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Continuities and changes in infant attachment patterns across two generations

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This study examined the intergenerational continuities and changes in infant attachment patterns within a higher-risk longitudinal sample of 55 female participants born into poverty. Infant attachment was assessed using the Strange Situation when participants were 12 and 18 months as well as several decades later with participants' children. Paralleling earlier findings from this sample on the stability of attachment patterns from infancy to young adulthood, results provided evidence for intergenerational continuities in attachment disorganization but not security. Children of adults with histories of infant attachment disorganization were at an increased risk of forming disorganized attachments. Although changes in infant attachment patterns across the two generations were not correlated with individuals' caregiving experiences or interpersonal stresses and supports during childhood and adolescence, higher quality social support during adulthood was associated with intergenerational changes from insecure to secure infant–caregiver attachment relationships.

Keywords: infant attachment security; infant attachment disorganization; continuity and change; intergenerational transmission; social support

Continuities and changes in infant attachment patterns across two generations

One longstanding question within attachment theory and research concerns the extent to which attachment patterns demonstrate continuity or change across development and across generations (Bowlby, 1988; Crittenden & Ainsworth, 1989; Grossman, Grossman, & Waters, 2005; Main, Kaplan, & Cassidy, 1985; van IJzendoorn & Bakermans-Kranenburg, 1997). Infants are thought to develop internal working models regarding their caregiver's availability and responsiveness based on their history of infant–caregiver interactions, and these mental models help organize infants' attachment behaviors during threatening situations (Bowlby, 1969/1982). For example, the behavioral strategy characteristic of attachment security – seeking proximity with the caregiver when distressed and effectively using the caregiver for comfort – is thought to reflect the infant's expectations that their caregiver is capable of meeting their needs. Importantly, these early attachment-relevant representations are believed to be relatively stable across development and involved in organizing individuals' behavior within subsequent close relationships. Attachment representations formed early in life may be especially influential when interacting with one's own children as an adult (Kovan, Chung, & Sroufe, 2009; Sroufe & Fleeson, 1986), thereby setting the stage for the transmission of attachment patterns into the next generation.

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To date, research into the intergenerational processes related to attachment has been divided across (a) longitudinal studies of the stability of attachment patterns from infancy to young adulthood (Fraley, 2002; Groh et al., 2014; Pinquart, Feußner, & Ahnert, 2013; Waters, Merrick, Treboux, Crowell, & Albersheim, 2000) and (b) investigations into the degree to which adults' attachment states of mind predict infant attachment patterns in the next generation (van IJzendoorn, 1995). Although these findings suggest that attachment representations may be transmitted across generations, prospective longitudinal data about whether there are intergenerational continuities in the quality of infant–caregiver attachment relationships remain missing.

The primary aim of the current study was to examine intergenerational continuities and changes in infant attachment patterns using data from the Minnesota Longitudinal Study of Risk and Adaptation (MLSRA; Sroufe, Egeland, Carlson, & Collins, 2005), an ongoing 37-year longitudinal study of the development of children born into poverty. Prior investigations with the MLSRA indicated there was a relatively modest association between attachment security observed during infancy and the security of individuals' attachment representations during adulthood. More specifically, the test-retest stability estimate of security from infancy to young adulthood within the MLSRA is equivalent to a correlation of approximately .15 (Raby, Cicchetti, Carlson, Egeland, & Collins, 2013; Weinfield, Whaley, & Egeland, 2004). Based on these findings, we anticipated that the intergenerational continuities infant attachment security would be relatively small in overall magnitude within the MLSRA.

