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Multiple Domains of Parental Secure Base Support During Childhood and Adolescence Contribute to Adolescents' Representations of Attachment as a Secure Base Script

Brian E. Vaughn,
Auburn University

Theodore E. A. Waters,
New York University–Abu Dhabi

Ryan D. Steele,
University of Minnesota

Glenn I. Roisman,
University of Minnesota

Kelly K. Bost,
University of Illinois at Urbana-Champaign

Warren Truitt,
Auburn University

Harriet S. Waters, and
State University of New York at Stony Brook

Cathryn Booth-LaForce
University of Washington

Abstract

Although attachment theory claims that early attachment representations reflecting the quality of the child's "lived experiences" are maintained across developmental transitions, evidence that has emerged over the last decade suggests that the association between early relationship quality and adolescents' attachment representations is fairly modest in magnitude. We used aspects of parenting beyond sensitivity over childhood and adolescence and early security to predict adolescents' scripted attachment representations. At age 18 years, 673 participants from the NICHD Study of Early Child Care and Youth Development (SECCYD) completed the Attachment Script Assessment (ASA) from which we derived an assessment of secure base script knowledge. Measures of secure base support from childhood through age 15 years (e.g., parental monitoring of child activity, father presence in the home) were selected as predictors and accounted for an additional 8% of the variance in secure base script knowledge scores above and beyond direct observations of sensitivity and early attachment status alone, suggesting that adolescents' scripted

Correspondence concerning this paper should be directed to: Brian E. Vaughn, Department of Human Development and Family Studies, Auburn University, Auburn, AL 36849 (vaughe@auburn.edu) or to Glenn I. Roisman, Institute of Child Development, University of Minnesota, Minneapolis, MN 55455 (roism001@umn.edu).

attachment representations reflect multiple domains of parenting. Cognitive and demographic variables also significantly increased predicted variance in secure base script knowledge by 2% each.

A central assumption of attachment theory is that the quality of attachment relationships reflect the nature of individuals' lived experiences with primary caregivers (Ainsworth, 1967; Bowlby, 1973, 1982). Caregiving quality typically has been operationalized in terms of the caregiver's sensitivity to the child's communicative signals and cooperation with the child's ongoing stream of activity (e.g., Ainsworth, Blehar, Waters, & Wall, 1978). Bowlby (1973, 1980) also presumed that attachment relationships, initially co-constructed from the behavioral patterns and routines characteristic of caregiver/child dyads during infancy and toddlerhood, would become represented as internal working models of the caregiver-child relationship. Moreover, he believed that these internal models guided the formation of related internal models of self, self-worth, and intimate relationships more generally, as the child's cognitive, emotional, and behavioral capacities matured over developmental time. These assumptions influenced attachment researchers' hypotheses concerning the impacts of early child-caregiver experiences on children's social, emotional, and cognitive adaptation across the childhood and adolescent years and into adulthood. That is to say, children with histories of sensitive, cooperative care, who have co-constructed secure attachments in the early years are expected to show evidence of more secure attachment representations as adolescents and adults. Furthermore, these representations support (or fail to support, if attachments were not secure) the individual's confidence as an agent acting in and on the world(s) of persons and things and also support the belief that effective assistance from attachment figures would be forthcoming, should stressors emanating from those worlds threaten to overwhelm the individual's available capacities and resources.

For the most part, these assumptions of attachment theory have received consistent empirical support (e.g., Beijersbergen, Juffer, Bakermans-Kranenberg, & Van IJzendoorn, 2012; Belsky & Fearon, 2002; Main, Kaplan, & Cassidy, 1985; Sroufe, Egeland, Carlson, & Collins, 2005; Waters, Merrick, Treboux, Crowell, & Albersheim, 2000). Nevertheless, large-scale longitudinal studies and several meta-analyses have indicated that the magnitude of associations between childhood experiences with attachment figures and adolescent/adult representations of attachment is weaker than was widely assumed (e.g., Atkinson et al., 2000; Groh et al., 2014; Steele et al., 2014; de Wolff & van IJzendoorn, 1997), even when findings can be interpreted as being consistent with a causal effect of maternal sensitivity on attachment security (Bakermans-Kranenberg, Juffer, & van IJzendoorn, 2003). Effects of even weaker magnitudes have been reported when measures of attachment security obtained during infancy/toddlerhood are used as predictors of mental representations of attachment during adolescence and adulthood in large-scale longitudinal studies (e.g., Sroufe et al., 2005; Steele et al., 2014).

These rather modest associations have prompted calls to re-conceptualize and broaden the meaning of the "sensitivity" construct, to make it applicable across life course stages (e.g., Bernier, Matte-Gagné, Bélanger, & Whipple, 2014; Waters & Cummings, 2000). A primary goal of this report was to identify and assess additional indicators of parental support that are

consistent with the definition of sensitivity (i.e., awareness of the child's communicative signals and the capacity and willingness to cooperate with the meaning of those signals), but would also be applicable to children beyond the infancy/toddler years. We used these indicators, in conjunction with assessments of sensitivity and early attachment security status, to determine whether (and how much) they might increase the magnitude of predicted variance for a measure of attachment representations in late adolescence.

