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## The Distinctive Role of Romantic Relationships in Moderating the Effects of Early Caregiving on Adult Anxious-Depressed Symptoms over Nine Years

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### Abstract

This study tests a model of young adult romantic quality as a moderator of the effects of early caregiving on anxious-depressed symptoms over a nine-year period in adulthood. Participants ( $n = 93$ ) were a subsample from a longitudinal study of risk and adaptation. Quality of early caregiving was measured using observational data collected at five points in the first four years of life. Young adult romantic relationship quality was assessed from interviews with participants at age 23. Self-report anxious-depressed symptoms were measured at ages 23, 26, and 32. The results indicated that romantic quality moderated early caregiving to predict symptom levels across this period, with evidence for inoculation, amplification, and compensation effects. A discriminant analysis examining young adult work competence as a moderator provided further evidence for the distinctiveness of romantic relationships in changing the association between early caregiving and adult internalizing symptoms.

### Keywords

anxious-depressed symptoms; romantic relationships; early caregiving

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Romantic relationships are contexts for observing changes in individual functioning. Indeed, the potential for adult romantic relationships to precipitate enduring psychological or behavioral change has long been recognized by those interested in understanding the factors related to persistence in and desistance from childhood antisocial behavior (Laub & Sampson, 1993; Quinton, Pickles, Maughan, & Rutter, 1993; Roisman, Aguilar, & Egeland, 2004; Rutter, Quinton, & Hill, 1990; Sampson & Laub, 1990, 1993; Zoccolillo, Pickles, Quinton, & Rutter, 1992) as well as the correlates of adult adjustment for at-risk youth (Rönkä, Oravala, & Pulkkinen, 2002). Noticeably absent from the developmental psychopathology literature, however, is an understanding of adult romantic relationships as moderators of early risk for internalizing-spectrum problems. The present study begins to fill this gap by testing a series of hypotheses derived from an organizational-developmental perspective, which emphasizes the joint significance of early and later interpersonal experiences for predicting individual adaptation (Sroufe, Egeland, Carlson, & Collins, 2005). According to this perspective, romantic experiences may moderate the effects of early caregiving to predict anxious-depressed symptoms in young adulthood.

## Interpersonal Origins of Adult Anxious-Depressed Symptoms

Major models of the interpersonal origins of the internalizing problems of anxiety and depression focus on the role of childhood caregiving experiences (Burbach & Bourduin, 1986; Duggal, Carlson, Sroufe, & Egeland, 2001; Hammen, 1992; Kendler, Gardner, & Prescott, 2002; Moffitt et al., 2007; Toth, Manly, & Cicchetti, 1992). Multiple psychological and biological processes are implicated in this association. For example, inconsistent or inadequate early caregiving sets into motion maladaptive beliefs concerning the value of the self and the supportiveness of others that can render individuals vulnerable to subsequent internalizing symptoms (Beck, 1967; Bowlby, 1969/1982, 1980; Brown & Harris, 1978; Hammen, 1992). On a biological level, insensitive or unresponsive early caregiving that fails to modulate the emotional arousal of the infant may perturb the development of the physiological and neurobiological systems that support adaptive emotion functioning later in life (Hofer, 1994; Schore, 2001, 2005).

Prospective studies document the direct and indirect effects of early caregiving experiences on internalizing symptoms in adulthood. Moffitt and colleagues (2007), for example, found that maltreatment between ages 3-11 increases the risk for adult clinical depression and anxiety diagnoses. The adulthood follow-up of the *Patterns of Child Rearing* sample (Sears, Maccoby, & Levin, 1957) found that early parental warmth positively predicted marital and social functioning at age 41, which in turn predicted concurrent psychological health (Franz, Weinberger, & McClelland, 1991). Overbeek and colleagues (2007) found that low parent-child relationship quality promoted a pathway toward lower romantic quality in the late 30s, which in turn was associated with greater concurrent anxious-depressed symptoms.

Studies using retrospective methods or the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1985) document similar links between early caregiving and adult internalizing symptomatology. For example, depressed adults retrospectively report lower quality early caregiving compared to a variety of control groups (Burbach & Bourduin, 1986), although this effect may be confounded with mood-related negativity biases (Blaney, 1986). Studies using the AAI, which assesses adults' current state-of-mind (i.e., Secure-Autonomous, Insecure-Dismissing, Insecure-Preoccupied, or Unresolved) with respect to their childhood caregivers, also find that insecure AAI classifications are associated with psychopathology, although there does not appear to be specificity between internalizing disorders and the type of insecurity (van IJzendoorn & Bakermans-Kranenburg, 1996). Thus, a number of methodologies suggest that lower quality early caregiving—whether measured prospectively, retrospectively, or using representational measures such as the AAI—is a risk factor for later internalizing problems.

## Romantic Relationships as Moderators of the Effects of Early Caregiving

A developmental psychopathology approach to anxious-depressed symptoms emphasizes the dynamic, transactional process between one's current circumstances and his/her history of adaptations (Bowlby, 1969/1982; Cicchetti, 1984, 1989; Hammen, 1992; Sameroff, 2000; Sroufe et al., 2005). Accordingly, poor quality early caregiving experiences may launch individuals toward elevated symptoms later in life, but their *adaptation* to subsequent developmental issues may either accentuate or compensate for this early risk (O'Connor, 2003; Rutter & Sroufe, 2000). Prior adaptations to developmentally salient issues are not "erased from the tape" (Kagan, 1980, p. 240), but instead are incorporated into the self system as new developmental issues are negotiated while others wane in significance (Erikson, 1963).

Cross-sectional and longitudinal studies from the clinical marital literature document negative associations between adult partners' anxiety and depression and their marital

satisfaction and functioning (Brock & Lawrence, 2011; Proulx, Helms, & Buehler, 2007; Whisman, 2001; Whisman, Uebelacker, & Weinstock, 2004). For example, a meta-analysis of 26 cross-sectional studies of community samples found a moderately-sized link between marital quality and depressive symptoms for both men and women (Whisman, 2001). A more recent study found that husbands' relationship satisfaction and sense of balance and control in the relationship and wives' perceptions of the relationship's emotional intimacy were negatively related to their own anxious-depressed symptoms across a seven-year period (Brock & Lawrence, 2011).

Young adult romantic relationships are particularly well-suited to redirect pathways initiated early in childhood given the close ties between the developmentally-salient psychosocial tasks defining each age (Collins & van Dulmen, 2006). In Eriksonian (1963) terms, the early childhood issue of hope (i.e., trust vs. mistrust) is particularly relevant to the young adult issue of love (i.e., intimacy vs. isolation) and the formation of close relationships in young adulthood. Continuity between these two developmental achievements, wherein early parenting quality initiates pathways toward later romantic quality, provides evidence for this view (Overbeek et al., 2007; Roisman, Collins, Sroufe, & Egeland, 2005; Simpson, Collins, Tran, & Haydon, 2007).

Although the quality of early caregiving experiences predicts adult romantic outcomes, people who have less favorable early caregiving histories (e.g., attachment insecurity) can and do form secure adult partnerships. Likewise, even those who had high quality early caregiving can and do form insecure adult partnerships. Early caregiving experiences, however, are not "lost" in light of new experiences. "Early" and "later" interpersonal experiences are systematically related to psychological and behavioral outcomes. One example of this principle comes from studies examining the effects of adults' state-of-mind with respect to both their early caregiving experiences and their current romantic relationships on romantic functioning. Both representations of early caregiving as well as current romantic relationships affect romantic functioning in early adulthood (Haydon, Collins, Salvatore, Simpson, & Roisman, online ahead of print; Treboux, Crowell, & Waters, 2004), underscoring the idea that configurations of past and present close relationship representations predict unique patterns of thinking, feeling, and behaving.

Similar developmental logic can be applied to understanding the interpersonal antecedents of adult anxious-depressed symptoms. Poor early caregiving experiences may initiate a developmental pathway leading to negative working models of self and others, which in turn may impact interpersonal and cognitive vulnerabilities associated with anxious-depressed symptoms (e.g., excessive reassurance seeking, dependency, negatively biased social information processing) (Hammen, 1992; Haydon et al., online ahead of print). If these vulnerabilities surface in low-quality romantic relationships in adulthood, negative cognitions about the self and others may be reinforced, aggravating anxious-depressed symptoms over time (Coyne, 1976; Hammen, 1992). In contrast, someone whose poor early caregiving experiences put them at risk for elevated internalizing symptoms in adulthood may be *buffered* by a high-quality romantic relationship in adulthood. Likewise, positive early caregiving experiences may serve as an "inner resource" that can be used to overcome later difficulties, such as involvement in a low-quality romantic relationship (Bowlby, 1973, 1980; Mikulincer & Florian, 1998; Mikulincer, Shaver, & Pereg, 2003; Sroufe, Egeland, & Kreutzer, 1990).

## The Present Study

The present study was designed to test the hypothesis that young adult romantic relationship experiences would moderate the effects of early caregiving experiences to predict anxious-

depressed symptoms across a nine-year period in young adulthood. Participants were 93 individuals for whom prospectively measured early caregiving (ages 12-42 months), young adult romantic relationship quality (age 23), and anxious-depressed symptom (ages 23, 26, and 32) data were available. We derived and tested the following hypotheses related to cross-sectional/intercept effects (i.e., the interaction between early caregiving and age 23 romantic experiences to predict age 23 anxious-depressed symptoms) and slope effects (i.e., changes in symptoms over time).

