo</td>
<td>-0.38***</td>
<td></td>
</tr>
<tr>
<td>42 mo</td>
<td>-0.29**</td>
<td>-0.51***</td>
</tr>
</tbody>
</table>

Note: *$p \leq .05$; **$p \leq .01$; ***$p \leq .001$.

---

### Table 5: Convergent Validity: Associations Between Signs of Indiscriminately Social/Disinhibited Reactive Attachment Disorder and Externalizing Signs

<table>
<thead>
<tr>
<th></th>
<th>ITSEA Activity/Impulsivity</th>
<th>ITSEA Aggression/Defiance</th>
<th>Bear-Dragon Procedure</th>
<th>PAPA ADHD Signs</th>
<th>PAPA ODD, CD Signs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline (n = 130)</td>
<td>-0.01</td>
<td>-0.07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 mo (n = 126)</td>
<td>0.12</td>
<td>0.07</td>
<td>0.14</td>
<td>-0.28*</td>
<td>0.45***</td>
</tr>
<tr>
<td>42 mo (n = 123)</td>
<td>0.19*</td>
<td>0.14</td>
<td>0.28*</td>
<td>0.45***</td>
<td>0.30**</td>
</tr>
<tr>
<td>54 mo (n = 123)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: ADHD = attention-deficit/hyperactivity disorder; CD = compulsive disorder; ITSEA = Infant Toddler Social Emotional Assessment; ODD = oppositional defiant disorder; PAPA = Preschool Age Psychiatric Assessment.

*p $\leq .05$; **$p \leq .01$; ***$p \leq .001$. 

---
associated with higher levels of depressive symptoms at all time points. However, despite the association between emotionally withdrawn/inhibited RAD and depressive signs, two of the five children who met PAPA RDC for emotionally withdrawn/inhibited RAD did not meet criteria for major depressive disorder, demonstrating discriminant validity for the diagnosis, although there was a statistical association (Fisher exact test, \( p < .001 \)).

Stability of Indiscriminately Social/Disinhibited RAD Over Time

Next, the stability of RAD over time was examined. Because of a substantial but experimentally imposed change in caregiving experiences (from institutional care to family care), only the children randomized to the care-as-usual group were examined for this analysis. Linear mixed modeling demonstrated that there was a decrease in signs of RAD from baseline to 54 months over the four time points (\( F_{4, 22,505} = 4.0; \ p = .01 \)). However, at every time point, the estimated marginal means showed overlapping 95% confidence intervals, a finding that is equivalent to \( p \geq .05 \) or no significant difference (Table 7 and Figure 2). Examination of the pairwise comparisons demonstrated that there were no significant differences between signs of indiscriminately social/disinhibited RAD at any time points (\( p \geq .1 \)). Post hoc analysis examining the effect of remaining in the institution throughout the study period approached significance (\( F_{1,88} = 3.4; \ p = .06 \)). Signs of emotionally withdrawn/inhibited RAD also showed a decrease in time over the course of the study in the care-as-usual group (\( F_{4,122} = 25.4; \ p = .001 \)). As seen in the indiscriminately social/disinhibited type of RAD, 95% confidence intervals for the estimated marginal means were overlapping at every time point, indicating that no difference in the intervals between time points. Similarly, pairwise comparisons revealed no significant difference between any consecutive time points (e.g., between baseline and 30 months and between 30 and 42 months). The only significant difference was between baseline and 54 months (mean difference, 0.9; \( p < .04 \); Figure 3 and Table 7).

**TABLE 6** Convergent Validity: Correlation between Emotionally Withdrawn/Inhibited Reactive Attachment Disorder and Depressive Signs

<table>
<thead>
<tr>
<th>ITSEA Depression</th>
<th>PAPA Depression</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline (n = 121)</td>
<td>0.44***</td>
</tr>
<tr>
<td>30 mo (n = 123)</td>
<td>0.35***</td>
</tr>
<tr>
<td>42 mo (n = 126)</td>
<td>0.72***</td>
</tr>
<tr>
<td>54 mo</td>
<td>0.62*</td>
</tr>
</tbody>
</table>

Note: ITSEA = Infant Toddler Social Emotional Assessment; PAPA = Preschool Age Psychiatric Assessment.

\( *p \leq .05; \ ***p \leq .001 \).