Although Bowlby's model of attachment development assumed that early relationships would become represented internally (e.g., Bowlby, 1973, 1980), he was never especially specific about the form that these "internal working models" might take. Investigators across several psychology sub-disciplines have offered suggestions and important insights concerning assessment of the content and quality of these models (e.g., Fraley, Waller, & Brennan, 2000; George, Kaplan, & Main, 1985; Main & Goldwyn, 1994; Shaver & Hazen, 1993). Recently, H. S. Waters and associates (e.g., Waters, Brockmeyer, & Crowell, 2013; Waters & Waters, 2006) suggested that a core feature of the internal working model of attachment is a cognitive script that summarizes an individual's understanding of the operation of a secure base (i.e., attachment) relationship. Components of a well-formed secure base script would include: 1) attached individual and the attachment figure engage in joint activity or (depending on developmental level), if attachment figure is at a distance, joint communication; 2) a challenge is encountered that induces distress, or threatens to do so, for the attached individual; 3) the dyad member exposed to the challenge signals for assistance; 4) the other dyad member recognizes the communicative signal and reacts in a manner consistent with the message; 5) the assistance provided is accepted; 6) the assistance is effective in resolving the challenge; 7) comfort is provided and alleviates any distress; 8) the dyad resumes joint activity or initiate a new activity (Waters & Waters, 2006).

Waters and her associates also suggested that the availability of the secure base script could be assessed from narrative samples that were primed by specific sets of prompt words (e.g., Waters & Rodrigues-Doolabh, 2001; Waters & Waters, 2006). For their purposes, they found that reliable estimates of the degree to which a secure base script was available to adult respondents could be obtained from narrative samples using the Attachment Script Assessment (ASA) protocols (e.g., Vaughn, Waters, Coppola, Cassidy, Bost, & Verissimo, 2006; Waters & Rodrigues-Doolabh, 2001). Extending this work with adults, Dykas, Woodhouse, Cassidy, & Waters (2006) showed that a revised version of the ASA, using word prompt lists more relevant for adolescents than for adults (e.g., seeking parental advice for a personal problem, *vs.* describing a mother and child spending a morning playing together) provided reliable assessments of secure base script use in a sample of adolescents. More recently, the ASA has been successfully revised for middle childhood samples (Psouni, & Apetroaia, 2014; Waters, Bosmans, Vandevivere, Dujardin, & Waters, 2015). Both Dykas et al. (2006) and Steele et al. (2014) found that adolescent ASA script scores were significantly correlated with established measures of adult attachment (e.g., Adult Attachment Interview, AAI, George et al., 1985; Experiences in Close Relationships–Revised questionnaire, ECR-R, Fraley et al., 2000) and had similar patterns of associations with parental sensitivity measures from infancy through early adolescence and early attachment histories as did scale scores derived from the AAI completed by these SECCYD participants. Schoenmaker et al. (2015) also reported significant associations between

maternal sensitivity, assessed during infancy and again at seven years of age, and attachment security at age 23, assessed using the ASA (see also Waters, Ruiz, & Roisman, in press).

The current study

Our analyses build on the results reported by Steele et al. (2014), who tested relations among different measures of attachment security for adolescents and the degree to which those attachment measures were predicted by parental sensitivity measures across infancy, childhood, and adolescence in the SECCYD. We also leverage suggestions offered by E. Waters and associates (i.e., Waters & Cummings, 2000; Waters, Kondo-Ikemura, Posada & Richters, 1991) to examine a broader suite of potential predictors of secure base script knowledge in the SECCYD, including parenting dimensions reflecting parental monitoring of child social activities during childhood and adolescence, as well as evidence of support for the child's cognitive development, academic achievement, and schooling. In addition, we included variables indicating the provision of a safe home environment in a safe neighborhood/community and the consistent presence of the father, or father-equivalent, as potential support for secure base provision. This last variable reflects our assumption that having two possible secure base supports in the home is an advantage for children and adolescents. Waters and Cummings (2000) had suggested that each of these domains would reflect age-appropriate secure base support during childhood and could be considered as unfolding aspects of sensitivity that may not be as relevant during infancy as they may be over childhood and adolescence, due to the child's maturing motor, cognitive, and social/emotional capacities.

For most of these domains, it was possible to identify relevant assessments across two or more age periods and composite measures were created (when supported by significant cross-time stability estimates) to improve the internal consistency of the domain indicator. We also included a set of cognitive predictors that included aspects of verbal and spatial intelligence and academic achievement, because Haydon, Roisman, Owen, Booth-LaForce, and Cox (2014) reported that measures from these domains were unique, significant predictors of AAI dimensions relevant to attachment security in the SECCYD. Finally, we included a set of demographic covariates that have been used in other studies reporting on analyses of SECCYD data, including child sex, race/ethnicity, maternal education level, and income-to-needs ratio. Regression models were estimated to determine whether the new parenting variable set added significantly to the predicted variance in the ASA script scores, after controlling for known, attachment-relevant predictors in the SECCYD (i.e., parental sensitivity, proportion of times securely attached in the first three years). The cognitive and demographic variables were then added to the equation to determine whether the new variable set survived as a significant predictor to the ASA script scores. Positive results in these analyses would support the notion that attachment remains a developmentally salient socialization domain beyond infancy/early childhood and that the construction of internal representations of attachment is contingent upon additional inputs beyond those provided by sensitive and responsive care and early attachment security.

Method

Participants

Participants were 673 adolescents who completed an age-18 follow-up of the NICHD SECCYD (http://www.nichd.nih.gov/research/supported/Pages/seccyd.aspx; see Booth-LaForce & Roisman, 2014). ASAs were primarily administered in-person by design, although three ASAs were completed via phone and these also were included in this analysis. Details regarding the demographic characteristics of the ASA sample (n = 673, 52% female) of the SECCYD are reported in Steele et al. (2014). As noted there, the ASA subsample differs from the original SECCYD sample being proportionally more female and deriving from families with higher levels of maternal education and greater incomes-to-needs, but does not differ in terms of ethnic status. Statistical analyses of these differences were reported by Steele et al. (2014) and we include their analyses as a supplementary document to avoid redundancy.