In contrast, we expected that infant attachment disorganization would exhibit stronger intergenerational stability. Attachment disorganization is characterized by contradictory, confused, or dysregulated infant attachment behaviors and is thought to reflect a breakdown in the infants' strategies for organizing their attachment behavior resulting from experiencing frightening or chaotic caregiving (Carlson, 1998; Cyr, Euser, Bakermans-Kranenburg, & van IJzendoorn, 2010; Main & Soloman, 1990). These disturbances in infant–caregiver attachment relationships are thought to be especially harmful for children's later development. Indeed, within the MLSRA infant attachment disorganization has proven to be a powerful early predictor of problematic adjustment during adolescence and early adulthood. For example, infant attachment disorganization predicts unresolved states of mind with regard to prior experiences of abuse at age 19 (r = .48; Weinfield et al., 2004). Moreover, infant attachment disorganization has been observed to predict psychopathology outcomes such as overall history of psychopathology during adolescence (r = .34; Carlson, 1998), dissociative tendencies during late adolescence (r = .36; Carlson, 1998), and borderline personality symptoms during adulthood (r = .20; Carlson, Egeland, & Sroufe, 2009). Because these outcomes have also been associated with infant attachment disorganization in the next generation (Madigan et al., 2006; van IJzendoorn, Schuengel, & Bakermans–Kranenburg, 1999), we expected to observe intergenerational continuities in infant attachment disorganization.

The second goal of this study was to investigate the potential sources of changes in infant–caregiver relationships across generations. Attachment scholars predict that developmental changes in attachment patterns represent adaptations that are lawfully related to relationship experiences during the intervening years (Bowlby, 1969/1982; Sroufe, 1979). Available longitudinal research has provided relatively consistent evidence that developmental changes in attachment patterns are indeed associated with the child's later caregiving experiences, including parental sensitivity and maltreatment

during childhood and adolescence (Beijersbergen, Juffer, Bakermans-Kranenburg, & van IJzendoorn, 2012; Booth-LaForce et al., 2014; Weinfield et al., 2004). Retrospective studies also suggest that emotional support from a caregiver other than the primary attachment figure may promote changes toward security for individuals with insecure attachment histories (Saunders, Jacobvitz, Zaccagnino, Beverung, & Hazen, 2011; see also Egeland, Jacobvitz, & Sroufe, 1988). In addition, experiences that have the potential to disrupt or promote healthy family relationships, including stressful life events, maternal depression, and parents' social support resources, have also been observed to predict changes in attachment security (Booth-LaForce et al., 2014; Hamilton, 2000; Waters et al., 2000; Weinfield et al., 2004; Zimmermann, Fremmer-Bombik, Spangler, & Grossmann, 1997). Altogether, these results indicate that individuals who have higher quality interpersonal interactions with parents or other social support figures and experience fewer interpersonal stresses during childhood and adolescence are more likely to become or remain secure compared to individuals who experienced more relationship hardships during the intervening years. In this study, we investigated whether these same factors also account for intergenerational changes in infant attachment patterns.

Prior research has focused almost entirely on the role of experiences within the family of origin during childhood and adolescence in accounting for changes in attachment. As a result, factors during adulthood have received scarce empirical attention. That said, research into the intergenerational continuities and changes of adults' parenting behaviors – which are the principal determinant of the quality of the infant–caregiver attachment relationship (Ainsworth, Blehar, Waters, & Wall, 1978; Bernard et al., 2012; De Wolff & van IJzendoorn, 1997; Raby et al., 2012) – has highlighted the importance of adults' current social ecology and psychological resources for understanding changes in parenting across generations. Specifically, adults who receive higher quality social support, experience fewer stressors, and report fewer mental health problems are more likely to show improvements in parenting quality across generations (Egeland et al., 1988; Thornberry et al., 2013). In light of these findings, we hypothesized that social support, life stress, and mental health during adulthood would also contribute to intergenerational changes in infant attachment. Lastly, based on the prior research on the intergenerational associations between parents' and infants' attachment patterns (van IJzendoorn, 1995), we investigated the role of adults' attachment states of mind in accounting for changes in infant attachment across generations.

Altogether, the twofold purpose of the present study was to examine the intergenerational continuities and explore the sources of change in infant attachment patterns using a prospective, longitudinal research design. In this way, the current study builds on prior findings from the MLSRA as well as other longitudinal projects that have focused on stability and change in attachment within a single generation (e.g., Booth-LaForce et al., 2014; Raby et al., 2013; Waters et al., 2000; Weinfield et al., 2004). MLSRA participants completed assessments of attachment quality during infancy, and measures of their experiences with caregivers and interpersonal stresses and resources were repeatedly collected during childhood and adolescence. Beginning in late adolescence, MLSRA participants also completed assessments with their own children, including an assessment of the quality of the infant–caregiver attachment relationship. As such, the MLSRA offers a unique opportunity for investigating both presence of continuity and sources of change in infant attachment patterns across two generations.