**TABLE 7** Predictive Validity: Estimated Marginal Mean (EMM) Scores of Reactive Attachment Disorder (RAD) Across Four Time Points in Care-as-Usual Group

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>30 mo</th>
<th>42 mo</th>
<th>54 mo</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signs of indiscriminately social/disinhibited RAD</td>
<td>2.5 [0.4–4.7]</td>
<td>2.1 [0–2.3]</td>
<td>2.1 [0–4.2]</td>
<td>2.2 [0.01–4.3]</td>
</tr>
<tr>
<td>Signs of emotionally withdrawn/inhibited RAD</td>
<td>2.8 [2.1–3.4]</td>
<td>2.4 [1.8–3.0]</td>
<td>2.0 [1.4–2.7]</td>
<td>1.9 [1.2–2.5]</td>
</tr>
</tbody>
</table>

Note: CI = confidence interval.
ITSEA social competence at the first three time points and the PAPA incapacity scale at 54 months, there was a statistically significant association between indiscriminately social/disinhibited RAD and impairment at all ages except baseline, with a large association at age 54 months. At 30 and 54 months, these associations remained significant in a linear regression, after controlling for two other potentially impairing factors—signs of ADHD and IQ—as presented in Table 8.

As predicted, having more signs of emotionally withdrawn/inhibited RAD was moderately associated with measurements of social emotional competence and functional impairment in the predicted directions at all time points. Controlling for IQ and clinical signs of depression, signs of emotionally withdrawn/inhibited RAD independently contributed to the variance in competence on the ITSEA at baseline and 30 and 42 months, but not at 54 months (Table 9).

Signs of emotionally withdrawn/inhibited RAD at each age were hypothesized to predict functional impairment at age 54 months in children randomized to care as usual, and this prediction was confirmed. The magnitude of the association between impairment at 54 months and signs of emotionally withdrawn/inhibited RAD was moderate at baseline and 42 and 54 months. The association remained significant in a stepwise regression that included independent contributions by IQ and signs of depression at baseline (adjusted $R^2 = 0.15$; $F_1 = 9.6, B = 0.4, t_1 = 3.7, p \leq .003$).

DISCUSSION

These findings represent the most complete assessment of the reliability and validity of two types of RAD in young children published in a single study to date. First, previous suggestive findings that the indiscriminately social/disinhibited and the emotionally withdrawn/inhibited types appear to be distinct clinical disorders were replicated. Statistically, although the continuous variable of signs of RAD showed moderate intercorrelations between the two disorders, the categorical diagnoses were not associated at any time point. These findings extend the literature demonstrating that these two constructs likely represent clinically distinct disorders that should be considered separately.

With regard to indiscriminately social/disinhibited RAD, previous findings of high levels of internal consistency of the signs of indiscriminately social/disinhibited RAD over multiple time points were replicated.\(^{28}\) The mean internal consistency of 0.71 indicates statistical cohesion,\(^{62}\) similar to that found in other studies of validated preschool and school age criteria.\(^{63,64}\) Second, criterion validity was demonstrated by the convergence of diagnoses by different measurements, including a psychiatric diagnostic interview, an observational measurement, and a

<table>
<thead>
<tr>
<th>TABLE 8</th>
<th>Functional Impairment: Indiscriminately Social/Disinhibited Reactive Attachment Disorder (RAD) and Concurrent and Predictive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concurrent Associations (N = 135)</td>
<td></td>
</tr>
<tr>
<td><strong>Social Competence (ITSEA)</strong></td>
<td><strong>Total Impairment (PAPA)</strong></td>
</tr>
<tr>
<td>Indiscriminately social/ disinhibited RAD</td>
<td></td>
</tr>
<tr>
<td>Baseline (n = 130)</td>
<td>$-0.13$</td>
</tr>
<tr>
<td>30 mo (n = 126)</td>
<td>$-0.28^{**}$</td>
</tr>
<tr>
<td>42 mo (n = 123)</td>
<td>$-0.21^*$</td>
</tr>
<tr>
<td>54 mo</td>
<td>$0.49^{***}$</td>
</tr>
<tr>
<td>Emotionally withdrawn/ inhibited RAD</td>
<td></td>
</tr>
<tr>
<td>Baseline (n = 130)</td>
<td>$-0.64^{***}$</td>
</tr>
<tr>
<td>30 mo (n = 126)</td>
<td>$-0.25^{**}$</td>
</tr>
<tr>
<td>42 mo (n = 123)</td>
<td>$-0.60^{***}$</td>
</tr>
<tr>
<td>54 mo (n = 123)</td>
<td>$0.41^{**}$</td>
</tr>
</tbody>
</table>

*Note: ITSEA = Infant Toddler Social Emotional Assessment; PAPA = Preschool Age Psychiatric Assessment. $^*p \leq .05; ^{**}p \leq .01; ^{***}p \leq .001$. 