Measures and Procedures

Attachment Script Assessment—The adolescent version of the ASA (Dykas, et al., 2006) measures secure base script knowledge. The adolescent version of the ASA that we used consisted of the four word-prompt lists designed to prompt narratives relevant to secure base use (Dykas et al., 2006). There is no overlap between the adolescent and adult versions of the ASA with regard to the word-prompt lists used (see Dykas et al., 2006 for the word-prompt lists). One word-prompt list is presented in the Appendix, with four exemplar narratives that illustrate the range of secure base content in the stories that can be elicited by the list. Two teams of coders were responsible for scoring the adolescent ASA narratives (one team at each of the two coding sites). Both teams had extensive experience coding adult secure base narratives and they also received additional training in scoring adolescent protocols by H. Waters.

Participants were asked to construct narratives based on a series of word-prompt lists that outline various attachment-relevant scenarios. They were instructed to use each list as a guide, with the columns of words helping to frame a story line. They were told that elaboration of the material was welcomed, and that they need not use every word from the list in producing their story. Participants had up to three minutes to look over the list and formulate a narrative. The narratives were audio-recorded for later transcription. Nearly all participants completed this task in 10–15 minutes or less. Transcribed narratives typically range from approximately one-half to one full page in length and each story can usually be fully coded in less than 10 minutes.

Coders independently evaluated each narrative on a 7-point scriptedness scale reflecting secure base script knowledge. Four different coders (two teams of two coders, with each team scoring ~63% of all narratives, including 170 that were coded by both teams to establish rater agreement) participated in evaluation of the narratives. Both team members coded every transcript assigned to the team. Coders evaluating the ASA transcripts were blind to all other study variables for the participants. For this report, rater agreement was assessed at two levels, within and across teams, using an intraclass correlation coefficient

(ICC; absolute agreement for averaged measures). For both teams, the within-team ICC for secure base script knowledge (i.e., the mean of available stories for each coder) was .95 (*n*s = 424 and 420, respectively). Between-team rater agreement was assessed for the 170 cases coded by both teams. The between-team ICC was .95. Given high levels of rater agreement, composite scores were created for each story by averaging the scores of all coders who evaluated a given story for a child. Across all four stories, these composite scores ranged from 1.0 to 6.4. The final ASA script score was derived by averaging across all available stories for a given child. Cronbach's alpha for this composite was .78. See T. Waters et al. (2015) for additional information regarding the latent structure of the ASA.

Parental sensitivity—Assessments of maternal sensitivity were acquired at 6, 15, 24, 36, and 54 months; Grades 1, 3, and 5; and age 15 years. Assessments of paternal sensitivity were collected at 54 months; Grades 1, 3, and 5; and age 15 years. Sensitivity was assessed while children and their mother/father were videotaped as the target participants completed age-appropriate tasks. As in prior studies using the SECCYD, sensitivity scores at all ages were standardized and then averaged to create the maternal sensitivity and paternal sensitivity composites. More information regarding the tasks can be found in Booth-LaForce, Groh, Burchinal, Roisman, Owen, and Cox (2014) and Fraley, Roisman, Booth-LaForce, Owen, and Holland (2013). Booth-LaForce et al. (2014) reported that internal consistencies for the composite measures of sensitivity collected from the full sample ranged from .70-.85 for mothers and .71-.82 for fathers across assessments.

Attachment security in early childhood—As described by Groh et al. (2014), security in early childhood was assessed using the Strange Situation Procedure (SSP; Ainsworth et al., 1978) at 15 months, the Attachment Q-Set (AQS; Waters & Deane, 1985) at 24 months, and the Modified Strange Situation Procedure (MSSP; Cassidy, Marvin, & the MacArthur Working Group on Attachment, 1992) at 36 months. For the SSP, a secure versus insecure variable was created. For the AQS, children whose Q-sorts were correlated at .30 or above with the security criterion sort were classified as secure (vs. insecure). For the MSSP, a secure versus insecure variable also was computed. If data were available on two or more of these assessments, the proportion of times the child was coded as secure was determined (see Steele et al., 2014, for additional details).

Parent investment variables beyond parental sensitivity and early attachment security

Father presence—The proportion of data-collection contacts for which the father was living in the household was computed from 1 month of age to 15 years (1, 3, 6, 9, 12, 15, 24, 36, 42, 46, 50, 54, 60, and 66 months; Kindergarten-Fall [F], Kindergarten-Spring [S]; Grades 1F, 1S, 2F, 2S, 3, 4, 5, 6, 7; ages 14 and 15), using data originally reported by Roisman, Haltigan, Haydon, and Booth-LaForce (2014).

Stimulation in the physical environment—Trained observers or participant's mothers completed modified versions of the Home Observation for Measurement of the Environment (H.O.M.E.) Inventory (Caldwell & Bradley, 2001) at 36 and 54 months; Grades 3 and 5; and age 15. The H.O.M.E. inventory was designed to assess the quality and quantity of support, stimulation, and structure provided to the target child in a home environment. The Physical

Elements sub-score (7 items) was used here to represent the extent to which the mother provided secure base support through the creation of a home environment supporting exploration and mastery of developmentally appropriate skills (e.g. reading). At each assessment, items within the sub-score were summed, with higher values indicating that more physical elements were present in the home. These were averaged across available assessments to create a composite. Cronbach's alpha for the composite variable was .70.