Method

Participants

Between 1975 and 1977, pregnant mothers who were living below the poverty line and receiving prenatal services through the local health department in Minneapolis, Minnesota, were recruited for enrollment in the MLSRA. At the time of their child's birth, 48% of the mothers were teenagers, 65% were not married, and 42% had completed less than a high school education. The subsample used in this study consisted of 55 female participants who have been followed from infancy into adulthood and participated in an assessment of second-generation (G2) infant attachment quality. Although G2 data were collected for 56 participants, first-generation (G1) infant attachment data were not available for one participant. Only female participants were invited to complete the G2 infant attachment assessment in order to ensure that the adult participants were serving as attachment figures for their children. This subsample did not significantly differ from the original sample (N = 267) with respect to maternal age, marital status, or maternal education at the time of the original participants' births.

Within this subsample, 67% of the participants were White/non-Hispanic, 20% were multiracial, 9% were African American, and less than 1% were Hispanic or Asian American. At the time of the G2 assessments, participants' ages ranged from 16 to 36 years (M = 24.2, SD = 5.0), 37% were in marital relationships, and 25% had received less than a high-school education (34% had graduated from high school or received their GED, 29% had attended some college, 9% had received a four-year college degree, and 4% had received a post-baccalaureate degree). Participants reported that 12% of the fathers had received less than a high-school education, 30% had graduated from high school or received their GED, 29% had attended some college, 12% had received a four-year college degree, and 6% had received a post-baccalaureate degree. Household SES was measured using Duncan's Socioeconomic Index (Stevens & Featherman, 1981), a widely used indicator of occupational ranking with a theoretical range of 0–100, and scores were between 10.0 and 80.5 (M = 28.7, SD = 18.8). Mothers' age, marital status, parents' educational attainment, and household SES at the time of the G2 assessments were not significantly associated with G2 infant attachment security or disorganization. Among the G2 children, 95% percent were first-born, and 32% were female.

Measures

Infant attachment

In the first generation (G1), the quality of the infant–caregiver attachment relationship was assessed when infants were 12 and 18 months old using the Strange Situation procedure (Ainsworth et al., 1978). Videotaped observations of the child's behavior were first coded using the interactive behavior ratings for proximity seeking, contact maintenance, attachment avoidance, and resistance. Based on those ratings, children were classified according to the organized patterns of securely attached, insecure-avoidant, or insecure-resistant. Independent teams coded the attachment assessments at 12 and 18 months with high interrater agreement at each assessment (89% and 93%, respectively). Within this subsample, 66% were classified as securely attached, 21% were insecure-avoidant, and 13% were insecure-resistant at 12 months. At 18 months, 56% were classified as secure, 28% were insecure-avoidant, and 16% were insecure-resistant. Attachment classifications from the 12- and 18-month assessments were combined using a series of decision rules first described by Weinfield, Sroufe, and Egeland (2000). Specifically, if only one attachment

assessment was completed (either 12- or 18-months), that classification was used (n = 7). If the attachment classification was the same at both 12- and 18-months, that classification was used (n = 24). If the classifications differed at the two assessments, a single classification was determined using a 24-month assessment as a deciding factor (n = 24; see Gove, 1983, for more information about the 24-month assessment).

All videotapes still available and of sufficient quality for coding were rated for attachment disorganization at a later time (see Carlson, 1998, for more information about coding attachment disorganization in the MLSRA). Within this subsample, this included 40 individuals. Trained coders used the 9-point infant attachment disorganization/disorientation rating scale described by Main and Soloman (1990; M = 4.0, SD = 2.0). Infants were classified as disorganized if they received a score of 5 or higher at either the 12- or 18-month assessment (38%). Interrater agreement was based on a subset of 35 cases from the total sample and was high (κ = .72).

