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Recovering from Early Deprivation: Attachment Mediates Effects of Caregiving on Psychopathology

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Abstract

Objective—Children exposed to early institutional rearing are at risk for developing psychopathology. The present investigation examines caregiving quality and the role of attachment security as they relate to symptoms of psychopathology in young children exposed to early institutionalization.

Methods—Participants were enrolled in the Bucharest Early Intervention Project (BEIP), a longitudinal intervention study of children abandoned and placed in institutions at or shortly after birth. Measures included observed caregiving when children were 30 months of age, observed attachment security at 42 months and caregiver reports of children's psychopathology at 54 months. At 54 months, some children remained in institutions, others were in foster care, others had been adopted domestically, and still others had been returned to their biological families. Thus, the children had experienced varying amounts of institutional rearing.

Results—After controlling for gender, quality of caregiving when children were 30 months old was associated with symptoms of multiple domains of psychopathology at 54 months of age. Ratings of security of attachment at 42 months mediated the associations between quality caregiving at 30 months and fewer symptoms of psychopathology at 54 months.

Conclusions—Among deprived young children, high quality caregiving at 30 months predicted reduced psychopathology and functional impairment at 54 months. Security of attachment mediated this relationship. Interventions for young children who have experienced deprivation may benefit from explicitly targeting caregiver-child attachment relationships.

Keywords

institutionalization; early childhood; caregiving; attachment; psychopathology

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Introduction

Studies of young children raised in socially deprived institutional settings have documented a substantial increased risk for psychopathology. From the mid-20th century to the present, problems documented in young children living in institutions have included sadness and social withdrawal, anxious and wary behavior, aggression and defiance, hyperactivity and inattentiveness, stereotyped movements, indiscriminate behavior, and disturbances in attachment. [1–11]

Findings across studies of institutionalized children suggest that the social deprivation and low caregiving quality characteristic of institutional care [2, 12] are responsible for the high prevalence of psychopathology in these children. For example, individual differences in the quality of caregiving in institutions have been related to individual differences in child development and adaptive functioning.[3] Second, when changes in quality of caregiving within institutional settings were quasi-experimentally manipulated, higher quality of care was associated with more favorable outcomes.[13] In a different study, reductions in the number of different caregivers assigned to particular children resulted in fewer signs of disordered attachment, even though the actual child to caregiver ratio did not change and no specific interventions for enhancement of caregiving were made.[2] Collectively, these studies indicate that higher quality caregiving protects, or minimizes the risk, of young children developing psychopathology.

Assessments of currently institutionalized children uniformly document high levels of psychopathology. [2, 5, 6] Evidence from multiple studies demonstrate that removing young children from institutional care and placing them in more favorable caregiving environments, such as foster or adoptive homes, is associated with improved outcomes. [14–18] These findings suggest that removing a child from an institution and placing him/her in an enhanced caregiving environment may lead to a reduced risk for psychopathology.

In the most rigorous examination of caregiving quality and psychopathology among children reared in institutions conducted to date, Zeanah et al.[6] examined the effects of quality foster care as an intervention to reduce psychopathology in young children raised in institutions. The Bucharest Early Intervention Project (BEIP) is a randomized clinical trial that included 136 children who were 6 to 31 months of age at baseline and currently residing in institutions for young children in Bucharest, Romania, in 2001. [19] Following detailed baseline assessments, the children were randomly assigned to placement in foster families or to care as usual, which mostly meant continued institutional placement. The children were reassessed at 30, 42 and 54 months of age. The BEIP foster care intervention was specifically designed to provide stable family placements including facilitating healthy and secure attachment relationships between the child and the foster parent. (see Smyke et al. [20] for a detailed description of the intervention). To date, investigators have reported that children placed in foster care had significantly fewer symptoms of internalizing disorders, [6] attachment disorders, [21] and stereotyped movement disorders [22] compared to children receiving continued institutional care. While these findings, within a randomized trial, strongly suggest that foster placement and the subsequent improvement in caregiving,

reduces risk for psychopathology the direct association between caregiving quality and psychopathology remains unexplored. Mechanisms linking caregiving quality and psychopathology also remain unclear. One purpose of the current investigation is to examine if caregiving quality at 30 months of age predicts psychopathology at 54 months.