### Intercept hypotheses

We expected that individuals who experienced lower quality early caregiving and also had a lower quality young adult romantic relationship would have the highest initial levels of anxious-depressed symptoms at age 23 (*Hypothesis 1*). In contrast, we expected that individuals who had higher quality early caregiving and higher quality young adult romantic relationships would have the lowest initial levels of anxious-depressed symptoms (*Hypothesis 2*).

We also expected the initial anxious-depressed symptoms of individuals whose early caregiving and romantic relationship quality differed to be between the two extreme concordant groups (i.e., the groups that were either both low or both high on early caregiving and young adult romantic quality measures) (*Hypotheses 3 and 4*). These hypotheses are consistent with the notion that: (1) an early history of security (i.e., better caregiving) may serve as an internal resource that insulates these individuals from later difficulties, such as elevations in internalizing symptoms typically associated with poor relationship adjustment (Bowlby, 1973, 1980; Mikulincer & Florian, 1998; Mikulincer et al., 2003; Sroufe et al., 1990), and (2) positive adult close relationships can compensate for risk factors experienced earlier in development (Rönkä et al., 2002).

### Slope hypotheses

Although considerable theory and research supports the derivation of the intercept hypotheses (described above), less theory and empirical work has addressed *how* anxious-depressed symptom levels may change across time as a function of early caregiving and young adult romantic quality. We expected that the symptoms of individuals who experienced lower quality early caregiving and had lower quality young adult romantic relationships would increase over time, given the reciprocal influence between negative close relationship experiences and internalizing symptoms (Coyne, 1976; Hammen, 1991) (*Hypothesis 5*). In contrast, we expected that individuals who had higher quality early caregiving and higher quality young adult romantic relationships would display a relatively flat trajectory of symptoms over time (*Hypothesis 6*). Because positive adult romantic relationship experiences can compensate for negative early caregiving (Rönkä et al., 2002), we also anticipated that the moderate level of anxious-depressed symptoms for individuals who have this particular configuration would decrease over time (*Hypothesis 7*).

Lastly, we anticipated that the moderate level of anxious-depressed symptoms among those who experienced higher quality early caregiving but lower quality young adult romantic relationships would be relatively stable across time (*Hypothesis 8*), given that a history of positive early caregiving should protect against the longitudinal declines in mental health typically associated with poor quality romantic relationships (Proulx et al., 2007).

### Discriminant Prediction and Covariates

In addition, we tested the uniqueness and specificity of adult romantic quality as a moderator of early caregiving in predicting anxious-depressed symptoms in two ways. First, we treated participants' competence in the workplace, another salient domain of adaptation that draws

upon related but distinct developmental achievements (Collins & van Dulmen, 2006; Erikson, 1963), as a discriminant moderator of early caregiving to predict anxious-depressed symptoms in adulthood. Second, we statistically controlled for several covariates to further test the specificity of adult romantic quality as a moderator of early caregiving. Gender was controlled based on the well-documented sex differences in internalizing symptoms (Nolen-Hoeksema & Girgus, 1994). Maternal depressive symptoms were included as the best available proxy to control for genetic factors as well as intergenerational continuity in stressful environments that may contribute to elevated anxious-depressed symptoms (Kendler et al., 2002; Rutter, Silberg, O'Connor, & Simonoff, 1999).

Participants' marital status (whether they were married) and child status (whether they had children) during adulthood (at ages 23, 26, and 32) were also controlled in view of past research linking these variables to internalizing problems (Evenson & Simon, 20005; Pearlin & Johnson, 1977). In addition, participants' cohabitation status and the length of their current romantic relationship at age 23 were also controlled to examine the effects of relationship quality above and beyond other demographic relationship characteristics. Finally, whether participants were with the same romantic partner between ages 23 and 32 was included to control for the potential effects of relationship dissolution on anxious-depressed symptoms (Horwitz, White, & Howell-White, 1996).

## Method

### Participants

Data for testing these predictions came from the Minnesota Longitudinal Study of Risk and Adaptation (MLSRA; Sroufe et al., 2005), which has followed approximately 165 first-born children from birth through adulthood. Participants' mothers were originally recruited into the study during the third trimester of pregnancy while they were receiving prenatal care at Minneapolis public health clinics. The analyses in this study are based on a subset of the sample ( $n = 93$ , 53% female, 47% male) for whom young adult romantic relationship quality was assessed at age 23. Sixty-eight percent of these participants were White, 22% were of mixed, other, or unknown race, and 10% were Black.<sup>1</sup>

### Procedures and Measures

**Early Caregiving Composite**—The early caregiving variables that assessed emotional supportiveness of the early caregiving environment (between ages 1-4) included the number of times that the parent-child attachment relationship was classified as secure<sup>2</sup> out of two Strange Situation assessments conducted at 12 and 18 months (Ainsworth, Blehar, Waters, & Wall, 1978), maternal supportive presence (minus hostility) at 24 and 42 months during challenging tasks that the participant completed with his/her mother (Erickson, Sroufe, & Egeland, 1985; Matas, Arend, & Sroufe, 1978), and maternal verbal and emotional responsiveness on the HOME scale (Caldwell, Heider, & Kaplan, 1966) at 30 months. Full

<sup>1</sup>A series of comparisons of major demographic variables were conducted to determine whether the subset sample was different from the full sample. The distribution of race and gender did not differ between the full sample and the subsample according to non-significant chi-square tests (all  $ps > .05$ ). Non-significant  $t$ -tests and chi-square tests indicated that subsample participants did not differ from the full sample in SES prenatally, SES at 42 months, maternal IQ, maternal age, years of education, or marital status at time of birth. Finally, non-significant  $t$ -tests indicated that age 26 and 32 anxious-depressed symptom levels for those in versus not in the subsample (but for whom anxious-depressed symptom data were available) indicated that the two groups' distributions overlapped; however, those in our subsample did have slightly lower anxious-depressed symptoms at age 23 ( $M_{\text{subsample}} = 5.20$ ,  $M_{\text{not subsample}} = 7.16$ ,  $p = .03$ )

<sup>2</sup>We decided to use the secure vs. insecure distinction given recent meta-analytic findings showing that this contrast predicts differences in broadband internalizing psychopathology more so than other attachment classification contrasts do (e.g., insecure-avoidant vs. not-avoidant, insecure-resistant vs. not-resistant, disorganized vs. not-disorganized) (Groh, Roisman, Van IJzendoorn, Bakermans-Kranenburg, & Fearon, 2012).

descriptions along with reliability and validity information for these measures are reported in Appleyard, Egeland, and Sroufe (2007). Standardized scores on each of these measures were calculated and then averaged to create a single indicator of early caregiving for participants for whom at least two of the contributing measures were available ( $n = 91$ , 98% of the subsample).

**Young Adult Romantic Quality (age 23)**—At age 23, participants who were in a romantic relationship of 4 months or longer were interviewed about their experiences in that relationship. This relationship length cutoff was used to increase the likelihood that participants had a range of experiences relevant to the types of examples they would be asked to provide during the interview. Participants responded to questions about times when they felt especially close to their partner, whether they could completely be themselves and share anything with their partner, how the couple resolved conflicts, and how committed the relationship was.

The interviews were audiotaped and trained coders then rated each interview on scales measuring the level of Enjoyment, Commitment, Security, Conflict Resolution, and Overall Quality (Collins et al., 1999). All scales were rated on 5-point Likert-type scales anchored low-to-high. Enjoyment assessed the degree to which the participant viewed his/her current romantic relationship as a source of happiness, pleasure, and good feelings. Commitment indexed the degree to which the participant wanted the relationship to be stable and long-term and invested resources in it. Security measured the degree to which the partner was viewed as available, responsive, and fully accepting of the participant in both good and bad times. Conflict resolution tapped the degree to which the couple's strategies for managing conflicts were effective and equitable to both partners. Overall Quality assessed the degree to which mutual caring, trust, emotional closeness, self-sacrifice, and sensitivity characterized the relationship as a whole. Interrater reliabilities (intraclass correlations) between the coders were high, ranging from .89 to .94 ( $M = .92$ ). Intercorrelations ( $r$ s) among the scales ranged from .46 to .89 ( $M = .73$ ). A principal components analysis confirmed that all five variables loaded on a single romantic quality dimension that accounted for 78% of the variance in the scales. Component loadings, which reflect the correlations between the variables and the component, ranged from .79 to .93 ( $M = .88$ ). Scores on the scales were  $z$ -scored and averaged to create an age 23 Romantic Quality Composite.

**Anxious-Depressed Symptoms (Ages 23, 26, and 32)**—Participants completed the 119-item Young Adult Self-Report for ages 18-30 (YASR; Achenbach, 1997) as part of their 23 year and 26 year assessments, and they completed the 126-item Adult Self-Report (ASR; Achenbach, 2003) as part of their 32 year assessment. Participants rated themselves, their feelings, and their behavior during the past six months on a 3-point scale (0-2). Scores on the anxious-depressed subscale were used in the present analyses. According to the Achenbach manuals (1997, 2003), scores on the anxious-depressed subscale discriminate between clinically referred and non-referred samples, and they are highly and positively correlated with scores on both the depression scale from the Symptom Checklist-90-Revised (Derogatis, 1977; 1994) and the depression scale from the Minnesota Multiphasic Personality Inventory-2 (Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989). One, five, and four participants scored in the borderline clinical range (T-scores of 65-69) at ages 23, 26, and 32, respectively. No participants scored in the clinical range ( $T > 70$ ) at ages 23 and 26, but one participant did at age 32.