G2 infant attachment quality was also assessed using the Strange Situation procedure. G2 infants' ages ranged from 12 month to 21 months (M = 13.9, SD = 2.0). As with the G1 assessments, infants' attachment behaviors were coded using the interactive behavior rating scales and infants were then classified according to the organized patterns of securely attached (69%), insecure-avoidant (20%), or insecure- resistant (7%). Two G2 cases (4%) could not be classified according to the organized patterns. These cases were omitted for the 3-way analyses but were coded as insecure for the 2-way (secure vs. insecure) analyses. Attachment disorganization was rated using the 9-point infant attachment disorganization/disorientation scale (M = 3.7, SD = 1.9), and infants were classified as disorganized if they received a score of 5 or higher (29%). For the G2 observations, interrater agreement was based on 11 cases and was 72% (κ = .58) for the three organized categories and 100% (κ = 1.00) for disorganization classifications.

Maternal sensitivity

Observations of mother–child interactions were collected at multiple ages during infancy, childhood, and adolescence. For the purpose of these analyses, only those observations collected after the G1 infant attachment assessments were used. When participants were 24 months and 42 months, mother–child interactions were observed in a laboratory while children attempted to solve a series of tasks that gradually increased in complexity, ultimately becoming too difficult for the child to complete independently. Mothers were instructed to first allow the child to try to independently solve each task and then to give the child any help they thought was needed. When participants were 13 years old, adolescent participants and their parents were observed completing a set of collaborative problem-solving tasks. At each of these three assessments, the extent to which each mother was positively engaged while interacting with her child and helped the child feel comfortable with the task by providing a secure base was assessed with a 7-point rating of each mother's supportive presence. Interrater reliability estimates (intraclass correlations) for the three supportive presence ratings were between .84 and .89. When participants were 30 and 72 months, maternal caregiving quality was assessed using the Home Observation for Measurement of the Environment (HOME; Caldwell & Bradley, 1984), which measures the quality of the child's home environment based on naturalistic home observations and semi-structured interview questions. The emotional and verbal responsivity sub-scale from the HOME indexed the extent to which the mother recognized and appropriately responded to the child's behavior at 30 months (11 items; α = .72) and at 72 months (six items; α = .68).

A principal components analysis of the five maternal sensitivity ratings collected between 24 months and 13 years indicated that only one component had an eigenvalue greater than 1. This single component accounted for 46% of the variance in the ratings of maternal sensitivity, and loadings ranging from .56 to .74. Based on these results, the seven observational ratings were standardized and averaged to create a composite measure reflecting each individual's experiences of sensitive maternal care during childhood and early adolescence ($\alpha = .70$).

Relationship with an alternative caregiver

As described by Appleyard, Egeland, and Sroufe (2007), direct social support provided to participants during early childhood was rated based on interviews with mothers when children were 12, 18, 30, 42, 54, and 64 months. Ratings of the overall quality of the relationship between an alternative caregiver who was not the primary caregiver and the child were used in the present study. Ratings were completed using a 7-point scale that focused on the emotional tone of the mother–child interactions, the depth of the caregiver's involvement in the child's life, and the child's feelings about the caregiver. Interrater reliability (intraclass correlation) was .94. As reported by Appleyard et al. (2007), alternative caregivers most frequently were the biological fathers or a father figure, grandparents, or other relatives. Within this subsample, ratings were not completed for two individuals because insufficient information was available in order to confidently assign scores.

Childhood maltreatment

Children's experiences of maltreatment was regularly assessed using information from a number of sources, including direct observations in the home and lab, interviews with mothers and other caregivers, reviews of child protection and medical records when available, and teacher interviews. Maltreatment included acts of commission (physical, sexual, and verbal abuse) as well as acts of omission (neglect and psychological unavailability) that occurred prior to age 18. For the purpose of these analyses, maltreatment status was coded dichotomously (0 = no clear evidence of maltreatment, 1 = child experienced maltreatment at any point). Within this subsample, 27 individuals (50%) were classified as having experienced maltreatment. One individual was missing too much data in order to make a confident decision regarding maltreatment status.