In this report, we further examine whether security of attachment is the mechanism by which the quality of caregiving a child receives intensifies or reduces risk for psychopathology. We emphasize that rather than testing effects of the BEIP intervention, here we are interested in determining whether security of attachment is an important pathway through which high quality caregiving leads to decreased symptoms of psychopathology. The rationale for selecting attachment security as a mechanism is twofold. First, there is an extensive literature on the association between caregiving quality and security of attachment. Studies have documented a consistent, though modest, association between maternal sensitivity as a precursor to security of attachment in infancy (see Belsky and Fearon [23] for a review). Similarly, a variety of aberrant parenting behaviors associated with poor caregiving quality are associated with risk for disorganized and other atypical attachment classifications (see Green and Goldwyn [24] for a review). Second, there are numerous studies implicating insecure and especially disorganized attachment in the development of child psychopathology (see DeKlyen and Greenberg; [25] Fearon et al.; [26] Guttman-Steinmetz and Crowell [27] for reviews). Research has generally linked insecure and disorganized attachments to a range of different disorders rather than to any specific disorder (as reviewed in Zeanah, Keyes, and Settles[28]).

Although the association between caregiving and attachment security has been established in many studies, whether this same relation exists in children exposed to institutional care in early childhood is less clear. We therefore test the hypothesis that security of attachment mediates the association between caregiving quality and symptoms of psychopathology. We examined symptoms of disorders known to be prevalent in children exposed to early institutional care, including Reactive Attachment Disorder (RAD), stereotypies, internalizing disorders and externalizing disorders. We also examined functional impairment.

Sensitive, responsive caregiving is thought to create expectations in young children that their emotional needs will be met. This in turn is believed to lead to greater security of attachment, which in turn is believed to protect against psychopathology.

In a sample of children exposed to socially deprived institutional rearing, we tested the following hypotheses: (1) caregiving quality at 30 months predicts psychopathology at 54 months, (2) caregiving quality at 30 months predicts security of attachment at 42 months, (3) security of attachment at 42 months predicts psychopathology at 54 months, and (4) security of attachment at 42 months mediates the association between caregiving quality at 30 months and psychopathology at 54 months.

Methods

Participants

Participants were children from the Bucharest Early Intervention Project (BEIP) and their caregivers. Children who had been abandoned by their parents were recruited from six institutional care settings in Bucharest, Romania, when they were less than 31 months old (see Zeanah et al.[19]). At baseline (BL), 136 children met inclusion criteria (e.g., lacking medical conditions such as genetic syndromes, microcephaly or fetal alcohol syndrome) and had been abandoned and placed in institutions, between birth and 17.49 months of age (M = 2.53, SD = 3.91). At BL, children had spent an average of 86.11% (SD = 21.07) of their lives in institutional care, and 52.6% had resided in institutional care their entire life. Slightly more than half of the children were ethnically Romanian and female.

The children in BEIP varied in the amounts of institutional rearing they experienced post abandonment. Over the course of the study, some continued to reside in institutional care, while others were placed in foster care, adopted or returned to their biological families. Although the original study population was randomized to care as usual or foster care, the local Commissions on Child Protection made all decisions about placements, and there were many changes in status for a large number of the children in the study (See Table 1). In this study, we were most interested in the role of individual variation of caregiving quality in young children who shared histories of abandonment followed by varying amounts of institutional rearing.

Procedures

Following baseline evaluations (mean age = 22 months), children were assessed at 30 months, 42 months, and 54 months, and the present investigation used assessments from each of these ages. For the present study, data were available on 126 children and their caregivers at 30 months, 126 children and their caregivers at 42 months, and 123 children at 54 months. Assessments included observational procedures with children and their caregivers, and interviews with caregivers. For children living in an institutional setting, staff members identified as each child's "favorite" caregiver participated in the study as the primary caregiver in interaction assessments and as the reporter on caregiver interviews. If the child had no favorite caregiver, a staff member who worked with the child regularly and knew the child well participated.

Measures

Observational Record of the Caregiving Environment (ORCE)—The ORCE was originally developed by the NICHD Early Child Care Research Network to assess the caregiving quality within childcare settings.[29] In this study, children and their caregivers were videotaped for 1 ½ hours in their "home" environments (institutions or foster homes) at 30 and 42 months. Trained coders who knew only that they were coding behaviors of caregivers and children in different settings and who were unaware of the study design rated behavior of children and caregivers. We used caregiving quality at 30 months in this report. Five qualitative items were rated from "1" (not characteristic) to "4" (highly characteristic). These ratings of caregivers' sensitivity, stimulation of development, positive regard for

child, flat affect (reverse scored), and detachment (reverse scored) were averaged to create caregiving quality scores. Inter-rater reliability (ICC= 0.75) and scale reliability (Cronbach's α = .86) were more than adequate. See Table 2 for descriptive statistics of caregiving quality scores.