Linear mixed modeling requires measurement invariance, meaning that the same dependent measure must be used across time (Edwards & Wirth, 2009). Consistent with past literature examining repeated measures of anxious-depressed symptoms across different Achenbach

forms (e.g., Edwards, Larsson, Lichtenstein, & Kendler, 2011), the items that loaded on both the YASR and ASR anxious-depressed subscale were summed to create the anxious-depressed symptoms composite. Reliabilities for the resulting 15-item scale at ages 23, 26, and 32 (summarized in Table 1) were high,  $\alpha_{23} = .90$ ,  $\alpha_{26} = .89$ ,  $\alpha_{32} = .90$ .

**Discriminant Predictor and Covariates**—The following discriminant predictor and covariates were used to test the uniqueness and specificity of young adult romantic relationship quality as a moderator of early caregiving in predicting anxious-depressed symptoms in adulthood.

**Work competence (age 23):** At age 23, participants were interviewed and responded to paper-and-pencil questions about their work experiences, including their employment history and their plans for future education/employment. Measures and audiotaped interviews were then coded for the degree to which each participant showed *reflectivity* about his/her career plans, the degree to which s/he had engaged in *exploration* of potential career opportunities, and the degree to which his/her thinking about job or career goals showed *maturity* on separate 5-point unidimensional Likert-type scales. Interrater reliabilities (intraclass correlations) for two raters on these scales ranged from .74 to .84. Scores on these scales were composited to form a Work Competence index. Past research linking this index to the quality of middle childhood peer competence, but not to the quality of adolescent relationships, provides evidence for its convergent and divergent validity (Collins & van Dulmen, 2006).

**Maternal depressive symptoms (ages 48 months, 7, 8, 16, and 17.5 years):** Participants' mothers reported their own depressive symptoms when the participants were 48 months, 7, 8, 16, and 17.5 years old. The Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977) was administered at the 48 month, 16, and 17.5 year assessments. The 20-item CES-D asks respondents to rate themselves on a 4-point scale (0-3) according to specific feelings and behaviors during the past week that are characteristic of depression. The Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) was administered at the 7 and 8 year assessments. The 21-item BDI asks respondents to rate themselves on a 4-point scale (0-3) on feelings during the past week characteristic of depression. Cronbach alphas for these scales ranged from .83 to .88 ( $M = .86$ ). A maternal depressive symptoms composite was calculated by *z*-scoring and averaging these measures.

**Relationship length and cohabiting status (age 23):** At age 23, participants reported the length of their current romantic relationship (in months) and whether they were living with their current romantic partner, coded 0 (*No*) or 1 (*Yes*).

**Romantic relationship stability between ages 23 and 32:** At ages 23 and 32, participants reported their romantic partner's name. Name data were then used to create a dichotomous variable indicating whether the participant was involved with the same partner at ages 23 and 32, coded 0 (*No*) or 1 (*Yes*). Stability coding was corroborated with relationship length information collected at age 32.

**Marital status (ages 23, 26, and 32):** Three dummy variables were coded for whether each participant was married at ages 23, 26, and 32. For each age, a separate marital status variable was coded 0 (*Unmarried*) or 1 (*Married*).

**Child status (ages 23, 26, and 32):** Three dummy variables were coded for whether each participant had a biological child at ages 23, 26, and 32. For each age, a separate child status variable was coded 0 (*No*) or 1 (*Yes*).

## Results

### Descriptive Statistics and Correlations

Descriptive statistics and zero-order correlations for all the variables are summarized in Table 2. Anxious-depressed symptoms at each age were positively correlated ( $r_s = .53$  to  $.64$ ), as were age 23 romantic quality and work competence ( $r = .25$ ). Romantic quality was negatively related to anxious-depressed symptoms at ages 23 and 32, but not significantly at age 26. Neither early caregiving quality, romantic relationship length, work competence, nor marital status were significantly related to anxious-depressed symptoms at any age. Romantic quality was not associated with age 23 marital status, but it was positively associated with age 26 and 32 marital status. Early caregiving was inversely associated with having a child at ages 23, 26, and 32.

### Analytic Plan

A linear mixed modeling (LMM) growth curve framework was used to analyze the data. Analyses were run using the lme4 package (Bates & Maechler, 2010) in R version 2.11.1 (R Development Core Team, 2010). Percentages of missing data for variables in the study ranged from 2 to 8%. Missing data were multiply imputed (van Buuren & Groothuis-Oudshoorn, 2009). The equation, expressed in HLM form, for the primary analysis examining the effects of early caregiving and young adult romantic quality on the intercepts and slopes of anxious-depressed symptoms included one Level 1 and two Level 2 equations:

$$\text{Level 1: Anxious-Depressed Symptoms}_{ij} = b_{1i} + b_{2i}t_{ij} + e_{ij}$$

$$\text{Level 2: } b_{1i} = b_1 + b_3\text{Gender}_i + b_4\text{Early Caregiving}_i + b_5\text{Romantic Quality}_i + b_6(\text{Early Caregiving}_i * \text{Romantic Quality}_i) + b_{1i}$$

$$\text{Level 2: } b_{2i} = b_2 + b_7\text{Early Caregiving}_i + b_8\text{Romantic Quality}_i + b_9(\text{Early Caregiving}_i * \text{Romantic Quality}_i) + b_{2i}$$

where  $b_1$  is the intercept (the mean anxious-depressed symptom score at age 23),  $b_2$  is the slope for the linear time term,  $b_3$  is the effect of gender on the intercept,  $b_4$  is the effect of early caregiving on the intercept,  $b_5$  is the effect of romantic quality on the intercept,  $b_6$  is the interaction of early caregiving and romantic quality on the intercept,  $b_7$  is the effect of early caregiving on the slope,  $b_8$  is the effect of romantic quality on the slope,  $b_9$  is the interaction of early caregiving and romantic quality on the slope,  $b_{1i}$  is the random intercept allowing for individual variation around the mean ( $b_1$ ), and  $b_{2i}$  is the random slope allowing for individual variation around the mean slope ( $b_2$ ).  $b_{1i}$  and  $b_{2i}$  denote the participant-specific intercepts and slopes.

A parallel analysis was run to test the discriminant hypothesis that this moderating effect was unique to young adult romantic quality as opposed to work competence. Bayesian weight of evidence (Burnham & Anderson, 2004; Raftery, 1995) for the predicted and discriminant models was used to compare relative fit of these non-nested models. This approach involves calculating the Bayesian information criterion (BIC; Schwarz, 1978), a model fit index derived from probability theory, for each model.<sup>3</sup> Conclusions about the relative fit of the predicted and discriminant models were made based on guidelines established by Raftery (1995). The same HLM equations described above were used again, only work competence was substituted for romantic quality.

<sup>3</sup>Because model fit statistics do not perform well following multiple imputation, BIC comparisons were performed on the subset of participants ( $n = 83$ ) for whom we had complete data on the early caregiving, adult romantic quality, and adult work competence variables.



A follow-up LMM was then run to test the robustness of the observed early caregiving and age 23 romantic quality interactions by including the covariates discussed previously. Child and marital status data were available at ages 23, 26, and 32; thus, these variables were incorporated in the Level 1 equation to assess the longitudinal covariation between anxious-depressed symptoms and whether the participant was married and/or had a child. The other control variables were added to the Level 2 equation related to the intercepts, with the exception that the one variable that could change between ages 23 and 32 (i.e., whether the participant was with the same partner during this time period) was also added to the Level 2 equation related to slope in order to test whether it moderated change in anxious-depressed symptoms over time. Thus, the equations were:

$$\text{Level 1: Anxious-Depressed Symptoms}_{ij} = \beta_{1i} + \beta_{2i}\text{Marital Status}_{ij} + \beta_{3i}\text{Child Status}_{ij} + \beta_{4i}t_{ij} + e_{ij}$$

$$\text{Level 2: } \beta_{1i} = \beta_1 + \beta_5\text{Gender}_i + \beta_6\text{Relationship Stability 23-32}_i + \beta_7\text{Living with partner (Age 23)}_i + \beta_8\text{Relationship Length (Age 23)}_i + \beta_9\text{Maternal Depressive Symptoms}_i + \beta_{10}\text{Early Caregiving}_i + \beta_{11}\text{Romantic Quality}_i + \beta_{12}(\text{Early Caregiving}_i * \text{Romantic Quality}_i) + b_{1i}$$

$$\text{Level 2: } \beta_{2i} = \beta_2$$

$$\text{Level 2: } \beta_{3i} = \beta_3$$

$$\text{Level 2: } \beta_{4i} = \beta_4 + \beta_{13}\text{Early Caregiving}_i + \beta_{14}\text{Romantic Quality}_i + \beta_{15}(\text{Early Caregiving}_i * \text{Romantic Quality}_i) + \beta_{16}\text{Relationship Stability 23-32}_i + b_{4i}$$

In all analyses, continuous variables were centered on their means prior to creating the interaction terms. The results are reported as unstandardized coefficients. Inferences for fixed effects were made using corresponding  $z$ -values because the  $N^*$  (i.e., the total number of anxious-depressed symptom observations) was large ( $N^* = 279$ ). The  $t$ -values obtained for parameters were compared to the critical values under the standard normal distribution (for two-tailed tests,  $|t| \geq 1.64$  for  $p \leq .10$ ;  $|t| \geq 1.96$  for  $p \leq .05$ ;  $|t| \geq 2.58$  for  $p \leq .01$ ).