Maternal report of parental monitoring—Participants' mothers reported on their perception of their ability to monitor their child's activities using questionnaires at Grades 5 and 6, as well as age 15 (e.g., see Lamborn, Mounts, Steinberg, & Dornbusch, 1991; Steinberg, Lamborn, Darling, Mounts, & Dornbusch, 1994; Stattin & Kerr, 2000). Higher scores indicated greater parental monitoring (range at each assessment = 1–4). A final composite score was derived by averaging across available assessments. Cronbach's alpha for the composite variable was .76.

Participants' report of parental monitoring—Participants reported on their perception of their mothers' ability to monitor their activities using questionnaires at Grades 6 and age 15 (e.g., see Lamborn et al., 1991; Steinberg et al., 1994; Stattin & Kerr, 2000). Higher scores indicated greater parental monitoring (range at each assessment = 1–4). A final composite score was derived by averaging across available assessments. Participants' reports of parental monitoring were correlated at Grade 6 and age 15 ($r = .40$, $p < .01$), although Cronbach's alpha for the two questionnaires was modest ($\alpha = .58$). We reasoned that it was more appropriate to create one variable that maximized validity, rather than to increase the number of analyses and inflate the likelihood of a Type 1 error.

Mothers' perceptions about neighborhood safety—The Neighborhood Questionnaire (Greenberg, Lengua, Coie, Pinderhughes, & Conduct Problems Prevention Research Group, 1999) was completed by participants' mothers at Grades 1, 3 and 5. The Neighborhood Questionnaire is a 16-item measure of neighborhood characteristics such as safety, violence, drug traffic, satisfaction, and stability. The Neighborhood Safety subscale was of focal interest in the present study (5 items). Items were summed, with higher scores reflecting an increased sense of safety. A final composite score was computed by averaging across available assessments. Cronbach's alpha for the composite variable was .85.

Teachers' report of parental involvement—The participants' teachers completed the Parent-Teacher Involvement Questionnaire (Miller-Johnson, Maumary-Gremaud, & Conduct Disorders Research Group, 1995) at Grades 1, 2, 3, 4, and 5. The Parent Encouragement of School subscale was of focal interest in the present study (9 items). Items were summed, with higher scores reflecting more parental encouragement of schooling as reported by the teacher. A final composite score was derived by averaging across available assessments. Cronbach's alpha for the composite variable was .85.

Cognitive covariates

Participants' planning/problem-solving ability—In Grades 1, 3, and 5, participants completed a planning/problem-solving task called the Tower of Hanoi (Anzai & Simon,

1979). To successfully complete the task, participants were instructed to construct a tower of rings in the fewest moves while following specific rules that constrained possible ring movements. At each grade, a total planning efficiency score was derived by summing the total number of moves needed to successfully complete a predetermined number of the Tower of Hanoi tasks (the number of tasks varied by grade). A final composite score was derived by standardizing and averaging the total planning efficiency score across the available assessments. Cronbach's alpha for the composite variable was .68.

Participants' early cognitive skills—At 15 and 24 months, participants were administered the Bayley Scales of Mental Development (Bayley, 1969). The Mental Development Index scale score assesses sensory-perceptual acuities and discriminations; memory, learning, and problem-solving; early verbal communication; and the ability to form generalizations and classifications. This scale yields a standard score, Mental Development Index, with a mean of 100 and standard deviation of 15 in the norming sample. Thus, higher scores indicated higher cognitive ability. A final composite score was derived by averaging across the available assessments. Cronbach's alpha for the composite variable was .69.

Participants' academic skills—The Woodcock–Johnson Psycho-Educational Battery–Revised (WJ–R; Woodcock, 1990; Woodcock & Johnson, 1989) was administered to the participants at 54 months; Grades 1, 3, and 5; and age 15 to assess academic skills. A slightly different sub-set of scales from the WJ-R was used at each assessment point. Following Haydon et al. (2014), for purposes of this analysis, the *W* (standard) scores for every available subscale at each time point were averaged (Cronbach's alpha across the five assessment ages for the composite was .93; see Fraley, Roisman, & Haltigan, 2013). Means and SDs for all parenting, attachment and cognitive variables used in these analyses are presented in Table 1.

Other Covariates

A set of four demographic covariates was used in regression analyses. These covariates have been used consistently as control variables in prior analyses of the SECCYD datasets, including earlier publications based on these data from the SECCYD cohort (e.g., Steele et al., 2014). Variables were child race/ethnicity (1 = White, non-Hispanic, 0 = other), child gender (1 = female, 0 = male), maternal years of education, and family income. Family income was measured as an income-to-needs ratio (total family income divided by the year-specific poverty threshold for the appropriate family size), calculated separately at 1, 6, 15, 24, 36 and 54 months; Grades 1, 3, 5 and 6; and age 15.

Analysis Plan

We planned to test several hypotheses in sequence. We first tested the significance of bivariate relations among the measured variables in relation to the adolescent ASA script scores, and in relation to each other (correlations calculated using pairwise deletion to handle missing data), to determine whether individual measures behaved as expected in relation to our adolescent attachment outcome. Previously published findings from the ASA subsample of the SECCYD (Steele et al., 2014) have demonstrated that parental sensitivity measures obtained from infancy through adolescence bear a significant association with the

ASA script scores (presented in Table 2 for reference), and we tested whether the additional measures of parental investment in the child would predict additional script score variance (over and above that associated with sensitivity), using hierarchical regression analysis. Because some cognitive and demographic variables have been shown to predict attachment scores derived from the AAI (i.e., Haydon et al., 2014), we also were interested in knowing whether cognitive and demographic variables would have similar patterns of associations with the ASA script scores. We also examined whether these might contribute additional variance to the prediction of ASA script scores, when entered after the theoretically relevant (i.e., sensitivity, other parenting) variables. The cognitive and demographic scores were entered as separate blocks in the hierarchical regression analysis.