Strange Situation Procedure (SSP)—The SSP is a widely used and validated measure of children's attachment security.[30] For this study, children and their caregivers were observed in the preschool Strange Situation Procedure during the 42-month assessment (see Smyke et al.,[31] for details). In addition to classifications of attachment, attachment security was rated as a continuous variable by trained coders who were blind to children's status (FCG vs. CAUG). Ratings of children's attachment security ranged from 1 (no security evident) to 9 (most secure). The continuous scores were used in the present study, and 75% of the SSPs were double coded to assess reliability. Interrater reliability for this scale was excellent (ICC = .87). Descriptive statistics for children's attachment security scores are in Table 2.

The Disturbances of Attachment Interview (DAI)—The DAI is a semi-structured interview of caregivers about symptoms of attachment disorders. [2] The DAI has been validated in numerous studies as a measure of emotionally withdrawn/inhibited RAD and indiscriminately social RAD.[2, 32–36] It also assesses caregiver reports of aggression, language impairment, and symptoms of stereotyped movement disorder. Each of 15 items is probed by interviewers until it can be coded on a 3-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.

For this study, we examined the DAI at 54 months. The DAI yields continuous scores reflecting symptoms of indiscriminately social/disinhibited reactive attachment disorder RAD, symptoms of emotionally withdrawn/inhibited RAD, and symptoms of stereotyped movement disorder. We computed symptoms of Indiscriminately social/disinhibited RAD scores by summing 3 items that assessed indiscriminately social/disinhibited behaviors (i.e., lack of reticence with strangers, failure to check back with/stay close to a caregiver, willingness to leave with a stranger). Possible scores ranged from 0 to 6, with higher scores indicating more symptoms of indiscriminately social/disinhibited RAD. Scale reliability for symptoms of indiscriminately social/disinhibited RAD was acceptable (Cronbach's α = .81). We computed symptoms of emotionally withdrawn/ inhibited RAD scores by summing 5 items that assessed symptoms of emotionally withdrawn/inhibited behaviors (lack of preference for a particular caregiver, failure to seek comfort, failure to respond to comfort, reduced social reciprocity and poorly regulated emotions). Symptoms of emotionally withdrawn/inhibited RAD scores ranged from 0 to 10, with higher scores representing increasing symptoms of emotionally withdrawn/inhibited RAD. Scale reliability was also found to be acceptable (Cronbach's α = .84). One global rating on the DAI was used to assess the presence or absence of stereotypies in children at 54 months. Responses were scored from 0 to 2 with 0 indicating no stereotypies present and 2 indicating the presence of stereotypies.

The DAI has been found to have strong internal validity.[2] Furthermore, scores for symptoms of emotionally withdrawn/inhibited and symptoms of indiscriminately social/disinhibited RAD scale converge with other caregiver report measures of the same constructs [32, 34] and with observed behavior.[32, 36] Scores for both types of RAD and stereotypies also distinguish children with histories of institutional rearing from never institutionalized children.[2, 22] Descriptive statistics for symptoms of indiscriminately social/disinhibited RAD, symptoms of emotionally withdrawn/inhibited RAD, and symptoms of stereotypies are found in Table 2.

The Preschool Aged Psychiatric Assessment (PAPA)—The PAPA is a structured parent interview used to assess symptoms, diagnoses and impairment in preschool aged (ages 2–5) children.[37] When children were 54 months of age, caregivers were interviewed in detail by trained clinicians about the presence, frequency, and duration of psychiatric symptoms and related impairment. Egger and colleagues[38] found that the PAPA has adequate test-retest reliability.

In this study, we used composite scores for symptoms of externalizing disorders (i.e., ADHD, oppositional defiant disorder [ODD] and conduct disorder [CD]), symptoms of internalizing disorders (anxiety and depressive disorders) and a continuous measure of overall disability or functional impairment. We computed scores for symptoms of externalizing disorders by summing the number of ADHD, ODD, and CD symptoms. We computed scores for symptoms of internalizing disorders by summing the number of anxiety and depressive disorder symptoms. Children's functional impairment scores represent the number of life domains (0–30) in which the child's symptomatology significantly interfered with functioning. Descriptive statistics for each PAPA variables are found in Table 2.