### Focal Analyses

The results for the primary LMM are shown in Table 3. There were no significant ( $p < .05$ ) main effects for either early caregiving or adult romantic quality on the intercepts or the slopes of anxious-depressed symptoms across adulthood. Furthermore, the parameter for the linear time term was not significant, indicating flat levels of anxious-depressed symptoms over time. These null main effects were qualified by interactions, however. Early caregiving and adult romantic quality significantly interacted to predict intercepts (i.e., age 23 anxious-depressed symptoms) ( $p = .008$ ) and slopes ( $p = .05$ ) across time.<sup>4</sup>

Predicted growth curves for the four configurations of early caregiving and adult romantic quality at 1  $SD$  above and below the mean on each variable (per the recommendations on plotting and probing interactions between continuous variables discussed in Aiken & West, 1991 and Cohen & Cohen, 1983) are plotted in Figure 1. A dual fan-shaped pattern emerged. The intercept and slope interaction effects were probed using computational tools from Preacher, Curran, and Bauer (2006). As expected, the highest intercept was observed for participants who experienced both low early caregiving and low adult romantic quality. This value significantly differed from zero ( $z = 3.80, p < .01$ ). The lowest intercept was

<sup>4</sup>In response to a reviewer's concern that our results may be driven by a few extreme scores, we also performed an outlier analysis using Cook's distance (Cook, 1977) as our measure of influence. Three cases were identified as outliers. We then re-ran the analyses after dropping these cases. The pattern of effects and significance levels were identical to those reported in the results. Given the similarity between the reported findings and those with outliers removed, we decided to retain the outliers in our primary analyses because we did not have a substantive reason to drop them.

observed for those who had low early caregiving and high adult romantic quality, and this value did not differ significantly from zero ( $z = -0.40, p = .67$ ). The intercept for those who experienced high early caregiving and high adult romantic quality was moderately high and differed significantly from zero ( $z = 2.93, p < .01$ ). Although the predicted intercept value for those who experienced high early caregiving and low adult romantic quality is greater than the predicted intercept value for the high early caregiving/high adult romantic quality group, it did not significantly differ from zero ( $z = 1.38, p = .17$ ).

There was also a significant interaction between early caregiving and adult romantic quality in predicting slopes. Probing this effect for each of the four configurations revealed that none of the simple slopes of the trajectories differed significantly from zero. In other words, the slopes for configurations of early caregiving and adult romantic quality differ from one another (as indexed by the significant interaction), but none of them significantly differ from zero. These null simple slope effects suggest that the intercept differences described above were maintained across time.

A comparison of the BICs for the model examining adult romantic quality as the moderator of early caregiving (BIC = 1480.67) versus work competence as the moderator of early caregiving (BIC = 1499.86; model results not shown, but available from the first author) indicated a very strong preference for the adult romantic quality model.<sup>5</sup>

Finally, as shown in Table 4, the intercept interaction effect remained significant after including the covariates. However, the slope interaction effect dropped to marginal significance. In addition, the child status covariate was significant, indicating that having a child was associated with fewer anxious-depressed symptoms at each age. No other covariates were significant.

## Discussion

This longitudinal study is one of the first to test the hypothesis that adult romantic relationship experiences *alter* the impact of prospectively measured early caregiving to predict anxious-depressed symptoms in adulthood. This research builds upon past work linking romantic relationships to persistence and desistance in externalizing behaviors (Laub & Sampson, 1993; Quinton et al., 1993; Roisman et al., 2004; Rutter et al., 1990; Sampson & Laub, 1990, 1993; Zoccolillo et al., 1992), and extends it to consider internalizing behavior. The perspective adopted here differs from past studies in that we tested for standard cross-sectional anxious-depressed symptom effects, as well as for whether these effects *changed* across early adulthood for individuals with certain configurations of early caregiving quality and later adult romantic quality.

In terms of zero-order correlations, early caregiving was not significantly related to anxious-depressed symptoms at any age, which is consistent with prior work indicating that early caregiving experiences are likely to have indirect, rather than direct, effects on later internalizing symptoms (Franz et al., 1991; Overbeek et al., 2007; for an exception see Moffitt et al., 2007). Also consistent with past research from the clinical marital literature (Brock & Lawrence, 2011; Proulx et al., 2007; Whisman, 2001), young adult romantic quality was inversely related to anxious-depressed symptoms at ages 23 and 32. Young adult

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<sup>5</sup>As one reviewer pointed out, another way to test whether the quality of adult romantic relationships is a specific moderator of early caregiving experiences to predict anxious-depressed symptoms would be to examine age 23 romantic quality and age 23 work competence as moderators of early caregiving together in the same analytic model. We pursued this alternative, and the results were consistent with the results from the Bayesian model comparison. The interaction between early caregiving and age 23 romantic quality was significant ( $B = 6.83, t(279) = 2.33, p < .05$ ). Moreover, the interaction between early caregiving X age 23 work competence was not significant ( $B = 0.33, t(279) = -0.40, ns$ ). Full results from this model are available from the first author.

romantic quality and age 26 anxious-depressed symptoms were also negatively related, but this effect was not statistically significant.

Our multivariate growth-curve analyses showed that young adult romantic relationship quality moderated the effect of early caregiving to predict anxious-depressed symptom intercepts. There were no main effects for early caregiving or romantic quality, as is often the case in the presence of fan-shaped interactions (Cohen, Cohen, West, & Aiken, 2003). There was also a significant slope interaction in the model containing gender as the only covariate; however, probing this effect revealed no significant simple slopes. Thus, there was no support for the hypotheses that symptom levels may change over time for the low early caregiving/low adult romantic quality configuration or the low early caregiving/high adult romantic quality configuration. Instead, the initial differences in anxiety-depression symptoms (described in more detail below) were sustained over the nine-year period.

As expected, the low early caregiving quality/low adult romantic quality group had the highest number of anxious-depressed symptoms. This is consistent with previous research showing that early experiences that put one at risk for psychosocial problems in adulthood tend to be exacerbated within low-quality or problematic adult romantic relationships (Hammen, 1992; Rönkä et al., 2002). Intriguingly, the low early care/high adult romantic quality group had the *fewest* symptoms. Although this finding was unexpected in light of the organizational-developmental logic that both early and later close relationships should make equivalent contributions to later functioning, there are parallel findings in other research. For example, individuals who have insecure representations of early caregiving experiences have especially positive self-reported romantic relationship perceptions when their romantic relationships exceed their expectations of close relationship partners (Treboux et al., 2004). Moreover, past research with the MLSRA sample shows that individuals who have insecure attachment histories benefit the most from partners who are especially good at modulating their emotional arousal in the moments following conflict (Salvatore, Kuo, Steele, Simpson, & Collins, 2011).

These results are also consistent with the idea that those at greatest risk may benefit the most from later supportive environments (Rutter, 1999). For individuals who experienced low quality early care, a high quality romantic relationship may violate their expectations for what it means to be in a close relationship, promoting a change in cognitive models and representations of the self and/or close others. Such a shift may be reflected in fewer anxious-depressed symptoms. Romantic relationship processes such as the inclusion-of-other-in-the-self (Aron, Aron, & Paris, 1995), partner idealization (Murray, Holmes, & Griffin, 1996), and caregiving (Crowell, Treboux, & Waters, 2002) may also challenge one's previously held ideas of the self and others, decoupling the link between poorer early caregiving and later internalizing symptomatology (Bowlby, 1988).

We also acknowledge the possibility that individuals who experience the low early care/high adult romantic quality configuration may be psychologically defensive individuals who provide overly favorable views of their romantic relationships and their psychological health. This alternative interpretation seems less plausible because our interview-based measures of romantic quality emphasized participants' ability to provide concrete examples to back up claims about the best features of their relationships, making these measures less prone to self-presentation biases than standard self-report assessments. The fact that we did not observe this moderation effect in the work competence discriminant analysis (given that the work competence measures should also have been prone to self-presentation biases) reduces the likelihood of this alternative explanation even further.

Turning to people who experienced high early caregiving, we found that individuals who had high early care/high adult romantic quality had a moderate amount of symptoms across time. Although this finding was not anticipated, those who experienced low early care/high adult romantic quality reported very few symptoms, setting up an extreme contrast for the number of symptoms reported by the high early care/high adult romantic quality group. This again maps onto the conceptually-related finding that people who hold insecure representations of early caregiving experiences but positive adult romantic experiences have romantic relationship perceptions that are even *more* favorable than people who hold secure representations of early caregiving and adult romantic experiences (Treboux et al., 2004).