**FIGURE 3** Signs of emotionally withdrawn/inhibited reactive attachment disorder (RAD) across time points by placement status at 54 months in CAU group. Note: 
DAI = Disturbances of Attachment Interview; NS = not significant.
structured interview assessing indiscriminate behavior. Convergence with an observational measurement extends previously reported findings that different interviews showed convergence with one another.\textsuperscript{11}

The association of indiscriminately social/disinhibited RAD with caregiving quality and attachment was examined. Caregiving quality is asserted to be an etiologic contributor to indiscriminately social/disinhibited RAD.\textsuperscript{8} However, in the present study, concurrent caregiving quality was associated with signs of indiscriminately social/disinhibited RAD only at 42 months and then only modestly. In other studies, indiscriminate behavior has been associated with maternal psychopathology and history of maltreatment,\textsuperscript{25,50} disrupted affective communication and duration of institutional care,\textsuperscript{9,10,12} but only one of these studies included direct assessments of caregiving behavior. It is possible that low-quality caregiving in institutions is necessary to potentiate the development of indiscriminately social/disinhibited RAD, at least in some children, but that once indiscriminate behavior develops, the importance of caregiving quality diminishes. This could explain why postinstitutional caregiving environments in other populations do not eliminate signs of indiscriminately social/disinhibited RAD even when they are of high quality.\textsuperscript{10,30} At this time, the relation between specific characteristics of caregiving and indiscriminately social/disinhibited RAD appears to be less than straightforward and warrants further investigation.

Regarding the relation between indiscriminately social/disinhibited RAD and selective attachment patterns, the present findings were mixed. A continuous rating of secure attachment was moderately and inversely related to signs of indiscriminately social/disinhibited RAD at 42 months. In contrast, several studies, including the present one, have demonstrated that organized classifications in the Strange Situation Procedure does not preclude high levels of indiscriminate behavior.\textsuperscript{12,30} In fact, in the present study, nearly half of children who met criteria for indiscriminately social/disinhibited RAD showed organized attachment classifications. Others have reported similar findings,\textsuperscript{10,12,30} including Lyons-Ruth et al.\textsuperscript{50} who showed that indiscriminate behavior carried additional risks for adverse mental health outcomes over and above disorganized attachment. The present results support a growing empirical base that indicates that, although the signs of indiscriminately social/disinhibited RAD are moderately associated with the construct of attachment, indiscriminately social/disinhibited RAD reflects a separate construct that often can occur independent of the quality of the child’s selective attachment.

### TABLE 9

<table>
<thead>
<tr>
<th></th>
<th>Standard $\beta$ Coefficient</th>
<th>$T$</th>
<th>Statistical Significance ($p$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signs of indiscriminately social/disinhibited RAD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline</td>
<td>$-0.11$</td>
<td>1.7</td>
<td>NS</td>
</tr>
<tr>
<td>Model $R^2 = 0.14$, $F_3 = 6.8$</td>
<td>$-0.24$</td>
<td>$-2.7$</td>
<td>$\leq .01$</td>
</tr>
<tr>
<td>30 mo</td>
<td>$-0.05$</td>
<td>$-0.54$</td>
<td>NS</td>
</tr>
<tr>
<td>42 mo</td>
<td>$0.19$</td>
<td>2.3</td>
<td>$\leq .03$</td>
</tr>
<tr>
<td>Model $R^2 = 0.24$, $F_3 = 14.2$</td>
<td>$0.43$</td>
<td>27.6</td>
<td></td>
</tr>
<tr>
<td>54 mo</td>
<td>$0.01$</td>
<td>$-0.1$</td>
<td>NS</td>
</tr>
<tr>
<td>Signs of emotionally withdrawn/inhibited RAD</td>
<td>$-0.47$</td>
<td>$-6.2$</td>
<td>$\leq .001$</td>
</tr>
<tr>
<td>Baseline</td>
<td>$-0.20$</td>
<td>$-2.1$</td>
<td>$\leq .04$</td>
</tr>
<tr>
<td>Model $R^2 = 0.43$, $F_3 = 36.6$</td>
<td>$-0.24$</td>
<td>$-2.4$</td>
<td>$\leq .02$</td>
</tr>
<tr>
<td>42 mo</td>
<td>$0.01$</td>
<td>$-0.1$</td>
<td>NS</td>
</tr>
<tr>
<td>Model $R^2 = 0.27$, $F_3 = 14.4$</td>
<td>$0.46$</td>
<td>34.5</td>
<td></td>
</tr>
</tbody>
</table>