Analysis Methods

The hypotheses included evaluating 42-month attachment security as a mediator of the associations between 30-month caregiving quality and six 54-month outcomes: symptoms of indiscriminately social/disinhibited RAD, symptoms of emotionally withdrawn/inhibited RAD, symptoms stereotypic movement disorder, symptoms externalizing disorders, symptoms internalizing disorders, and overall functional impairment associated with these disorders. In order to empirically evaluate hypotheses regarding mediation, we were guided by several approaches including: 1) computing regression analyses guided by the methods of Baron and Kenny[39] and Kraemer, Stice, Kazdin, Offord, and Kupfer[40] and 2) using bootstrapping to test the statistical significance of the indirect effect with the methods specified by Preacher and Hayes.[41]

We first evaluated the mediation hypotheses by completing regression analyses. In the first set of regression analyses, we examined the associations between the predictor variable (30-month caregiving quality) and the outcome variables (54-month symptoms of psychopathology).[39] Next, we examined the association between the predictor variable (30-month caregiving quality) and the mediator variable (42-month attachment security). Kraemer et al.[40] specify that to demonstrate mediation a temporal association must exist between the predictor variable (30-month caregiving quality) and the mediator variable (42-

month attachment security) and this association must be statistically significantly. In the third step, we examined the association between the mediator (42-month attachment security) and the outcome variables (54-month symptoms of psychopathology). Baron and Kenny[39] require that this association is found even when statistically controlling for the predictor variable (30-month caregiving quality). Furthermore, Kraemer et al.[40] suggest a main or interactive effect can exist between the mediator variable (42-month attachment security) and the outcome variable (54-month psychopathology). In order to examine the possibility of main or interactive effects, we created an interaction term by centering the predictor variable (30-month caregiving quality) and mediator variable (42-month attachment security) and multiplying them together. The predictor variable (30-month caregiving quality), the mediator variable (42-month attachment security) and the interaction term were entered in each regression equation. Results of these regression analyses were also used to re-examine the association between the predictor variable (30-month caregiving quality) and the outcome variable (54-month symptoms of psychopathology) while statistically controlling for the mediator variable (42-month attachment security). Mediation occurs when there is reduction in the strength of the association between the predictor variable (30-month caregiving quality) and the outcome variables (54-month psychopathology) once the variance associated with the mediator has been estimated.[39]

In addition to using the methods of Baron and Kenny[39] and Kraemer et al.,[40] Preacher and Hayes'[41] bootstrapping procedure was used to examine the statistical significance of the indirect effect of the predictor variable (30-month caregiving quality) to the outcome variables (54-month symptoms of psychopathology) through the mediator variable (42-month attachment security). Bootstrapping is a resampling technique that produces the bias-corrected confidence interval of the indirect effect. Mediation is said to occur if the upper and lower confidence limit of the confidence internal does not contain zero. For the present analyses, 5000 bootstrap resamples were requested.

We chose not to examine the effect size of the indirect effect as the direction of the associations in the mediation models are in opposite directions. Specifically, we anticipated a positive association between caregiving quality at 30 months and attachment security at 42 months and a negative association between attachment security at 42 months and symptoms of psychopathology at 54 months. This inverse association thus limited the interpretability of the effect sizes of the mediation models.

Results

Preliminary Analyses

Correlations among study variables were evaluated before the mediation hypotheses were tested. Results of correlational analyses are found in Table 2. All outcome variables were found to be related to one another with the exception that 54-month symptoms of emotionally withdrawn/inhibited RAD was not related to symptoms of externalizing disorders. Next, gender, and ethnicity were examined as possible confounding variables. T-tests were computed to evaluate the impact of gender on all study variables. Significant gender differences were found for 4 out 8 study variables. Boys were reported to have more symptoms of indiscriminately social/disinhibited RAD (t [119.82] = −2.27, $p < .05$), more

symptoms of externalizing disorders (t [115.84] = −3.08, $p < .01$), more symptoms of internalizing disorders (t [118] = −2.71, $p < .01$), and more functional impairment (t [108.65] = −2.67, $p < .01$) compared to girls. Given the presence of gender differences, gender was statistically controlled for in all analyses testing study hypotheses. T-tests were also computed to evaluate if ethnicity (Romanian vs. all other) was related to any study constructs. No statistically significant ethnicity differences emerged.