As hypothesized, the intercepts of individuals who had high early caregiving/low adult romantic quality fell between the two extreme anchoring groups. Positive early caregiving experiences appear to have buffered these individuals from the detrimental effects of having a low-quality romantic relationship at age 23. This finding is consistent with the view that positive early caregiving experiences act as an “inner resource” when one confronts future challenges (Bowlby, 1973, 1980; Mikulincer & Florian, 1998; Mikulincer et al., 2003; Sroufe et al., 1990).

Even though the anxious-depressed symptom levels in the two discordant groups (i.e., the low early care/high adult romantic quality group and the high early care/low adult romantic quality group) can be interpreted in light of existing theories (i.e., the violation of expectation hypothesis on the one hand, the buffering hypothesis on the other), it is difficult to reconcile them under a single framework. For example, according to the violation of expectations perspective, individuals who have positive early experiences should have experienced greater psychological distress (reflected in higher anxious-depressed symptoms) if their adult romantic experiences fail to meet their lofty standards for close relationships (Treboux et al., 2004).

One potential explanation for the different levels of anxiety-depression displayed by the two discordant groups is the degree to which top-down versus bottom-up relationship processes are at play. Individuals who have histories of sensitive, supportive caregiving should make more benevolent, growth-oriented attributions when their relationships are lower in quality (e.g., “We sometimes have trouble resolving conflicts, but things will get better over time if we keep working on it”) (e.g., Rusbult, Verette, Whitney, Slovik, & Lipkus, 1991). These favorable interpretations may buffer these individuals from lower quality relationship experiences. These individuals may also receive greater emotional support from their social networks (e.g., family, friends), which in turn buffers them from elevations in internalizing symptoms commonly associated with lower quality romantic relationships. In contrast, individuals who experienced low quality early caregiving may be especially responsive to “bottom-up” romantic relationship experiences that challenge their previously held views of self and other. Testing these hypotheses is an important direction for future research.

Contrary to our predictions, there was no evidence that anxious-depressed symptoms for the low early care/low adult romantic quality group or the low early care/high adult romantic quality group changed over time. By limiting our assessment to only relatively well-established relationships (a minimum length of 4 months, with a sample average of 37 months), we may have missed the critical period at the beginning of relationships when these changes occur. Future research using more fine-grained assessments of internalizing symptoms that are associated with being involved in a new romantic relationship might be a more sensitive test of this hypothesis (for an example of a daily diary method in this vein, see Eberhart & Hammen, 2010)

As a set, our results call into the question the assumption that the quality of later romantic relationships “matters” to the same degree for all individuals. Indeed, our results suggest that the present takes on a different meaning in light of the past. For those who experienced low quality early caregiving, anxious-depressed symptom levels differed drastically as a function of their young adult romantic quality. However, anxious-depressed symptom levels for those who experienced high quality early caregiving did not vary as much as a function of their adult romantic relationship quality.

What implications do these findings have for our theoretical understanding of the role of early experience following developmental continuity versus change? Our data provide evidence for an inoculation effect associated with positive early experiences (Schaffer, 2000; Sroufe et al., 1990), in that those who experienced high quality early care appear to be less susceptible (in terms of their anxious-depressed symptom levels) to the effects of their later close relationship experiences. In sharp contrast, our results show that the impact of poor early caregiving on later internalizing symptoms comes into relief only when the quality of later romantic relationship experiences is considered. Identifying the psychological, physiological, and neurobiological mechanisms at the individual and dyadic levels that mediate these inoculation, amplification, and compensation effects are important directions for future research (Coan, 2008; Sbarra & Hazan, 2008).

Several additional findings highlighted the specificity and uniqueness of our findings. For example, the model testing young adult romantic quality as a moderator of early caregiving in predicting anxious-depressed symptoms provided a much better fit to the data than did a competing model that treated young adult work competence as a moderator. Moreover, the early caregiving by young adult romantic quality interaction effect remained significant when several possible confounds were statistically controlled, including romantic relationship stability in adulthood. Thus, the quality of young adult romantic relationships may set into motion certain intrapersonal changes that are not lost, even if the relationship ends. Moreover, our findings are not solely attributable to major relationship-related life events such as getting married or having a child. This lends further support to the premise that romantic relationships may uniquely alter the consequences of early caregiving for anxious-depressed symptom outcomes (Bowlby, 1988; Erikson, 1963; Hazan & Shaver, 1994).

## Limitations

This study has some limitations. To begin with, our sample size was relatively small, and our findings cannot necessarily be generalized to other non-risk samples. In addition, the number of participants who fell into the  $\pm 1$  *SD* illustrative groups plotted in Figure 1 was small (range 1-6). Thus, although our results can be interpreted in light of existing theories (e.g., Bowlby, 1988) and are conceptually consistent with evidence that later close relationship experiences (or representations of those experiences) may alter the consequences of early close relationship experiences (or representations of them) from both the human and non-human literatures (e.g., Harlow & Suomi, 1971; Treboux et al., 2004), replication in larger samples is needed. Furthermore, because our central research question focused on romantic relationships in young adulthood, we did not examine the anxious-depressed symptoms of single participants. Although dropout-control comparisons indicated that our participants were generally representative of the full MLSRA sample, single participants may be different than those who are in established relationships on other, unmeasured variables. Another limitation is the absence of data from participants' romantic relationship partners in early adulthood. Knowing more about participants' partners could provide a much clearer picture of how dyad members affect and are affected by one another.

## Conclusions

This longitudinal study is one of few prospective attempts to test whether romantic relationship experiences change the association between early caregiving and later adult anxious-depressed symptoms. We build on prior studies showing that internalizing symptoms and low quality romantic relationships in adulthood are partly a consequence of poor early caregiving experiences (Burbach & Bourduin, 1986; Conger, Cui, Bryant, & Elder, 2000; Moffitt et al., 2007; Overbeek et al., 2007; Roisman et al., 2005; Simpson et al., 2007). We find that low quality adult romantic relationship experiences may *amplify* the association between poor early caregiving and adult anxious-depressed symptoms. From a clinical perspective, these individuals may require therapeutic interventions that focus on both their developmentally-based and their relationship-based vulnerabilities to experiencing internalizing symptoms. On the other hand, our finding that individuals whose lower quality early caregiving experiences put them at greater risk for developing later anxious-depressed symptoms benefitted the *most* from a high quality romantic relationship experience in adulthood is optimistic. The relative invariance in adult anxious-depressed symptoms as a function of romantic quality for those who experienced high quality early caregiving suggests that these individuals may incur less harm when they encounter less favorable romantic relationships.

Longitudinal data provides a unique opportunity to address the critical question of whether cross-sectional effects change over time. Our results indicate that the initial differences in anxious-depressed symptoms associated with early caregiving and adult romantic quality persist over the nine-year period examined here, even after controlling for relationship stability, marriage and child birth, and additional factors. These stability findings, although not entirely anticipated, are a powerful demonstration that configurations of early and later close interpersonal experiences predict enduring patterns of adaptation.

In closing, the present research reaffirms the organizational-developmental principle that individual functioning is best understood as a product of one's developmental history in combination with later life events. The consequence of the quality of early interpersonal experiences on later anxious-depressed symptoms depends in part on the quality of young adult romantic relationships. Such findings contribute to our understanding of the legacy of early experience (Sroufe et al., 1990), and stimulate new avenues for research on the mechanisms underlying these effects.

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## References

- Achenbach, TM. Manual for the Young Adult Self-Report and Young Adult Behavior Checklist. University of Vermont Department of Psychiatry; Burlington, VT: 1997.
- Achenbach, TM. University of Vermont Department of Psychiatry; VT: 2003. Manual for the Adult Self-Report Burlington.
- Aiken, LS.; West, SG. Multiple regression: Testing and interpreting interactions. Sage; Newbury Park, CA: 1991.