Results

Initial Analyses

The ASA secure base script knowledge score was significantly associated with all other study variables (Table 2). By Cohen's (1992) criteria, these associations were of modest magnitude. Table 2 also shows that the composite maternal sensitivity score was positively and significantly associated with the remaining test/observation variables used as predictors of ASA script scores, as was the paternal sensitivity score (excepting for father presence). Table 2 shows that most of the predictor variables were themselves modestly correlated, both within and across variable sets, suggesting that there is coherence in parenting behavior across developmental periods that may be understood as a broad-band "sensitive parenting" construct (see Waters & Sroufe, 1983, for a similar argument). Not surprisingly, parenting qualities support the child's cognitive growth and academic achievement as well as her/his attachment representations, however, magnitudes for the majority of these relations were in the modest range, using the Cohen's (1992) criteria.

Regression Models Predicting Adolescents' Secure Base Script Knowledge

A series of nested hierarchical regression models (using listwise deletion for cases with missing data) tested whether the sets of correlates used in the bivariate analyses would yield unique and significant changes in the proportion of predicted variance for the ASA secure base script scores, beyond that associated with parental sensitivity and early attachment history variables (from the Steele et al., 2014, report). Because the paternal sensitivity composite is used as a predictor and this predictor is structurally missing for those occasions when no father or father figure was present in the home, the maximum effective N available for regression analyses is 581. Results are presented in Table 3. After entering the parental sensitivity and early attachment history variables, we entered the block of parental support and monitoring variables. Adding these variables increased the overall R^2 by ~8% (from .11 to .19). The child's evaluation of parental monitoring and the teacher's report of parental involvement in the school setting each were unique, significant predictors of the ASA secure base script scores.

The next block of variables entered into the regression analysis measured the target child's cognitive abilities and academic achievement. This allowed for examination of what, if any, additional variance in ASA secure base script scores might be due to the child's cognitive

level above and beyond the variance associated with parental sensitivity and parental support and involvement. Results, presented in column 3 of Table 3, indicated that cognitive level and academic achievement accounted for ~2% of additional variance in the ASA script scores, $F(3, 542) = 4.93$, $p < .005$, for the R^2 change. Among the cognitive variables, the Tower of Hanoi score was a uniquely significant predictor of secure base script scores at this step in the analysis.

At the final step, we entered the set of demographic control variables to determine whether the uniquely significant predictors of the ASA secure base script scores from the first three blocks remained significant when controls were included (column 4 in Table 3). The overall regression remained significant and the demographic variables increased the predicted variance by ~2.5%, $F(4, 538) = 4.22$, $p < .005$, for the R^2 change. Sex of child was the only uniquely significant predictor among the variables from the demographic control variable set; girls tended to receive higher ASA script scores. At this final step in the hierarchical regression, uniquely significant predictors were paternal sensitivity across infancy and childhood, the child's characterization of parental monitoring, teachers' characterizations of parental involvement in the school setting, the Woodcock-Johnson academic skills composite, the Tower of Hanoi task, and sex of child. Although the regression analyses indicated that only a few of these variables uniquely contributed to the prediction of adolescent ASA secure base script scores, this should be expected because there is a significant degree of within-block collinearity and parental sensitivity scores are associated with nearly all measures in the parenting, cognitive functioning, and demographic covariate blocks. Nonetheless, adding parenting, cognitive, and demographic variables to the regression equation increased the predicted ASA script score variance by 71%, compared to the amount of predicted variance from parental sensitivity and early attachment history variables alone.

Because both the cognitive and control variable blocks added significant increments to the predicted ASA script score variance, we re-ordered the predictor steps, such that demographic and cognitive variables were entered at the initial step, parenting sensitivity and attachment variables entered second, and the set of additional parenting variables entered last, as a check on our initial results. The change in R^2 was significant at both steps 2 and 3 and together the two parenting variable sets added 8.6% of predicted variance after the control and cognitive variables had been entered (3.3% and 5.2% increase at step 2 and step 3, respectively). Stated as a percent increase over the amount of variance at step 1, when cognitive and demographic variables were entered after all parenting and early attachment security variables, they increased the amount of predicted ASA variance by ~21%, whereas, when parenting and attachment variables were entered after the cognitive and demographic variable sets, they increased the amount of predicted ASA variance by ~56%.

Discussion

Attachment theory assumes that the attachment relationship co-constructed by the caregiver and child during the early years is a critical determinant of mental representations of secure base knowledge, secure base use, and secure base provision across the lifespan (Bowlby, 1973, 1980). This assumption has been supported, to a degree, in a host of empirical studies.

Nevertheless, the magnitudes of associations between children's early attachment experiences and subsequent representations of attachment in adolescence and adulthood have proven to be relatively modest in large sample, long-term longitudinal studies (e.g., Groh et al., 2014; Sroufe et al., 2005; Steele et al., 2014). This has motivated several empirical studies and conceptual considerations of the influences on attachment behavior and attachment representations during childhood, adolescence, and young adulthood (e.g., Roisman, et al., 2014; Waters & Cummings, 2000; Waters et al., 1991; Waters & Waters, 2006). The present study drew on insights offered by Waters and Cummings (2000) regarding the nature of children's experiences with parents that may not be fully captured by traditional measures of sensitivity and might also contribute to the construction of a positive secure base representation during late adolescence. We also relied upon the script measure of these representations designed by H. Waters and associates (Waters & Waters, 2006).