No baseline characteristics of children (i.e., birthweight, emotional responsiveness, or attachment status) had any effects on results and are not included in the analyses of mediation.

Mediation Analyses

In the first set of mediation analyses, 42-month attachment security was examined as a mediator of the association between 30-month caregiving quality and 54-month symptoms of indiscriminately social/disinhibited RAD using linear regression. A statistically significant association emerged between caregiving quality at 30 months and 54-month symptoms of indiscriminately social/disinhibited RAD (β = −.27, $p < .01$;Table 3; Figure 1), demonstrating a basis for further evaluating the mediation hypothesis.[39] A temporal association also emerged between caregiving quality at 30 months and 42-month attachment security (β = .32, $p < .001$; Figure 1) and a main effect of 42-month attachment security on 54-month symptoms of indiscriminately social/disinhibited RAD (β = −.33, $p < .01$; Table 4; Figure 1) also emerged, satisfying additional steps for demonstrating mediation specified by Kraemer et al and Baron and Kenny. [39] The interactive effect of 30-month caregiving quality and attachment security was not a statistically significant predictor of indiscriminately social/disinhibited RAD (β = .07, n.s.; Table 4).

Given these statistically significant associations, the association between 30-month caregiving quality and 54-month indiscriminately social/disinhibited RAD was reexamined while statistically controlling for 42-month attachment security. As predicted, after controlling for 42-month attachment security the association between 30-month attachment security and indiscriminately social/disinihibted RAD at 54 months was no longer statistically significant (β = −.16, n.s.; Table 4; Figure 1). Next, in order to verify the statistical significance of the indirect effect, the bias-corrected confidence interval of the indirect effect was examined using the bootstrapping procedure developed by Preacher and Hayes.[40] Results were consistent with the mediation hypothesis, as the upper and lower limits of the confidence interval did not cross zero (−.62 to −.12; Table 4).

This process was repeated for each of the remaining indicators of symptoms of psychopathology and functional impairment at 54 months. Statistically significant and negative associations emerged between 30-month caregiving quality and symptoms of emotionally withdrawn/inhibited RAD, symptoms of stereotypic movement disorder, symptoms of externalizing disorders, symptoms of internalizing disorders, and functional impairment (Table 3), demonstrating a basis for further testing the mediation hypotheses for each of these outcomes. Statistically significant and negative main effects also emerged between 42-month attachment security and symptoms of emotionally withdrawn/inhibited RAD, symptoms of stereotypic movement disorder, symptoms of externalizing disorders,

symptoms of internalizing disorders, and functional impairment (Table 4). For emotionally withdrawn/inhibited RAD, both a main effect of 42-month attachment security and an interactive effect emerged. Next, the associations between 30-month caregiving quality and each type of psychopathology was reexamined while statistically controlling for 42-month attachment security. For symptoms of stereotypies and externalizing disorders, the associations between caregiving quality and the psychopathology outcome was no longer statistically significant when statically controlling for 42-month attachment security (Table 4). The association between 30-month caregiving quality and symptoms of emotionally withdrawn/inhibited RAD, symptoms of internalizing disorders and functional impairment at 54 months remained statistically significant when statistically controlling for 42-month attachment, but there was a reduction in the strength of the relationship (Table 4). Finally, the bootstrapping procedure was used for each indicator of psychopathology and for functional impairment. These results are presented in Table 4, and all are consistent with the mediation hypotheses because the bias-corrected confidence intervals do not cross zero.

Discussion

The purpose of the current investigation was to examine a pathway through which caregiving quality was associated with subsequent psychopathology in a sample of children who shared a history of early abandonment and severe deprivation. Rather than evaluating the RCT of the BEIP (see McLaughlin et al.[42]), the questions here focused on whether high quality caregiving and secure attachments were pathways involved in buffering young children from various types of psychopathology and impairment. Several findings emerged from the current investigation.

First, this study demonstrated that, in children exposed to early institutional rearing, caregiving quality at 30 months predicted symptoms of psychopathology and impairment at 54 months. Specifically, caregiving quality was inversely related to symptoms of RAD, stereotypies, externalizing disorders, internalizing disorders, as well as functional impairment. This finding is consistent with the growing literature demonstrating an association between early adversity and psychopathology, [43] but specifically highlights the importance of the caregiving context.