Maternal depression

During G1, maternal depression was assessed using two standard self-report measures of depressive symptomatology: the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) and the Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977). For both measures, higher scores are indicative of increased levels of maternal depression. Participants' mothers completed the CES-D when the participants were 48 months, 16 years, and 17.5 years and completed the BDI when the participants were in second grade and third grade. Within each age, the internal consistency values ranged from .85 to .86. Total scores from the CES-D and BDI were standardized and averaged to create a composite measure of G1 maternal depression ($\alpha = .79$).

As part of the G2 assessment, adult participants completed the CES-D. The internal consistency estimate was .91. One participant did not complete the G2 CES-D.

Maternal life stress

Maternal life stress was assessed using the Life Events Scale (Egeland & Deinard, 1975), which was adapted for use with a high-risk sample from Cochrane and Robertson's (1973) Life Events Inventory. In both generations, mothers completed an interview that included questions related to the occurrence and impact of a multitude of stressful events, including trouble with family, neighbors, romantic partners, work, living situation, health, and crime. Trained raters scored each interview, and a final score was calculated by summing all the coded items. Higher scores indicate a higher quantity of stressful life events.

Although maternal life stress was repeatedly assessed within G1, only those observations collected after the G1 infant attachment assessments were used for the purpose of these analyses. This included when participants were 30, 42, 48, 54, and 64 months; during grades 1, 2, 3, and 6; and ages 16 and 17. As reported by Weinfield et al. (2000), interrater reliability estimates (Pearson correlations) for the total life stress scores ranged from .86 to. 96. The scores from these 11 assessments were standardized to ensure equal scaling and then averaged to create a composite measure of G1 maternal life stress ($\alpha = .79$).

As part of the G2 assessment, participants completed the life stress interview. Interrater reliability (intraclass correlation) was based on 12 randomly selected cases and was .97.

Maternal social support

In both generations, mothers completed interviews designed to elicit information about the quality and extent of their social support. The stability and quality of the mother's relationship with the child's biological father and, when different, husband/boyfriend was taken into consideration, as well as the support available from family members, friends, and outside agencies (e.g., religious institutions or psychotherapy). Trained coders rated the overall quality of emotional support available to the mother from her entire social support network using a 7-point scale. Low scores indicated that there was a total absence of any kind of support leaving the mother almost entirely isolated, and higher scores reflected a highly consistent, diverse support network of people who cared about the mother and were proactive in their efforts to ensure her well being. Prior MLSRA findings have demonstrated that this measure predicted mothers' caregiving quality and children's development adaptation during G1 (e.g., Yates, Obradović, & Egeland, 2010).

Social support ratings collected after the G1 infant attachment assessments were used for the current study, including when participants were 24, 30, 42, 48, 54, and 64 months, and grades 1, 2, 3, and 6. As reported by Van Ryzin, Carlson, and Sroufe (2011), the exact agreement or one-point discrepancy between independent raters averaged 84%. Ratings from these 10 assessments were standardized to ensure equal scaling and averaged to create a composite measure of G1 maternal social support ($\alpha = .84$).

During adulthood, participants' social support quality was also rated using the same 7-point scale based on interviews completed at the time of the G2 infant attachment assessment. All G2 ratings were double-coded, and disagreements were resolved via conference. Interrater reliability (intraclass correlation) for the pre-conference scores was .91.

Adult attachment

Participants completed the Adult Attachment Interview (AAI) at ages 19 and 26. During this semi-structured interview, participants were asked to provide an overall description of their attachment-related childhood experiences, provide specific memories that support these general portrayals, revisit episodes of separation and rejection, and evaluate the influence of these experiences on their development and current functioning. Following Main and Goldwyn's (1998) guidelines, AAI narratives were rated on a set of 9-point scales designed to capture each individual's state of mind with regard to their childhood attachment-related experiences. The coherence of mind was used in the current analyses since this rating provides an overall measure of the extent to which individuals discuss and freely evaluate their attachment-related experiences in an organized and emotionally contained manner. This rating is commonly used as a dimensional measure of the security of adults' attachment representations (e.g., Raby et al., 2013). Interrater reliability was based on a sample of 48 randomly selected cases at age 19 and 44 cases at age 26, and the intraclass correlations (two-way random effects, average measures) for coherence of mind ratings at age 19 and age 26 were .81 and .87, respectively.