Note: Baseline, 30, 42 months models predict social competence on ITSEA, 54 month model predict functional impairment on PAPA. NS = not significant.
relationships and concurrently with organized attachment patterns. These and similar findings have led some to question whether indiscriminately social/disinhibited RAD is best considered something other than an attachment disorder.2,19

Other researchers have suggested that indiscriminately social/disinhibited RAD represents an adaptive process for children vying for attention in institutions65 or a failure to develop committed social relationships.7 The present findings allow us to comment on these hypotheses. In the present study, this type of RAD was not adaptive because signs of this type of RAD were associated with functional impairment. In this study, some children with indiscriminately social/disinhibited RAD showed organized attachment patterns, thus not supporting the hypothesis that the core deficit in this type of RAD is a failure of committed social relationships. The finding that signs of RAD were only modestly associated with cognitive measurements of inhibitory control on the Bear-Dragon task is intriguing and suggests that socially indiscriminant behavior in these children is a separate construct from cognitive disinhibition. Further research examining the core deficit in children with indiscriminately social/disinhibited RAD is warranted.

The present study also allowed an investigation of other constructs that can be differentiated from indiscriminately social/disinhibited RAD. Previous studies have provided mixed findings about the association between this type of RAD and externalizing signs. In the present study, signs of indiscriminately social/disinhibited RAD before 54 months were minimally associated with externalizing behavior problems, thereby providing support for discriminant validity. Few previous studies have explored this association in children this young. The present study confirmed the previously reported association between indiscriminately social/disinhibited RAD and clinical signs of ADHD at 54 months, but also showed that these disorders most often occur independently of each other. Taken together, these findings and the modest association between indiscriminately social/disinhibited RAD and lower observed levels of inhibitory control suggest that indiscriminately social/disinhibited RAD is driven by a process that may be related to problems with social inhibitory control but is distinct from the processes involved with ADHD. The more modest association between activity and impulsivity and RAD at the first three time points than with ADHD at 54 months may reflect a developmental process in which problematic indiscriminately social behaviors are the first clinical presentation of an inhibitory control problem that progresses and generalizes over time or facilitates the development of other forms of disinhibition. Alternatively, it is possible that the differences reflect differences in measurements between a parent-report questionnaire and a structured psychiatric interview format or increased specificity of these measurements with age.

Indiscriminately social/disinhibited RAD in the care-as-usual group showed significant stability at all intervals in the study, although overall there was a decline in levels of RAD over the course of the study. The decrease in signs of RAD in the group randomized to care as usual could be related to caregiving changes because some of the care-as-usual children moved out of the institutions, a hypothesis that was not supported but warrants further examination particularly because the subgroup of children who remained in the institutions by 54 months was relatively small. The caregiving experiences of the children in the care-as-usual groups were determined by nonrandom factors including a range of family and nonfamily experiences, which may contribute to the overall decrease of signs of RAD. The overall finding of stability in the intervals measured is consistent with other studies that have demonstrated persistence of signs of indiscriminately social/disinhibited RAD after removal from institutional care and extends the findings by demonstrating stability of symptoms beginning with institutional care.10,24 Overall, these findings reflect the presence of a nontransient pattern of a clinical syndrome.