Second, higher caregiving quality when children were 30 months old was associated with greater security of attachment when children were 42 months of age. This finding adds to the existing literature about the formation of a secure attachment,[23] as it demonstrates that the relationship between caregiver behavior and security of attachment operates similarly in this very high-risk sample as it does in lower risk samples.

Next, results demonstrated that attachment security when children were 42 months of age was associated with symptoms of multiple forms of psychopathology. This is in keeping with theories that the development of a secure attachment relationship can serve as a protective factor in a high-risk context [25, 27] and that the effects of attachment security are best demonstrated in populations that share risk factors in other domains. According to DeKlyen and Greenberg,[25] the development of secure attachment relationships may be associated with reduced symptoms of psychopathology through intermediate developmental

effects. Attachment describes patterns of interpersonal relatedness in response to negative emotional arousal. Secure attachment behaviors in young children are thought to reflect a child's internal perception of the predictability and protection by his/her caregiver and are known to be associated with enhanced emotion and behavioral regulation abilities, socially engaging behaviors, and social competence. Deficiencies in these domains have been linked to both internalizing and externalizing symptoms as well as reactive attachment disorder and socially indiscriminant behavior.[25]

The association between security of attachment and attachment disorders is complex. Emotionally withdrawn/inhibited RAD represents limited to absent attachment, and increasing security would be expected to be associated with lower levels of symptoms of the disorder, as we found. The association between indiscriminately social/disinhibited RAD and secure attachment is more complex, but the English and Romanian Adoptees study found associations between lack of security and indiscriminant behavior,[17] much as we did. Zeanah and colleagues (2005) suggested that security of attachment and disorders of attachment are two distinct lenses through which to view attachment.

Finally, our data suggest that security of attachment may be an important pathway for reducing risk for psychopathology in children exposed to severe psychosocial deprivation early in life. Specifically, these results suggest that early high quality caregiving serves as a protective factor for psychopathology in part because of its association with the attachment relationship. Because the children in this study were a mean age of 22 months at the time the study began, these results also underscore the behavioral plasticity of attachment in young children and its relation to subsequent psychopathology. Although we previously reported that children who receive enhanced caregiving prior to 24 months were more likely to form secure attachments (Smyke et al., 2010), these results emphasize that even in older toddlers, providing enhanced caregiving relationships is associated with increasing security and measurably better outcomes.

In this study, attachment explained a significant proportion of the variance in the associations between caregiving quality and symptoms of reactive attachment disorder, stereotypies, symptoms of externalizing disorders, symptoms of internalizing disorders and functional impairment. This finding adds to the literature on psychopathology in children exposed to early institutional rearing, as it specifies a pathway for reducing risk and supporting resilience in these children.

The outcomes in this study are moderately to strongly interrelated, and this may account in part for the similar pattern of findings across several different outcomes. Nevertheless, we believe there is value in examining and reporting these outcomes separately because each has distinctive phenomenologies and courses. Multifinality, describing a single risk or protective factor that is related to multiple outcomes, is well known in developmental psychopathology research[44]. Based on these results, security of attachment appears to be a common pathway through which the risk associated with caregiving adversity appears to be reduced for multiple adverse psychiatric outcomes. The implications for intervention for children with known histories of adverse caregiving are clear. By targeting a specific domain – security of attachment to the primary caregiver -- it is may be possible to reduce

maladaptation in multiple domains, especially in children with a history of early caregiving adversity.

A significant strength of the current investigation is the use of a longitudinal design. Assessments took place when children were 30, 42, and 54 months old. The use of a longitudinal design extends our earlier findings in which caregiving quality was concurrently related to attachment security among institutionalized children.[36] Another strength was using both observational ratings and structured interviews to obtain data on this sample.