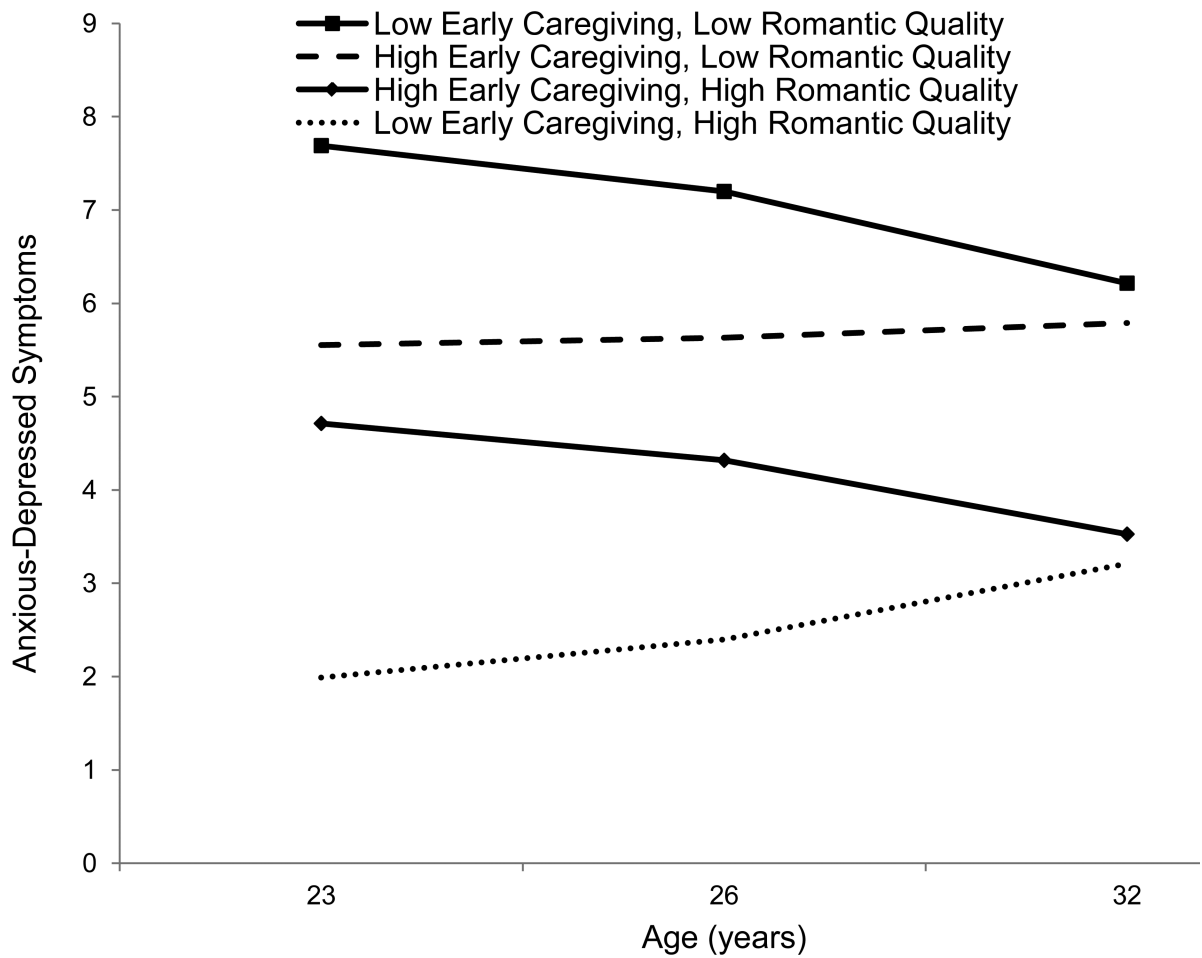
- Ainsworth, M.; Blehar, M.; Waters, E.; Wall, S. Patterns of attachment. Erlbaum; Hillsdale, NJ: 1978.
- Appleyard K, Egeland B, Sroufe LA. Direct social support for young high risk children: Relations with behavioral and emotional outcomes across time. *Journal of Abnormal Child Psychology*. 2007; 35:443–457. [PubMed: 17295063]
- Aron A, Aron EN, Paris M. Falling in love: Prospective studies of self-concept change. *Journal of Personality and Social Psychology*. 1995; 69:1102–1112.
- Bates, D.; Maechler, M. lme4: Linear mixed-effects models using S4 classes. 2010. <http://cran.r-project.org/web/packages/lme4/index.html>
- Beck, AT. Depression: Clinical, experimental and theoretical aspects. Staples; London: 1967.
- Beck AT, Ward C, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. *Archives of General Psychiatry*. 1961; 4:53–63.
- Blaney PH. Affect and memory: A review. *Psychological Bulletin*. 1986; 99:229–246. [PubMed: 3515383]
- Bowlby, J. Attachment and loss: Vol. 1. Attachment. Basic Books; New York: 1969/1982.
- Bowlby, J. Attachment and loss: Vol. 2. Separation: Anxiety and anger. Basic Books; New York: 1973.
- Bowlby, J. Basic Books; New York: 1980. Attachment and loss: Vol. 3. Loss: Sadness and depression..
- Bowlby, J. A secure base: Parent-child attachment and healthy human development. Basic Books; New York: 1988.
- Brock RL, Lawrence E. Marriage as a risk factor for internalizing disorders: Clarifying scope and specificity. *Journal of Consulting and Clinical Psychology*. 2011; 79:577–589. [PubMed: 21823784]
- Brown, GW.; Harris, TO. Social origins of depression: A study of psychiatric disorder in women. Tavistock; London: 1978.
- Burbach DJ, Bourduin CM. Parent-child relations and the etiology of depression: A review of methods and findings. *Clinical Psychology Review*. 1986; 6:133–153.
- Burnham KP, Anderson DR. Multimodel inference: Understanding AIC and BIC in model selection. *Sociological Methods and Research*. 2004; 33:261–304.
- Butcher, JN.; Dahlstrom, WG.; Graham, JR.; Tellegen, A.; Kaemmer, B. Manual for administration and scoring. University of Minnesota Press; Minneapolis: 1989. Minnesota Multiphasic Personality Inventory (MMPI-2)..
- Caldwell, B.; Heider, J.; Kaplan, B. The inventory of home stimulation. Paper presented at the American Psychological Association; New York: 1966.
- Cicchetti D. The emergence of developmental psychopathology. *Child Development*. 1984; 55:1–7. [PubMed: 6705613]
- Cicchetti D. Developmental psychopathology: Some thoughts on its evolution. *Development and Psychopathology*. 1989; 2:1–4.
- Coan, JA. Toward a neuroscience of attachment.. In: Cassidy, J.; Shaver, PR., editors. Handbook of attachment. 2nd ed.. Guilford Press; New York: 2008. p. 241-265.
- Cohen, J.; Cohen, P. Applied multiple regression/correlation analysis for the behavioral sciences. 2nd ed.. Erlbaum; Hillsdale, N.J.: 1983.
- Cohen, J.; Cohen, P.; West, SG.; Aiken, LS. Applied multiple regression/correlation analysis for the behavioral sciences. 3rd ed.. Lawrence Erlbaum Associates; Mahwah, New Jersey: 2003.
- Collins, WA.; Christian, S.; Englund, M.; Patterson, L.; Ruh, J.; Schwichtenberg, AJ.; Whaley, GJL.; Zimmer-Gembeck, M. Scales and coding manual for romantic relationship interviews. University of Minnesota; Minneapolis: 1999.
- Collins, WA.; van Dulmen, M. The significance of middle childhood peer competence for work and relationships in early adulthood.. In: Huston, A., editor. Successful pathways from middle childhood to adulthood. Cambridge University Press; New York: 2006. p. 23-40.
- Conger RD, Cui M, Bryant CM, Elder GH Jr. Competence in early adult romantic relationships: A developmental perspective on family influences. *Journal of Personality and Social Psychology*. 2000; 79:224–237. [PubMed: 10948976]

- Cook DR. Detection of influential observation in linear regression. *Technometrics*. 1977; 19:15–18.
- Coyne JC. Toward an interactional description of depression. *Psychiatry*. 1976; 39:14–27.
- Crowell JA, Treboux D, Waters E. Stability of attachment representations: The transition to marriage. *Developmental Psychology*. 2002; 38:467–479. [PubMed: 12090478]
- Derogatis, LR. SCL-90-R: Administration scoring and and procedures manual. National Computer Systems; Minneapolis, MN: 1977. 1994.
- Duggal S, Carlson EA, Sroufe LA, Egeland B. Depressive symptomatology in childhood and adolescence. *Development and Psychopathology*. 2001; 13:143–164. [PubMed: 11346049]
- Eberhart NK, Hammen CL. Interpersonal style, stress, and depression: An examination of transactional and diathesis-stress models. *Journal of Social and Clinical Psychology*. 2010; 29:23–38. [PubMed: 21052552]
- Edwards AC, Larsson H, Lichtenstein P, Kendler KS. Early environmental influences contribute to covariation between internalizing symptoms and alcohol intoxication frequency across adolescence. *Addictive Behaviors*. 2011; 36:175–182. [PubMed: 21051153]
- Edwards MC, Wirth RJ. Measurement and the study of change. *Research in Human Development*. 2009; 6:74–96.
- Erickson MF, Sroufe LA, Egeland B. The relationship between quality of attachment and behavior problems in preschool in a high-risk sample. *Monographs of the Society for Research in Child Development*. 1985; 50:147–166. [PubMed: 4069126]
- Erikson, E. *Childhood and society*. Norton; New York: 1963.
- Evenson RJ, Simon RW. Clarifying the relationship between parenthood and depression. *Journal of Health and Social Behavior*. 46:341–358. 2005. [PubMed: 16433280]
- Franz CE, Weinberger J, McClelland DC. Childhood antecedents of conventional social accomplishment in midlife adults: A 36-year prospective study. *Journal of Personality and Social Psychology*. 1991; 60:586–595.
- George, C.; Kaplan, N.; Main, M. University of California; Berkeley: 1985. *The Adult Attachment Interview.. Unpublished manuscript*
- Groh AM, Roisman GI, Van IJzendoorn MH, Bakermans-Kranenburg MJ, Fearon RP. The significance of insecure and disorganized attachment for children's internalizing symptoms: A meta-analytic study. *Child Development*. 2012; 83:591–610. [PubMed: 22235928]
- Hammen C. The generation of stress in the course of unipolar depression. *Journal of Abnormal Psychology*. 1991; 100:555–561. [PubMed: 1757669]
- Hammen C. Cognitive, life stress, and interpersonal approaches to a developmental psychopathology model of depression. *Development and Psychopathology*. 1992; 4:189–206.
- Harlow HF, Suomi SJ. Social recovery by isolation-reared monkeys. *Proceedings of the National Academy of Sciences of the United States of America*. 1971; 68:1534–1538. [PubMed: 5283943]
- Haydon KC, Collins WA, Salvatore JE, Simpson JA, Roisman GI. Shared and distinctive origins and correlates of adult attachment representations: The developmental organization of romantic functioning. *Child Development*. (online ahead of print).
- Hazan C, Shaver PR. Attachment as an organizational framework for research on close relationships. *Psychological Inquiry*. 1994; 5:1–22.
- Hofer MA. Hidden regulators in attachment, separation, and loss. *Monographs of the Society for Research in Child Development*. 1994; 59:192–207. [PubMed: 7984161]
- Horwitz AV, White HR, Howell-White S. The use of multiple outcomes in stress research: A case study of gender difference in responses to marital dissolution. *Journal of Health and Social Behavior*. 1996; 37:278–291. [PubMed: 8898498]
- Kagan J. Four questions in psychological development. *International Journal of Behavioral Development*. 1980; 3:231–231.
- Kendler KS, Gardner CO, Prescott CA. Toward a comprehensive developmental model for major depression in women. *American Journal of Psychiatry*. 2002; 159:1133–1145. [PubMed: 12091191]
- Laub JH, Sampson RJ. Turning points in the life course: Why change matters to the study of crime. *Criminology*. 1993; 31:301–325.