In addition, indiscriminately social/disinhibited RAD signs were demonstrated to be associated with functional impairment, which is necessary to distinguish the disorder from children who are adaptably sociable. The magnitude of the association between signs of RAD and impairment was strongest at 54 months. At 54 and 30 months, signs of indiscriminately social/disinhibited RAD contributed to impairment even when controlling for IQ and signs of ADHD, adding to the evidence that, at least at those ages, this type of RAD is impairing to children above and beyond other impairing clinical factors. It should be noted that the measurement of impairment used for the first three time points only measures social competence, and that PAPA
measures impairment in a broader range of domains, including family, peer, school, and public settings. Thus, the earlier measurements may not fully reflect the magnitude of cross-domain impairment seen in children with RAD during toddlerhood and the early preschool years. It is also possible that the cumulative experience associated with having signs of RAD or the experiences that facilitated the persistence of the signs up to 54 months account for the strong association at that time point.

In summary, the findings in this study demonstrate that indiscriminately social/disinhibited RAD is a distinct disorder that has minimal association with concurrent caregiving quality, can be seen in the context of an organized attachment relationship, is distinct from externalizing disorders and cognitive inhibitory control, and is associated with the same level of stability across at least 2 years as other DSM disorders in this age group. Like other disorders, this type of RAD is associated with functional impairment. In sum, RAD appears to be a distinct clinical disorder whose underlying core deficit warrants further examination.

To the best of our knowledge, this is the most comprehensive assessment of emotionally withdrawn/inhibited RAD reported to date, including attention to coherence of the signs of the disorder, association with expected risk factors and clinical syndromes, distinguishing the disorder from other types of psychopathology, functional impairment, and stability of signs over time. The present results support the validity of emotionally withdrawn/inhibited RAD as a distinct disorder.

First, we demonstrated that the emotionally withdrawn/inhibited RDC have significant internal consistency at four different ages in the first 5 years of life. In addition, we demonstrated criterion validity by finding that two different structured, independently administered psychiatric interviews converged on the same diagnosis.

Second, we demonstrated construct validity by demonstrating an association between poorer caregiving quality and signs of emotionally withdrawn/inhibited RAD at 30 and 42 months, thereby extending previously reported findings of institutionalized toddlers and children with histories of institutional care living in the United States, Great Britain, and Romania. In addition, we demonstrated an inverse relation between signs of emotionally withdrawn/inhibited RAD and security of attachment behavior at 42 months, extending previously reported findings.

As expected, emotionally withdrawn/inhibited RAD was associated with signs of depressive disorders, which share overlapping clinical presentations. Although the number of children who met categorical RDC for emotionally withdrawn/inhibited RAD was extremely limited and the findings must be interpreted with caution, two of the five children who met RAD criteria did not meet criteria for major depressive disorder, suggesting that these may be distinct diagnostic entities.

Like signs of indiscriminately social/disinhibited RAD, emotionally withdrawn/inhibited RAD showed stability at each interval in the care-as-usual group. This finding is particularly important because previous studies of children after institutional care have identified almost no children with emotionally withdrawn/inhibited RAD. This is the first demonstration of the stability of emotionally withdrawn/inhibited RAD in children in institutional care. Remaining in institutional care throughout the study period was not significantly associated with a higher stability of RAD, an unexpected finding because research focused on children with histories of institutional care has demonstrated that that type of RAD is extraordinarily rare.

At all four ages of assessment, signs of emotionally withdrawn/inhibited RAD were associated with functional impairment. These associations not only demonstrate that these clinical signs have clinical and statistical coherence, but that they are clinically relevant and associated with problems with functioning in a range of domains, even when controlling for associated developmental delays and depressive signs.

To summarize, signs of emotionally withdrawn/inhibited RAD were distinct from the indiscriminately social/disinhibited type of RAD, were associated with poorer caregiving quality in infants and toddlers and preschoolers, and were inversely associated with attachment security. Taken together, these findings suggest that that the essence of the emotionally withdrawn inhibited RAD is lack of selective attachment. The disorder shares some clinical signs with depression but can occur independently of major depressive disorder. The stability of the disorder between consecutive time points in the care-as-usual group was demonstrated and was associated with substantial functional impairment at all ages assessed.
Although these findings support all of our hypotheses, several limitations must be acknowledged. First, this study did not examine the disorders in children exposed to pathogenic caregiving conditions other than institutionalization and may not be generalizable to children exposed to other types of adverse caregiving. Second, we do not have detailed information about caregivers’ history, such as psychiatric status or maltreatment history, and thus cannot explore these factors as predictors of signs of either type of RAD, and we did not have access to information that would allow us to characterize children’s preinstitutional experiences and relationships. Third, caregivers reporting on the same child with different measurements may conflate levels of agreement. However, the convergence of interviews and observational measurements for both types of RAD increases confidence in the caregiver-report measurements used. Fourth, the low rates of emotionally withdrawn/inhibited RAD limited statistical analyses using categorical measurements and raise questions about whether the threshold of the diagnostic criteria may be too high. Fifth, biological markers were beyond the scope of this study.