Several limitations of the current investigation also must be acknowledged. First, symptoms of psychopathology were assessed through caregiver report alone. Given that some children were in institutional care and other children were in foster or family placements, the experience some caregivers had with children were not the same as foster parents. Nevertheless, caregivers who were children's "favorites" as identified by staff consensus were selected to report on children's behaviors. Second, birth and prenatal records were quite limited, making formal assessment of prenatal risk factors impossible. Finally, the magnitude of the associations between study constructs were relatively small, and we caution that other factors beyond caregiving quality and security of attachment that we did not examine may have contributed in important ways to the reduce risk for psychopathology that we observed. For instance, genetic factors, which the present investigation did not consider, play a role in the development of psychopathology in children with a history of early deprivation (see Drury et al. [45] and Kumsta et al.[43]). The present investigation also did not account for early child characteristics, like children's temperament, early psychopathology, or children's cognitive skills, which may impact the quality of care children receive and the development of psychopathology later in life. Interventions with caregivers ought to be individually tailored to specific dyads.

Our results, however, suggest that the role of attachment was not only statistically significant, but that attachment explains a meaningful proportion of variance in the psychiatric outcomes. The purpose of this investigation was to examine one plausible pathway for risk reduction and the results have implications for design of interventions for institutionalized and post-institutionalized children. Interventions for young children with histories of severe deprivation ought to emphasize enhancing caregiving quality, perhaps with special attention to sensitivity, which is known to be responsive to intervention and to impact attachment.

These results add to a growing literature demonstrating that interventions that target attachment security in very young children exposed to caregiving adversity can have far-reaching implications on child development and adaptation. For example, an attachment-focused intervention for foster parents was effective in enhancing attachment and normalizing cortisol patterns in maltreated children.[46, 47] In an intensive day program for very young children, only children whose mothers developed insightfulness (thought to be important in facilitating a healthy attachment relationship) showed decreases in psychopathology.[48] Further research should further examine more specific pathways for prevention of specific disorders. In many clinical settings targeting young children at risk,

our results suggest that the current attachment relationship may be an important, modifiable target of interventions to prevent the development of psychopathology in high-risk children. Biological parents, foster parents, adoptive parents and institutional caregivers should be considered potential partners in this process.

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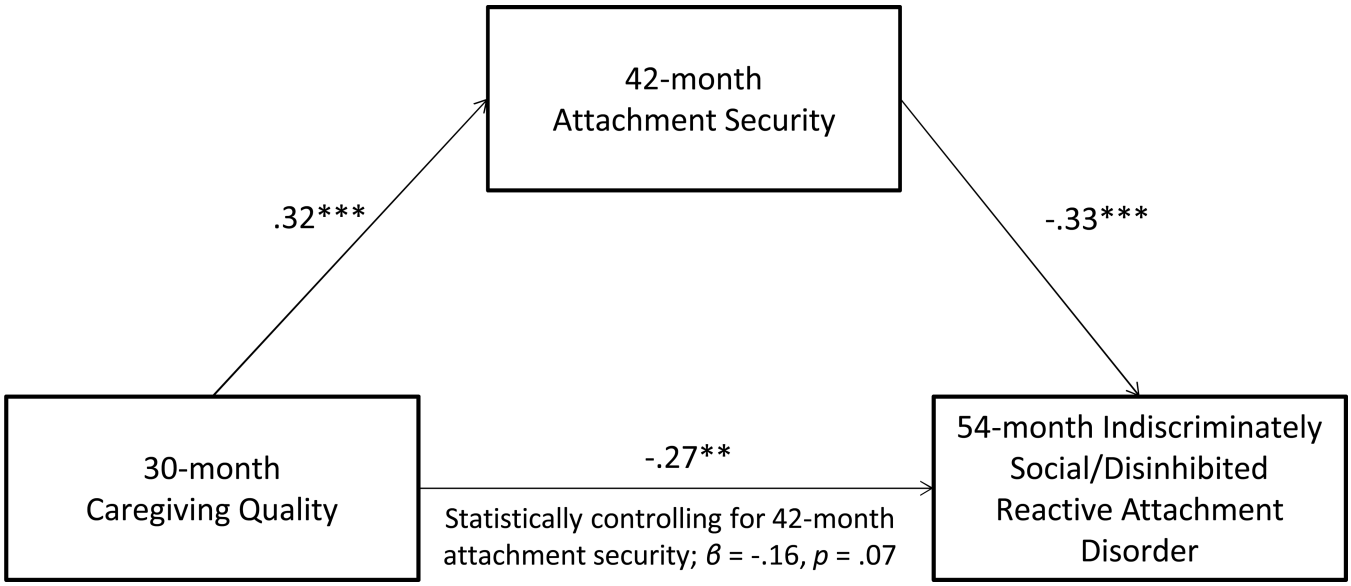

Figure 1.