For the purpose of these analyses, information from the AAI that temporally preceded the G2 infant attachment assessment, if available, was selected. This involved the age 19 AAI for 23 individuals and the age 26 AAI for 22 individuals. In order to maximize the sample size, age 19 AAI information was selected for the six individuals who completed the G2 assessment prior to age 19, and age 26 AAI information was selected for the four individuals who completed the G2 assessment before age 26 but did not complete an AAI at age 19. For this subsample, the coherence of mind scores ranged between one and eight (M = 4.0, SD = 1.7).

Results

Intergenerational continuities in infant attachment quality

Chi-squared tests were used to evaluate the continuities in infant attachment patterns across the two generations. The intergenerational association in the organized infant attachment patterns was positive but small in overall magnitude and not statistically different from zero (see Table 1). The intergenerational association was not statistically significant when the insecure-avoidant and insecure-resistant patterns were combined into a single insecure category: $\chi^2(1, N = 55) = .07$, $p = .79$, $r = .04$. Follow-up tests examining intergenerational associations with the 3-way and 2-way classifications from the 12-month and 18-month G1 assessments separately were not significant (ps between

Table 1. Intergenerational continuities of infant attachment security.

First-generation infant attachment classifications	Second-generation infant attachment classifications		
	Avoidant (A)	Secure (B)	Resistant (C)
Avoidant (A)	3 (1.5)	4 (5.0)	0 (0.5)
Secure (B)	6 (7.5)	26 (25.8)	4 (2.7)
Resistant (C)	2 (2.1)	8 (7.2)	0 (0.8)

Note: $\chi^2(4, N = 53) = 4.13$, $p = .39$. Values represent observed frequencies. Expected frequencies are in parentheses.

Table 2. Intergenerational continuities of infant attachment disorganization.

First-generation infant attachment classifications	Second-generation infant attachment classifications	
	Organized	Disorganized
Organized	20 (16.9)	5 (8.1)
Disorganized	7 (10.1)	8 (4.9)

Note: $\chi^2(1, N = 40) = 4.75$, $p = .03$, $r = .35$. Values represent observed frequencies. Expected frequencies are in parentheses.

.23 and .92). In order to ensure that these non-significant results were not due to low statistical power resulting from the use categorical measures of infant attachment, the associations between the interactive behavior ratings during G1 (average of 12- and 18-months) and G2 were examined. For all four rating scales, the associations were not statistically significant (proximity seeking: $r = -.01$, $p = .97$; contact maintenance: $r = -.23$, $p = .09$; avoidance: $r = .18$, $p = .19$; resistance: $r = -.04$, $p = .77$).

In contrast, infant attachment disorganization during G1 significantly predicted G2 infant attachment disorganization (see Table 2). G2 infants were significantly more likely to form disorganized attachment relationships if their parents had histories of disorganized infant–caregiver attachments. When infant attachment disorganization was represented by the highest disorganization rating at 12 and 18 months during G1 and the overall disorganization rating during G2, the intergenerational association approached statistical significance: $r = .31$, $p = .057$.

Correlates of change in infant attachment quality

A set of planned comparisons was conducted to evaluate whether participants' caregiving experiences and interpersonal stresses and supports during childhood and early adolescence accounted for the observed changes in infant attachment patterns. Specifically, participants who were insecurely attached during infancy but whose children formed secure attachments to them were compared to participants who had insecure infant–caregiver attachment relationships in both generations. Similarly, participants who were securely attached during infancy but whose children formed insecure attachments to them were compared to participants who had secure infant–caregiver attachment relationships in both generations. Because we had no hypotheses about different types of experiences contributing to changes in security versus disorganization, infants classified as secure but disorganized were recoded as insecure within each generation.