These findings provide support for the diagnostic validity of indiscriminately social/disinhibited RAD and emotionally withdrawn/inhibited RAD in children with a history of institutional rearing. The present findings provide significant support for the criterion validity, construct validity, discriminant validity, and predictive validity of these two disorders. This study adds significantly to the existing knowledge about the two types of RAD through examination of the clinical constructs in a group of vulnerable children who were followed longitudinally using observational and interview methodologies. Future studies will examine shared and distinct characteristics of indiscriminately social/disinhibited RAD and of Williams syndrome, which may serve as a biological model for the disorder. In addition, further research will examine biological markers associated with each type of RAD and will explore effective treatments for each type of RAD.

REFERENCES


SUPPLEMENT 1: DISTURBANCES OF ATTACHMENT INTERVIEW

This is a semistructured interview designed to be administered by clinicians to caregivers who know the child and the child’s behavior well. If possible, it should be administered to the child’s primary caregiver. Specific probes are designed to elicit more information; they are not intended to be exhaustive. Clinicians should feel free to probe further. The scoring is completed at the close of the interview based on the responses provided.

Interviewers talk with parents/caregivers about their children and some of the things they do, so the interviewers can better understand the children. This interview takes about 20 minutes. How old is the child?

1. Does s/he have one special adult that s/he prefers? Who is it? How does s/he show that s/he prefers that person? Can you give me a specific example? Are there any other adults that are special, like this? Who does s/he prefer most of all?
   0 Clearly differentiates among adults
   1 Sometimes or somewhat differentiates among adults
   2 Rarely or minimally differentiates among adults

2. When s/he falls down and hurts himself/herself what does s/he do? Is s/he one to sit where s/he is and wait for you or other caregivers to come or does s/he come over and tell you when s/he is hurt? Does s/he ever go to people that she doesn’t know well for comfort? Does she ever go to someone unfamiliar for comfort even when someone familiar is available?
   0 Clearly seeks comfort preferentially from a preferred caregiver
   1 Sometimes or somewhat seeks comfort preferentially from a preferred caregiver
   2 Rarely or minimally seeks comfort preferentially from a preferred caregiver

3. When s/he does come to you/or the preferred caregiver (or when you go to him/her), does s/he accept being comforted or is s/he one to take a while to calm down?
   0 Clearly responds to comfort from caregivers when hurt, frightened, or distressed
   1 Sometimes or somewhat responds to comfort from caregivers when hurt, frightened, or distressed
   2 Rarely or minimally responds to comfort from caregivers when hurt, frightened, or distressed

4. Does s/he share things back and forth with you, let’s say, talk with you or show you that s/he’s excited about something or is s/he one to not really share back and forth? Does s/he take turns talking or gesturing with you?
   0 Clearly responds reciprocally with familiar caregivers
   1 Sometimes or somewhat responds reciprocally with familiar caregivers
   2 Rarely or minimally responds reciprocally with familiar caregivers

5. How are his/her moods? Is s/he generally happy or is s/he one to be more irritable or sad or serious? Would you say s/he is like that most of the time or some of the time? How much of the time is s/he sad, serious, or irritable.
   0 Clearly regulates emotions well with ample positive affect and developmentally expectable levels of irritability and/or sadness
   1 Sometimes or somewhat has difficulty regulating emotions with less positive affect and more irritability and/or sadness than is expected developmentally
   2 Rarely or minimally regulates emotions well; instead, has little positive affect and definitely elevated levels of irritability and/or sadness

6. When you are in a place that is not familiar for [child], what does s/he do? Does s/he check back with you or is s/he one to just go off without checking back? Does s/he tend to wander off without any particular purpose? If s/he finds him/herself separated from you does s/he get upset or does it seem to not really bother him/her?
   0 Clearly checks back with caregiver after venturing away, especially in unfamiliar settings
1 Sometimes or somewhat checks back with caregiver after venturing away, especially in unfamiliar settings
2 Rarely or minimally checks back with caregiver after venturing away, especially in unfamiliar settings