- Matas L, Arend RA, Sroufe LA. Continuity of adaptation in the second year: The relationship between quality of attachment and later competence. *Child Development*. 1978; 49:547–556.
- Mikulincer, M.; Florian, V. The relationship between adult attachment styles and emotional and cognitive reactions to stressful events.. In: Simpson, JA.; Rholes, WS., editors. *Attachment theory and close relationships*. Guilford; New York: 1998. p. 143-165.
- Mikulincer M, Shaver PR, Pereg D. Attachment theory and affect regulation: The dynamics, development, and cognitive consequences of attachment-related strategies. *Motivation and Emotion*. 2003; 27:77–102.
- Moffitt TE, Caspi A, Harrington H, Milne BJ, Melchior M, Golderberg D, Poulton R. Generalized anxiety disorder and depression: Childhood risk factors in a birth cohort followed to age 32. *Psychological Medicine*. 2007; 37:441–452. [PubMed: 17201999]
- Murray SL, Holmes JG, Griffin DW. The self-fulfilling nature of positive illusions in romantic relationships: Love is not blind, but prescient. *Journal of Personality and Social Psychology*. 1996; 71:1155–1180. [PubMed: 8979384]
- Nolen-Hoeksema S, Girgus JS. The emergence of gender differences in depression during adolescence. *Psychological Bulletin*. 1994; 115:424–443. [PubMed: 8016286]
- O'Connor TG. Early experiences and psychological development: Conceptual questions, empirical illustrations, and implications for intervention. *Development and Psychopathology*. 2003; 15:671–690. [PubMed: 14582936]
- Overbeek G, Stattin H, Vermulst A, Ha T, Engels R. Parent-child relationships, partner relationships, and emotional adjustment: A birth-to-maturity prospective study. *Developmental Psychology*. 2007; 43:429–437. [PubMed: 17352550]
- Pearlin LI, Johnson JS. Marital status, life-strains, and depression. *American Sociological Review*. 1977; 42:704–715. [PubMed: 931191]
- Preacher KJ, Curran PJ, Bauer DJ. Computational tools for probing interaction effects in multiple linear regression, multilevel modeling, and latent curve analysis. *Journal of Educational and Behavioral Statistics*. 2006; 31:437–448.
- Proulx CM, Helms HM, Buehler C. Marital quality and personal well-being: A meta-analysis. *Journal of Marriage and the Family*. 2007; 69:576–593.
- Quinton D, Pickles A, Maughan B, Rutter M. Partners, peers, and pathways: Assortative pairing and continuities in conduct disorder. *Development and Psychopathology*. 1993; 5:763–783.
- R Development Core Team. R: A language and environment for statistical computing. R Foundation for Statistical Computing; Vienna, Austria: 2010.
- Radloff L. The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*. 1977; 1:385–401.
- Raftery AE. Bayesian model selection in social research. *Sociological Methodology*. 1995; 25:111–163.
- Roisman GI, Aguilar B, Egeland B. Antisocial behavior in the transition to adulthood: The independent and interactive roles of developmental history and emerging developmental tasks. *Development and Psychopathology*. 2004; 16:857–871. [PubMed: 15704818]
- Roisman GI, Collins WA, Sroufe LA, Egeland B. Predictors of young adults' representations of and behavior in their current romantic relationship: Prospective tests of the prototype hypothesis. *Attachment & Human Development*. 2005; 7:105–121. [PubMed: 16096189]
- Rönkä A, Oravala S, Pulkkinen L. "I met this wife of mine and things got onto a better track" Turning points in risk development. *Journal of Adolescence*. 2002; 25:47–63. [PubMed: 12009749]
- Rusbult CE, Verette J, Whitney GA, Slovik LF, Lipkus I. Accommodation processes in close relationships: Theory and preliminary empirical evidence. *Journal of Personality and Social Psychology*. 1991; 60:53–78.
- Rutter M. Resiliency concepts and findings: Implications for family therapy. *Journal of Family Therapy*. 1999; 21:119–144.
- Rutter, M.; Quinton, D.; Hill, J. Adult outcome of institution-reared children: Males and females compared.. In: Robins, LN.; Rutter, M., editors. *Straight and devious pathways from childhood to adulthood*. Cambridge University Press; Cambridge: 1990. p. 135-157.

- Rutter M, Silberg J, O'Connor T, Simonoff E. Genetics and child psychiatry: II Empirical research findings. *Journal of Child Psychology and Psychiatry*. 1999; 40:19–55. [PubMed: 10102725]
- Rutter M, Sroufe LA. Developmental psychopathology: Concepts and challenges. *Development and Psychopathology*. 2000; 12:265–296. [PubMed: 11014739]
- Salvatore JE, Kuo SI, Steele R, Simpson JA, Collins WA. Recovering from conflict in romantic relationships: A developmental perspective. *Psychological Science*. 2011; 22:376–383. [PubMed: 21245491]
- Sameroff AJ. Developmental systems and psychopathology. *Development and Psychopathology*. 2000; 12:297–312. [PubMed: 11014740]
- Sampson RJ, Laub JH. Crime and deviance over the life course: The salience of adult social bonds. *American Sociological Review*. 1990; 55:609–627.
- Sampson, RJ.; Laub, JH. *Crime in the making: Pathways and turning points through life*. Harvard University Press; Cambridge, Massachusetts: 1993.
- Sbarra DA, Hazan C. Coregulation, dysregulation, self-regulation: An integrative analysis and empirical agenda for understanding adult attachment, separation, loss, and recovery. *Personality and Social Psychology Review*. 2008; 12:141–141. [PubMed: 18453476]
- Schaffer HR. The early experience assumption: Past, present, and future. *International Journal of Behavioral Development*. 2000; 24:5–14.
- Schore AN. Effects of a secure attachment relationship on right brain development, affect regulation, and infant health. *Infant Mental Health Journal*. 2001; 22:7–66.
- Schore AN. Back to basics: Attachment, affect regulation, and the developing right brain: Linking developmental neuroscience to pediatrics. *Pediatrics in Review*. 2005; 26:204–204. [PubMed: 15930328]
- Schwarz G. Estimating the dimension of a model. *Annals of Statistics*. 1978; 6:461–464.
- Sears, RR.; Maccoby, EE.; Levin, H. *Patterns of child-rearing*. Row, Peterson; Evanston, IL: 1957.
- Simpson JA, Collins WA, Tran S, Haydon KC. Attachment and the experience and expression of emotions in romantic relationships: A developmental perspective. *Journal of Personality and Social Psychology*. 2007; 92:355–367. [PubMed: 17279854]
- Sroufe, LA.; Egeland, B.; Carlson, EA.; Collins, WA. *The development of the person: The Minnesota Study of Risk and Adaptation from Birth to Adulthood*. Guilford Press; New York: 2005.
- Sroufe LA, Egeland B, Kreutzer T. The fate of early experience following developmental change: Longitudinal approaches to individual adaptation in childhood. *Child Development*. 1990; 61:1363–1373. [PubMed: 2245730]
- Toth SL, Manly JT, Cicchetti D. Child maltreatment and vulnerability to depression. *Development and Psychopathology*. 1992; 4:97–112.
- Treboux D, Crowell JA, Waters E. When “new” meets “old”: Configurations of adult attachment representations and their implications for marital functioning. *Developmental Psychology*. 2004; 40:295–314. [PubMed: 14979768]
- van Buuren, S.; Groothuis-Oudshoorn, K. *mice: Multivariate imputation by chained equations*. R package version 1.21. 2009. from <http://CRAN.R-project.org/package=mice>
- van IJzendoorn MH, Bakermans-Kranenburg MJ. Attachment representations in mothers, fathers, adolescents, and clinical groups: A meta-analytic search for normative data. *Journal of Consulting and Clinical Psychology*. 1996; 64:8–21. [PubMed: 8907080]
- Whisman, MA. The association between depression and marital dissatisfaction.. In: Beach, SRH., editor. *Marital and family processes in depression: A scientific foundation for clinical practice*. American Psychological Association; Washington, D.C.: 2001. p. 3-24.
- Whisman MA, Uebelacker LA, Weinstock LM. Psychopathology and marital satisfaction: The importance of evaluating both partners. *Journal of Consulting and Clinical Psychology*. 2004; 72:830–838. [PubMed: 15482041]
- Zoccolillo M, Pickles A, Quinton D, Rutter M. The outcome of childhood conduct disorder: Implications for defining adult personality disorder and conduct disorder. *Psychological Medicine*. 1992; 22:971–986. [PubMed: 1488492]



**Figure 1.** Predicted anxious-depressed symptoms as a function of early caregiving and romantic quality configurations.