Accordingly, we studied a subset of SECCYD participants who participated in a follow-up assessment at 18 years of age, to develop a reliable battery of assessments that addressed the quality of parental monitoring and parental investment in their children's social and cognitive growth after early infancy/childhood. We also included assessments of the child's cognitive ability and academic skills that were relevant to verbal and spatial aspects of intelligence and a set of demographic variables as controls for effects on ASA secure base script scores, because these effects might have been independent of parenting and parent-child interactions. Most of the parenting and cognitive/academic variables were assessed multiple times during childhood and/or adolescence in the SECCYD and we tested each variable for cross-time stability prior to creating composites, thus reducing the likelihood of attenuation in the resulting correlation and regression values.

As anticipated by Waters and Cummings (2000), the set of parenting variables yielded significant, albeit modest, bivariate associations with the ASA script scores for this sample (Table 2). We also observed several significant associations with variables from the cognitive/academic variable block and from the covariate block (e.g., girls had somewhat higher ASA scores than boys). The hierarchical regression analyses showed that the bulk of the increase in predicted ASA secure base script score variance was due to the parenting variables rather than to the cognitive/academic or demographic variables. Including the full set of new variables in the regression more than doubled the predicted variance in the secure base script scores (to ~23% of ASA variance predicted, or ~12% of predicted variance added), when compared with the values for parental sensitivity and early attachment history alone (which accounted for ~11% of ASA variance predicted). Moreover, the bulk of this increase was accounted for by the added parenting variables. These results suggest that the adolescent's representation of secure base provision and secure base use is only partly determined by the attachment experiences of infancy and parenting sensitivity across childhood and adolescence. These representations continue to receive input from parenting practices, values, and beliefs across childhood and into the adolescent period that are not fully captured by measures of parenting sensitivity. Our findings are consistent with Bowlby's insistence that internal models of attachment do not spring into existence fully formed at the end of toddlerhood, but rather, should be seen as works in progress that are constructed over the better part of childhood and beyond. In future studies, it will be important to test whether these transactions (and the mental representations to which they

contribute) also predict the individual's confident exploration and mastery of the world as well as her/his confidence in the availability and effectiveness of support from attachment figures, should such support be needed during adolescence and young adulthood (Bowlby, 1973).

Our results argue for a dynamic view of the development of mental representations of attachment, while at the same time recognizing the thread of coherence that connects the past history of caregiving and support to the present representation of attachment for a given child. These findings also demonstrate the validity of the ASA protocol as a tool for assessing attachment representations during late adolescence. The four stories elicited using the word-prompt lists produced scores that were substantially inter-correlated and yielded a satisfactory Cronbach's alpha estimate and these scores correlated significantly with aspects of attachment representations derived from the AAI (e.g., Dykas et al., 2006; Steele et al., 2014). As such, our results suggest that the ASA is a valid index of attachment as a secure base system across adolescence and the transition to adulthood. Because the ASA has multiple forms (i.e., middle childhood, adolescent, and adult) with different word prompt lists that have a common procedural format (i.e., tell the best story you can from the outline presented in the word-list) but do not provide a clear indication of the intent of the task (compared with measures such as the AAI, which uses the same format and questions and so may allow for recall of content in repeated administrations), it seems ideally suited for longitudinal research.

Although our findings support our hypotheses and contribute to the understanding of adolescents' attachment representations, we do not mean to imply that the variables analyzed were necessarily the only, or even the best possible candidate variables to measure constructs that might influence the construction of a secure base script. In part this is a consequence of using secondary datasets for purposes different than what the original investigators may have intended. Furthermore, there is collinearity within and across our predictor domains. This is consistent with our expectations that parenting variables should cohere across socialization domains; thus, many parent-child and family level variables should be significantly associated. At the same time, correlated independent variables will likely contribute to overlapping variance estimates for the dependent variable and will reduce the likelihood that all predictor variables can yield unique, significant associations with the dependent variable. This is the case in our analyses (Table 3). Consequently, we do not attach special importance to variables with significant *beta* values at any step of the hierarchical regression analysis. Indeed, the uniquely significant variables account for less than half of the overall predicted variance. That is, the bulk of predicted ASA script score variance is common across the predictors.

We found that changing the order of variable sets in the hierarchical regression model affected the magnitude of variance increments predicted by the parental sensitivity/ proportion of times secure and by the new parenting variable set. When entered as a block, the cognitive and demographic covariates accounted for about 15% of the total variance in ASA scores, whereas the two blocks of parenting predictors added ~8.5% additional predicted variance of the ASA scores. We note that each of the two blocks of parenting and attachment variables accounted for a larger proportion of ASA variance than did either of the

covariate variable sets when they were entered after the parenting blocks, and the new parenting block (entered last in this analysis) alone accounted for twice the amount of predicted variance in ASA scores than did the two covariate blocks combined, when they were entered last. These results support the hypothesis suggested by Waters and Cummings (2000) that parenting experiences and parental investment in children's growth beyond infancy, which require knowledge of and sensitivity to developmentally appropriate skill-sets and needs, contribute to the construction of a secure base script over and above the effects of sensitivity to communicative signals and cooperation with the child's ongoing stream of activity/exploration.