7. How does s/he behave around adults that s/he doesn’t know? Does s/he tend to be friendly or is s/he one to stand back and observe or to approach? Does s/he tend to be sort of shy around strangers or is s/he one to go right up to people s/he doesn’t know? (If yes, why do you think s/he does this?) Does s/he cry or cling to you or does she just seem wary/cautious? Does s/he do this all the time or some of the time? Is his/her reaction sort of mixed so that at some times s/he is friendly but other times she might cry or s/he is friendly with some unfamiliar adults but not with others? Could you give me a specific example of a time when s/he was around an adult that s/he didn’t know?

If shy, does s/he seem to be shy at first and then tend to warm up or does s/he stay shy? Has she been consistently shy over time or has that been variable? For example, was she at one time more shy or less shy than she is now? [For adopted/foster children: Has s/he been the same in terms of shyness since you have known him/her or has her/his level of shyness changed at all?]

0 Clearly exhibits reticence with unfamiliar adults
1 Sometimes or somewhat exhibits reticence with unfamiliar adults
2 Rarely or minimally exhibits reticence with unfamiliar adults

8. Do you think s/he would be willing to go off with a stranger? Why do you think so? Could you give me a specific example? Do you think s/he would do this some of the time or most of the time? Has this way of interacting with strangers changed? Was s/he more/less willing at an earlier age to go off with someone s/he didn’t know?
0 Clearly is not willing to go off readily with relative strangers
1 Sometimes or somewhat is willing to go off readily with relative strangers
2 Willing to go off readily with relative strangers

9. Is s/he one to get him/herself in risky situations? Could you give me a specific example? Is s/he one to run out into traffic or maybe pull stuff off of the stove? Does s/he seem to try to provoke you with his/her dangerous behavior? Does s/he do this with everyone or does s/he do this mostly around one particular person? Why do you think s/he does it?
0 Clearly does not engage in a pattern of self-endangering behavior that is more pronounced in the presence of one particular caregiver
1 Sometimes or somewhat engages in a pattern of self-endangering behavior that is more pronounced with one particular caregiver
2 Definitely engages in a pattern of self-endangering behavior that is more pronounced with one particular caregiver

10. Does s/he tend to cling to you or stay right up under you? When does this seem to happen? Does it seem to happen if there is an adult around who she doesn’t know? Or does it tend to happen at other times, too? Could you give me a specific example?

0 Clearly does not engage in a pattern of excessive clinging to a particular caregiver in unfamiliar settings or with unfamiliar people
1 Sometimes or somewhat engages in a pattern of excessive clinging to a particular caregiver in unfamiliar settings or with unfamiliar people
2 Definitely engages in a pattern of excessive clinging to a particular caregiver in unfamiliar settings or with unfamiliar people

11. Does s/he tend to watch you or other caregivers a lot of the time, like watching to see what your or their moods are? Does she ever seem to be a bit afraid of any caregivers, or to do exactly what they want, in a sort of automatic way?
0 Clearly does not engage in a pattern of fearful, inhibited, and hypervigilant behavior with any particular caregiver
1 Sometimes or somewhat engages in a pattern of fearful, inhibited, and hypervigilant behavior with any particular caregiver
2 Definitely engages in a pattern of fearful, inhibited, and hypervigilant behavior with any particular caregiver
12. Does s/he seem to know when you or other caregivers are sad or mad or upset? What will s/he do? Could you give me a specific example? Does s/he ever seem worried about you (or other caregivers) or worried for you (or other caregivers)? Could you give me an example? Does s/he seem almost preoccupied by how you (or other caregivers) are doing? Why do you think s/he does this? Do you ever think that it may be a bit too much for a child his/her age?

0 Clearly does not engage in a pattern of controlling or role inappropriate behavior suggesting excessive preoccupation with caregiver’s emotional well-being

1 Sometimes or somewhat engages in a pattern of controlling or role inappropriate behavior suggesting excessive preoccupation with caregiver’s emotional well-being

2 Definitely engages in a pattern of controlling or role inappropriate behavior suggesting excessive preoccupation with caregiver’s emotional well-being