**Table 1**

YASR and ASR items included in the anxious-depressed symptom composite

Item Number	Item Description
12	Lonely
13	Confused
14	Cries a lot
22	Worries about future
31	Fears doing bad
33	Feels unloved
35	Feels worthless
45	Nervous, tense
47	Lacks self-confidence
50	Fearful, anxious
52	Feels too guilty
71	Self-conscious
103	Unhappy, sad, depressed
112	Worries
YASR 116/ASR 113	Worries about relations with opposite-sex

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Table 2

Descriptive statistics and zero-order correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
<i>M</i>	0.53	0.11	0.00	0.01	3.05	0.68	37.02	5.20	6.20	5.07	0.44	0.56	0.73	0.20	0.31	0.45	0.42	
<i>SD</i>	--	0.63	0.66	0.88	1.34	--	24.41	4.61	5.31	4.77	--	--	--	--	--	--	--	
Correlations																		
1	--	0.09	0.19 <sup>†</sup>	0.03	-0.06	0.22 <sup>*</sup>	0.16	0.21 <sup>*</sup>	0.02	0.09	-0.03	0.08	0.06	0.11	0.13	0.04	0.02	
2	--	--	-0.07	0.20 <sup>†</sup>	0.27 <sup>*</sup>	-0.15	-0.10	-0.04	-0.02	-0.04	-0.25 <sup>*</sup>	-0.33 <sup>**</sup>	-0.35 <sup>**</sup>	-0.04	0.13	0.12	-0.02	
3	--	--	--	-0.14	-0.07	0.07	0.13	0.13	0.03	0.06	0.06	0.05	0.14	0.06	-0.07	-0.01	-0.11	
4	--	--	--	--	0.25 <sup>*</sup>	-0.05	-0.09	-0.40 <sup>**</sup>	-0.18 <sup>†</sup>	-0.33 <sup>**</sup>	-0.15	-0.16	-0.25 <sup>*</sup>	-0.01	0.26 <sup>*</sup>	0.26 <sup>*</sup>	0.30 <sup>**</sup>	
5	--	--	--	--	--	-0.16	-0.12	-0.09	-0.08	-0.05	-0.22 <sup>*</sup>	-0.30 <sup>**</sup>	-0.20 <sup>†</sup>	0.02	0.14	0.35 <sup>**</sup>	0.08	
6	--	--	--	--	--	--	0.33 <sup>**</sup>	0.18 <sup>†</sup>	0.07	0.01	0.20 <sup>†</sup>	0.27 <sup>*</sup>	0.18 <sup>†</sup>	0.35 <sup>**</sup>	0.07	0.06	0.11	
7	--	--	--	--	--	--	--	0.13	0.16	0.18 <sup>†</sup>	0.33 <sup>**</sup>	0.25 <sup>*</sup>	0.27 <sup>*</sup>	0.26 <sup>*</sup>	0.08	0.04	0.31 <sup>**</sup>	
8	--	--	--	--	--	--	--	--	0.63 <sup>**</sup>	0.64 <sup>**</sup>	-0.15	0.04	0.11	0.10	0.05	0.05	-0.06	
9	--	--	--	--	--	--	--	--	--	0.53 <sup>**</sup>	-0.11	-0.09	-0.05	0.18 <sup>†</sup>	0.03	0.09	0.04	
10	--	--	--	--	--	--	--	--	--	--	-0.11	0.03	0.00	0.05	-0.01	-0.08	-0.06	
11	--	--	--	--	--	--	--	--	--	--	--	0.77 <sup>**</sup>	0.51 <sup>**</sup>	0.25 <sup>*</sup>	0.06	-0.11	0.09	
12	--	--	--	--	--	--	--	--	--	--	--	--	0.68 <sup>**</sup>	0.24 <sup>*</sup>	0.07	-0.08	0.09	
13	--	--	--	--	--	--	--	--	--	--	--	--	--	0.31 <sup>**</sup>	0.24 <sup>*</sup>	0.13	0.19 <sup>†</sup>	
14	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.36 <sup>**</sup>	0.28 <sup>**</sup>	0.14	
15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.54 <sup>**</sup>	0.54 <sup>**</sup>	
16	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.51 <sup>**</sup>	

Notes. Variable key: [1] Gender [2] Early Caregiving [3] Maternal Depressive Symptoms [4] Romantic Quality [5] Work Competence [6] Living with partner (Age 23) [7] Relationship Length (Age 23) [8] Anxious-Depressed Symptoms (Age 23) [9] Anxious-Depressed Symptoms (Age 26) [10] Anxious-Depressed Symptoms (Age 32) [11] Child Status (Age 23) [12] Child Status (Age 26) [13] Child Status (Age 32) [14] Marital Status (Age 23) [15] Marital Status (Age 26) [16] Marital Status (Age 32) [17] Relationship Stability Age 23-32. *SDs* were not calculated for dichotomous variables and are marked in that row with dashes.

<sup>†</sup> *p* < .10.

<sup>\*</sup> *p* < .05.

\*\*  
 $p < .01$ .

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**Table 3**

Linear mixed model predicting anxious-depressed symptoms (ages 23, 26, and 32) as a function of early caregiving and age 23 romantic quality.

Variable	<i>B</i>	<i>SE B</i>	<i>t(N</i> <sup>*</sup> <i>)</i>	95% CI
Intercept	5.75 **	1.60	3.61 (279)	[2.63, 8.88]
Gender	0.92	0.83	1.11 (279)	[-0.70, 2.55]
Time (years)	-0.03	0.06	-0.59 (279)	[-0.14, 0.08]
Early Caregiving	0.93	2.41	0.38 (279)	[-3.80, 5.65]
Age 23 Romantic Quality	-2.81 <sup>†</sup>	1.71	-1.65 (279)	[-6.16, 0.53]
Early Caregiving				
* Time	-0.03	0.09	-0.35 (279)	[-0.20, 0.14]
Age 23 Romantic Quality				
* Time	0.04	0.06	0.66 (279)	[-0.08, 0.16]
Early Caregiving				
* Age 23 Romantic Quality	6.91 **	2.88	2.40 (279)	[1.25, 12.56]
Early Caregiving				
* Age 23 Romantic Quality				
* Time	-0.21 *	0.10	-1.97 (279)	[-0.41, 0.00]

<sup>†</sup>*p* < .10.

\* *p* .05.

\*\* *p* < .01.

**Table 4**

Linear mixed model predicting anxious-depressed symptoms (ages 23, 26, and 32) as a function of early caregiving and age 23 romantic quality, including control variables.

Variable	<i>B</i>	<i>SE B</i>	<i>t(N</i> <sup>*</sup> <i>)</i>	95% CI
Intercept	3.84 <sup>†</sup>	2.18	1.76 (279)	[-0.43, 8.11]
Gender	0.68	0.87	0.78 (279)	[-1.03, 2.38]
Time (years)	0.02	0.08	0.23 (279)	[-0.13, 0.17]
Maternal Depressive Symptoms	-0.05	0.64	-0.07 (279)	[-1.31, 1.21]
Child Status	-1.50 <sup>*</sup>	0.72	-2.09 (279)	[-2.91, -0.09]
Marital Status	-0.15	0.68	-0.23 (279)	[-1.50, 1.19]
Early Caregiving	0.83	2.42	0.34 (279)	[-3.92, 5.57]
Age 23 Romantic Quality	-2.81	1.81	-1.56 (279)	[-6.35, 0.73]
Living with Partner (Age 23)	0.23	0.97	0.24 (279)	[-1.66, 2.13]
Relationship Length (Age 23)	0.04 <sup>†</sup>	0.02	1.81 (279)	[0.00, 0.07]
Relationship Stability (Ages 23-32)	0.46	3.25	0.14 (279)	[-5.91, 6.84]
Relationship Stability (Ages 23-32)	-0.01	0.12	-0.07 (279)	[-0.24, 0.22]
* Time				
Early Caregiving	-0.03	0.09	-0.36 (279)	[-0.20, 0.14]
* Time				
Age 23 Romantic Quality	0.04	0.07	0.58 (279)	[-0.09, 0.17]
* Time				
Early Caregiving	6.43 <sup>*</sup>	2.92	2.20 (279)	[0.71, 12.16]
* Age 23 Romantic Quality				
Early Caregiving				
* Age 23 Romantic Quality	-0.18 <sup>†</sup>	0.10	-1.74 (279)	[-0.39, 0.02]
* Time				

<sup>†</sup>*p* < .10.

\* *p* < .05.