Caregiving experiences and interpersonal stresses and supports during childhood did not significantly predict intergenerational changes in infant attachment quality (see Table 3). Although participants' depressive symptoms and stressful life experiences at the time of the G2 assessment were not associated with changes in infant attachment, social support quality during adulthood was a marginally significant predictor of changes from insecure to secure. Specifically, mothers with insecure infant attachment histories who subsequently formed secure attachment relationships with their own infants were receiving higher quality social support compared to mother–infant pairs who were insecure in both generations. Social support quality was not significantly associated with intergenerational changes from secure to insecure.

Table 3. Correlates of continuities and changes of infant attachment patterns across two generations.

	G1 insecure-G2 insecure	G1 insecure-G2 secure	Test statistic	*p*	G1 secure-G2 secure	G1 secure-G1 insecure	Test statistic	*p*
Caregiving experiences in childhood								
Maternal sensitivity	−0.42 (0.83)	−0.08 (0.56)	$t(22) = 1.18$	.25	−0.05 (0.81)	0.23 (0.29)	$t(29) = 1.08$	.29
Quality of alternative caregiving relationship	3.75 (0.75)	4.10 (0.54)	$t(21) = 1.24$	.23	4.11 (0.88)	4.36 (1.21)	$t(28) = 0.68$	.50
Maltreatment	0.62 (.51)	0.50 (.53)	$\chi^2(1, N = 23) = 0.31$	.58	0.55 (.51)	0.27 (.47)	$\chi^2(1, N = 31) = 2.20$	.14
Interpersonal stresses & supports in childhood								
G1 maternal depression	0.52 (0.89)	0.44 (0.93)	$t(22) = -0.22$	.83	−0.04 (0.72)	−0.18 (0.51)	$t(29) = -0.56$	.58
G1 maternal life stress	0.37 (0.79)	0.45 (0.57)	$t(22) = 0.31$	.76	0.02 (0.37)	0.12 (0.87)	$t(29) = 0.44$	.67
G1 maternal social support	−0.17 (0.58)	−0.35 (0.50)	$t(22) = -0.82$	.42	−0.03 (0.54)	0.15 (0.57)	$t(29) = 0.86$	.40
Interpersonal stresses & supports in adulthood								
G2 maternal depression	17.50 (13.04)	13.00 (8.74)	$t(21) = -0.96$	.35	15.40 (11.13)	9.45 (8.82)	$t(29) = -1.52$	.14
G2 maternal life stress	13.23 (7.52)	12.00 (6.53)	$t(22) = -0.42$	.68	12.45 (10.30)	9.00 (4.56)	$t(29) = -1.05$	.30
G2 maternal social support	3.54 (1.45)	4.64 (1.43)	$t(22) = 1.86$	.08	4.45 (1.23)	4.45 (1.29)	$t(29) = 0.01$	.99
G2 AAI coherence of mind	3.85 (2.08)	4.00 (1.95)	$t(22) = 0.19$	.85	3.75 (1.58)	4.73 (1.42)	$t(29) = 1.70$	.10

Note: Means and *SD*s (in parentheses) for the variables used in the correlate of change analyses. G1 = first generation. G2 = second generation. AAI = Adult Attachment Interview.

Lastly, AAI coherence was not significantly associated with changes in infant–caregiver attachment relationships. In addition, AAI coherence was not significantly associated with G2 infant attachment quality: $t(54) = -0.57$, $p = .57$.

Discussion

The primary goal of this study was to investigate for the first time the intergenerational continuities of infant attachment patterns. Within the MLSRA, the organized patterns of infant–caregiver attachment during the first and second generations were not significantly associated with one another. However, infants were more likely to form disorganized attachment relationships if their mothers had histories of attachment disorganization. More specifically, approximately 50% of mothers with histories of infant attachment disorganization had children who formed a disorganized infant–caregiver attachment relationship. In contrast, only 20% of mothers without histories of infant attachment disorganization had infants with disorganized attachments. Altogether, these results are consistent with (a) prior evidence of relatively modest stability of attachment security from infancy to adulthood within the MLSRA (Raby et al., 2013; Weinfield et al., 2004) but also (b) findings from the MLSRA as well as other samples indicating that infant attachment disorganization has long-term implications for individual's socioemotional development (Carlson, 1998; Obsuth, Hennighausen, Brumariu, & Lyons-Ruth, 2014; Weinfield et al., 2004). Perhaps more importantly, the current study extends these earlier findings by providing initial longitudinal evidence that disturbances in early attachment relationships may persist across generations.