At the same time, it is clear that parental sensitivity/cooperation is a central aspect of "parenting" more generally; insofar as our sensitivity index was linked to every other parenting, cognitive, and demographic predictor variable (for mothers, and nearly so for fathers). This finding is, in itself, novel and provocative and should prompt further analysis and theory building in this dataset and in others, as well as new, focused research on the long-term impact of sensitive/cooperative parenting over the course of childhood and adolescence (e.g., Fraley et al., 2013; Roisman & Fraley, 2012). It is interesting also that the effects of maternal sensitivity appear to be fully mediated by subsequent parenting qualities, but that fathers' sensitivity remained significant at every step of the hierarchical regression analysis. We suspect that this is a consequence of the variables available in the SECCYD dataset. That is, home stimulation and learning environment, school involvement, and parental monitoring tended to be measured with reference to mothers, to a greater extent than to fathers. It is possible that if we had a set of variables, measured on multiple occasions, that explicitly assessed fathers' involvement in schools, fathers' monitoring, etc., we might have found that fathers' sensitivity was mediated by these other aspects of parenting as well. Additional research will be required to determine whether this speculative explanation can be supported.

We also note that the NICHD SECCYD sample is not nationally representative, although it was designed to be "normative-risk" in the sense of including a wide range of participant families, with regard to the presence of factors that could put children at risk of sub-optimal developmental trajectories. Furthermore, because participant families with greater cumulative risk were less likely than other families to complete the study through 18 years, the subset of participants in the present study may be at lower overall developmental risk than the initial cohort, even though the present sample remains heterogeneous for risk factors. Consequently, we cannot claim that our findings should apply equally at all levels of overall developmental risk, but we do not view this fact to be a major limitation on the interpretation of our results.

To conclude, this study tested hypotheses concerning influences of parenting beyond sensitivity and infancy/early childhood attachment security on ASA secure base script scores in late adolescence. Correlation and regression analyses showed that a range of social, behavioral, cognitive, and demographic variables were associated with the secure base script scores. In hierarchical regression analyses, the bulk of script variance was accounted for by parenting variables. Moreover, parental sensitivity and attachment security assessed over the first three years of life accounted for less than half of the overall predicted variance in the

adolescent secure base script scores (see Bernier et al., 2014 for an analogous argument about sensitivity during infancy). Measures of parental investment in the child (e.g., monitoring, involvement in schools, neighborhood safety, father presence) after toddlerhood added substantially and meaningfully to the prediction of secure base script scores in late adolescence. These data are consistent with Bowlby's characterization of attachment as a life-span phenomenon and also suggest that growth of attachment representations reflects both continuities and changes in the parent/child relationship across childhood and adolescence.

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Appendix

Word-Prompt list for “The Party”

Friday night	sulk	Mom
party	couch	movie rental
uninvited	Mom	popcorn
miserable	talk	smile

Sample Adolescent Narratives

1. The Party–Rich Secure Base Script (score range: 6–7)

It was a Friday night after finals week had ended, and I was really excited hoping to go out with my friends. And then I called my two best friends, and one of them said that she wasn’t sure what she was doing, and the other one said that she was going out to a party. So not hearing about the party, I called another one of my friends, and she had already left. So I realized that I probably wasn’t invited to this party, so I began to get very upset. After sitting on the couch for awhile and feeling miserable about myself, I decided to talk to my mom. She made me feel better and she said that it probably wouldn’t be a place that I wanted to be away. If I wasn’t invited, then maybe it was for the best. She made me feel better and she told me that we can go to Blockbuster and rent a movie, and so we did. We rented my favorite movie, “Save the Last Dance,” and we got some popcorn, and she made me smile. And it felt good just to sit with my mom and talk to her.

2. The Party–Some Secure Base Script Content (Score range: 4–5)

A friend of mine wanted to go out Friday night. He told me about this party that some people were having. But I really didn’t want to go because I wasn’t invited and I knew I wouldn’t know most of the people there. When I got there, the whole time I was miserable. All I could do was walk around and sulk. I pretty much sat around on the couch the whole time while everyone else was having fun. It was a miserable night, I was dying to get home. But when I did I talked to my Mom about it. I felt really embarrassed and she really comforted me. She rented a movie from Blockbuster and we popped some popcorn. I really felt a lot of better and we had time to laugh and smile.

3. The Party - No Secure Base Script, Matter of Fact Presentation of Events (Score range: 3)

On Friday night, I had asked my parents if I could go out to a friend’s house. There was a planned party at the house but my friend had never called me and so I decided that I was going to sit at home and I was very upset that I wasn’t invited. So I got really upset. So my mom decided to go rent a movie. So we went out and got a movie and ice cream and went home and watched the movie. And in the middle of the movie, my friend had called me and

said that she had gotten in a fight with her mom and she was sorry that she didn't call me to give me a ride to the party. But by then my parents didn't want me going, and so I couldn't go to the party. But the next night my parents let me go and I was really happy that I was able to go to the party and I was invited because I didn't think I was.

4. The Party - No Secure Base Script, Atypical Content, Mom-child Interaction shows no support, Child expresses anger (Score range: 1–2)

It was Friday night, and I really didn't have anybody to hang out with because all my friends were at a party. I was invited to it because I wasn't really friends with the person who was holding it. I guess I was just acting pretty miserable and sulking on the couch. Just being generally unpleasant. My mom came in and was talking to me like, "What are you doing? Go do something. Go write an essay for college or go do some homework. Or find something better to do than just sit here and sulk on the couch." I got angry at her and stormed off. So, my dad came in and asked if I wanted to go to Blockbuster to go get a movie or something. So that's what I was gonna do. Alright, so we went. We got a comedy, so that it would cheer me up. When we got home my mom made some popcorn for us. We smiled and it was all better again.