42-month attachment security mediates the relationship between 30-month caregiving quality and 54-month Indiscriminately social/disinhibited Reactive Attachment Disorder

NOTE: gender was statistically controlled for in each regression equation

** p < .001

Table 1

Placement and Attrition-Baseline, 30 months, 42 months, and 54 months

	Institution	Foster Care	Adopted	Family Placement	Dropped Out/Excluded
Baseline	135	0	0	0	1
30 months	52	69	6	7	2
42 months	35	71	5	17	8
54 months	26	68	7	21	14

Table 2

Descriptive Statistics and Correlations among Study Constructs

	M (*SD*)	1.	2.	3.	4.	5.	6.	7.
1. Caregiving Quality (30 m)	2.56 (.62)	---						
2. Attachment Security (42 m)	3.79 (1.73)	.31**	---					
3. Indiscriminately social/disinhibited RAD (54 m)	1.80 (2.10)	−.26**	−.40**	---				
4. Emotionally withdrawn/Inhibited RAD (54 m)	1.13 (2.17)	−.32**	−.44**	.44**	---			
5. Stereotypes (54 m)	.55 (.76)	−.26**	−.43**	.41**	.45**	---		
6. Symptoms of Externalizing Disorders (54 m)	8.00 (6.98)	−.22*	−.27**	.45**	.18	.47**	---	
7. Symptoms of Internalizing Disorders (54 m)	4.56 (2.86)	−.29**	−.34**	.39**	.28**	.44**	.70**	---
8. Functional Impairment (54 m)	4.86 (6.09)	−.31**	−.34**	.49**	.40**	.47**	.77**	.69**

* p < .50,

** p < .0; two-tailed tests

Note: RAD stands for Reactive Attachment Disorder

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Table 3

Regression analyses examining the association between 30-month caregiving quality and 54 reported psychopathology

	R^2	*T*	β	*p-value*
54-month— Indiscriminately social/disinhibited RAD	.11	−3.01	−.27	.00
54-month—Emotionally withdrawn/Inhibited RAD	.10	−3.58	−.32	.00
54-month—Stereotypies	.07	−2.92	−.26	.00
54-month—Symptoms of Externalizing Disorders	.13	−2.70	−.24	.01
54-month—Symptoms of Internalizing Disorders	.15	−3.45	−.30	.00
54-month—Functional Impairment	.16	−3.70	−.32	.00

NOTE: Gender and 30-month caregiving quality were entered as predictors in each regression analysis; RAD stands for Reactive Attachment Disorder

Table 4

Examining the mediational role of 42-month attachment security of the relation between 30-month caregiving quality and 54-month psychopathology symptoms: Regression analyses and bootstrapping results

	54-month psychopathology																	
	Indiscriminately social/disinhibited RAD			***Emotionally withdrawn/Inhibited RAD***			***Stereotypies***			***Symptoms of Externalizing Disorders***			***Symptoms of Internalizing Disorders***			***Functional Impairment***		
	t	**β**	***p***	***t***	**β**	***p***	***t***	**β**	***p***	***t***	**β**	***p***	***t***	**β**	***p***	***t***	**β**	***p***
Child sex	2.16	.19	.03	−.33	−.03	.74	.11	.01	.91	3.02	.27	.00	2.88	.24	.01	2.77	.23	.01
Caregiving Quality	−1.82	−.16	.07	−2.27	−.19	.03	−1.57	−1.40	.12	−1.89	−.17	.06	−2.45	−.22	.02	−2.69	−.24	.00
Attachment Security	−3.71	−.33	.00	−4.66	−.39	.00	−4.35	−.39	.00	−2.17	−.20	.03	−3.00	−.27	.00	−2.89	−.26	.00
Caregiving Quality × Attachment	−.78	.07	.44	2.90	.23	.00	1.02	.09	.31	.11	.01	.91	1.96	.16	.05	1.37	.12	.18
Confidence Intervals[1]	Lower limits: −.62 Upper limits: −.12			Lower limits: −.80 Upper limits: −.13			Lower limits: −.27 Upper limits:−.06			Lower limits: −.75 Upper limits: −.10			Lower limits: −1.49 Upper Limits: −.16			Lower limits: −1.47 Upper limits: −.22		

Note: RAD stands for Reactive Attachment Disorder

[1] Bias corrected confidence interval for the indirect effect using the methods of Preacher and Hayes[41]