The MLSRA is considered a higher risk sample because the participants were born into poverty and many experienced highly stressful and chaotic early home environments (see Sroufe et al., 2005, for a thorough description of the sample). It is thought that internal working models of close relationships established during infancy are more likely to change under these types of unstable conditions (for meta-analytic evidence, see Fraley, 2002; see also Belsky & Fearon, 2002). Thus, it is possible that the intergenerational continuities in infant attachment security and disorganization may be more pronounced within lower risk populations relative to the estimated effects observed in this study. Additional longitudinal research is needed to determine the degree to which the findings reported here generalize to other populations and to identify potential moderators of the intergenerational continuities in infant attachment patterns.

Another task for future research involves identifying the specific mechanisms that explain how early attachment patterns are carried forward and impact infant–caregiver relationships in the next generation. Two interrelated processes by which infant attachment disorganization may be transmitted across generations are (a) adults' psychological well being – including their dissociative tendencies, psychopathology symptoms, and unresolved states of mind – and (b) adults' parenting behaviors. Indeed, these sets of outcomes have been shown to be both rooted in adults' early caregiving experiences and predictive of attachment disorganization in the next generation (Carlson, 1998; Madigan et al., 2006; van IJzendoorn et al., 1999; but see Haltigan & Roisman, 2015). Although measures of these variables – including G2 parenting – were collected within the MLSRA (e.g., Shlafer, Raby, Lawler, Hesemeyer, & Roisman, 2015), most of these data were collected after the G2 infant attachment assessments, which prohibited tests of mediation. In addition, the current study was not well suited to investigate questions of meditation since substantially larger samples are required in order to have adequately powered tests (Fritz & MacKinnon, 2007). Lastly, because the current study involved biologically related mother–infant pairs, it cannot rule out the possibility that unmeasured genetic factors shared between mothers and their children contribute to the

intergenerational continuities in attachment disorganization. That said, existing twin studies indicate that heritable factors have a negligible influence on early attachment patterns (Bokhorst et al., 2003; O'Connor & Croft, 2001; Roisman & Fraley, 2006), and molecular genetic studies have not identified specific genetic variations that are reliably associated with infant attachment security or disorganization (Pappa et al., 2015; Roisman, Booth-LaForce, Belsky, Burt, & Groh, 2013).

The second aim of this study was to examine the potential contributors to change in infant attachment patterns across the two generations. In contrast to earlier findings on the changes of attachment security from infancy to adulthood (e.g., Weinfield et al., 2000), experiences with caregivers and interpersonal stresses and supports during childhood and adolescence did not predict intergenerational changes toward or away from attachment security in this study. However, higher quality social support available to the adult participants and concurrently assessed at the time of the G2 infant attachment assessments was associated with shifts from attachment insecurity during G1 to security during G2. Although this finding should be interpreted with caution because of the modest statistical significance value and the large number of statistical tests, it is worth noting that this result is consistent with research on intergenerational changes in parenting (e.g., Egeland et al., 1988; Thornberry et al., 2013), which has demonstrated that social support during adulthood serves as a protective factor for individuals with histories of poor quality childhood caregiving experiences.

In summary, the current study extends our understanding of the stability of attachment across development as well as the intergenerational transmission of attachment, two topics that have historically been studied independently of one another. Given the potential importance of these findings for theory, research, and clinical practice, and the relatively modest sample size of this study, these results need to be replicated with additional longitudinal data from larger samples. It is the hope that continued longitudinal research on attachment will help shed light on the processes underlying the long-term significance of early parent–child relationships for later development, including continuities across generations.

Disclosure statement

No potential conflict of interest was reported by the authors.

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