Note: In an earlier version of the adolescent word-prompt lists, the word "Blockbuster" was used rather than "movie rental" (as in this study). As "Blockbuster" is now an anachronism, use of "movie rental" in this story should become the standard.

Table 1

Descriptive statistics

Measure	N	M	SD	Min	Max
ASA Secure Base Script Score	673	3.71	1.05	1.00	6.42
Maternal sensitivity	673	−.02	.99	−3.84	1.86
Paternal sensitivity	581	.02	1.03	−5.67	2.67
Prop. times secure	652	.60	.30	.00	1.00
H.O.M.E. physical environment	673	6.58	.80	2.50	7.33
Neighborhood safety	672	8.20	1.33	1.83	10.00
Parental monitoring (mom)	671	3.63	.22	2.50	4.00
Parental monitoring (child)	672	3.34	.36	1.89	4.00
School involvement (teacher)	666	3.68	.69	1.58	4.96
Father presence	673	.77	.35	.00	1.00
Bayley Scales of Infant Development	660	101.15	12.67	63.00	140.50
Woodcock-Johnson	673	488.58	11.17	432.35	520.65
Tower of Hanoi	673	−.01	.80	−2.58	1.98

Note. Z-scores are reported for the Maternal sensitivity, Paternal sensitivity, Child autonomy, and the Tower of Hanoi variables. Prop. times secure = proportion of times secure.

Table 2

Correlations Among Study Variables

Measure	1	2	3	4	6	7	8	9	10	11	12	13	14	15	16	17
1. ASA script score	--															
2. Maternal sensitivity	.27**	--														
3. Paternal sensitivity	.28**	.40**	--													
4. Proportion times secure	.14**	.30**	.14**	--												
5. H.O.M.E. physical environment	.23**	.45**	.23**	.18**	--											
6. Neighborhood safety	.11**	.36**	.16**	.18**	.35**	--										
7. Parental monitoring (mother)	.18**	.22**	.11**	.19**	.16**	.20**	--									
8. Parental monitoring (child)	.23**	.19**	.12**	.13**	.10**	.11**	.30**	--								
9. School involvement (teacher)	.27**	.50**	.28**	.19**	.46**	.27**	.30**	.21**	--							
10. Father presence	.20**	.42**	.06	.18**	.33**	.27**	.16**	.19**	.46**	--						
11. Bayley Scales of Infant Dev.	.23**	.42**	.20**	.32**	.26**	.21**	.17**	.17**	.32**	.24**	--					
12. Woodcock-Johnson	.23**	.45**	.23**	.24**	.32**	.30**	.10*	.12**	.41**	.27**	.49**	--				
13. Tower of Hanoi	.23**	.34**	.16**	.14**	.28**	.24**	.10*	.13**	.27**	.26**	.35**	.37**	--			
14. Child sex	.21**	.10**	.09*	.02	.04	.01	.19**	.15**	.03	.01	.14**	−.08	.06	--		
15. Child race/ethnicity	.14**	.41**	.12**	.14**	.29**	.27**	.17**	.12**	.32**	.33**	.30**	.30**	.24**	.03	--	
16. Maternal education	.20**	.50**	.23**	.17**	.35**	.29**	.10*	.10*	.45**	.34**	.31**	.43**	.23**	.07	.29**	--
17. Income-to-needs ratio	.17**	.45**	.24**	.16**	.38**	.34**	.16**	.14**	.39**	.36**	.30**	.39**	.26**	.06	.27**	.58**

Note.

*$p < .05$,

**$p < .01$.

ASA SBSK = ASA secure base script knowledge, Proportion times secure = proportion of times secure during infancy/toddlerhood. Correlations in Table 2 were calculated using pairwise deletion for each variable pair (Ns range from 638–673 for most values excepting paternal sensitivity, Ns = 555–581).

Table 3

Regression Analyses Predicting ASA Secure Base Script Scores While Controlling for Early Attachment History and Parental Sensitivity

	Step 1	Step 2	Step 3	Step 4
Predictor	**β**	**β**	**β**	**β**
Parental Sensitivity and Infant Attachment				
Maternal sensitivity	.19**	.05	.01	−.02
Paternal sensitivity	.19**	.17**	.16**	.16**
Prop. times secure	.04	.01	−.01	.00
Parental Support/Involvement				
H.O.M.E. physical environment	--	.07	.05	.06
Neighborhood safety	--	.04	.03	.04
Parental monitoring (mom)	--	.04	.05	.02
Parental monitoring (child)	--	.18**	.17**	.15**
Parental involvement (teacher)	--	.13**	.10	.10*
Father presence	--	.05	.05	.06
Child's Cognitive Abilities				
Bayley Scales of Infant Dev.	--	--	.05	.02
Woodcock-Johnson	--	--	.09	.12*
Tower of Hanoi	--	--	.09*	.08
Covariates				
Maternal education	--	--	--	.02
Child gender	--	--	--	.15**
Income-to-needs ratio	--	--	--	−.07
Child ethnicity	--	--	--	.05
ΔR^2	.11**	.08**	.02**	.02**
Total R^2 (with rounding)	.11	.19	.21	.24

Note.

* p < .05,

** p < .01.

Prop. times secure = proportion of times secure in early infancy, Bayley Scales of Infant Dev. = Bayley Scales of Infant development. Child gender: 1 = male; 2 = female. Child ethnicity: 0 = non-white; 1 = white, non-Hispanic.

N = 555 for these regressions, after listwise deletion of cases with any missing data for predictor sets.