Received: 28 July 2021 | Revised: 7 February 2023 | Accepted: 8 February 2023

DOI: 10.1002/icd.2410

REGISTERED REPORT STAGE 2

WILEY

Caregiving antecedents of secure base script knowledge inferred from the Adult Attachment Interview: A comparative, pre-registered analysis

Marissa D. Nivison[1] | Or Dagan[2] | Cathryn Booth-LaForce[3] | Glenn I. Roisman[1] | Theodore E. A. Waters[4]

[1]Institute of Child Development, University of Minnesota, Minneapolis, Minnesota, USA

[2]Institute of Child Development, Stony Brook University, Stony Brook, New York, USA

[3]Child, Family, and Population Health Nursing, University of Washington, Seattle, Washington, USA

[4]Department of Psychology, New York University Abu Dhabi, Abu Dhabi, United Arab Emirates

Correspondence
Marissa D. Nivison, Institute of Child Development, University of Minnesota, Minneapolis, MN, USA.
Email: nivis004@umn.edu

Funding information
Eunice Kennedy Shriver National Institute of Child Health and Human Development, Grant/Award Numbers: R01 HD054822, R01 HD069442, R01 HD102035, U10 HD027040; National Institute of Mental Health, Grant/Award Number: T32 MH015755

Abstract

Attachment theorists claim that the quality of parental support is internalized as a mental representation of early relationship experiences. Increasingly, the content of attachment representations is evaluated by studying the extent to which adults demonstrate *knowledge of the secure base script*, either in the context of the attachment script assessment (ASA) or during the Adult Attachment Interview (AAI_{sbs}). Preliminary evidence from a high-risk sample showed that AAI_{sbs} was more strongly associated with the quality of antecedent caregiving than was the more traditional approach to the measurement of adult attachment focused on the coherence of adults' AAI discourse. Drawing on new coding of data from the NICHD Study of Early Child Care and Youth Development (SECCYD), we found that AAI_{sbs} around age 18 years was significantly predicted by observations of maternal ($r = 0.21$) and paternal ($r = 0.12$) sensitivity assessed prospectively through age 15 years, and with attachment security in the first 3 years of life ($r = 0.08$). AAI_{sbs} was also associated with existing measures of adult attachment ($rs = 0.31$–0.42). Pre-registered analyses revealed that AAI_{sbs} performed in a manner roughly comparable to traditional, though more labour-intensive approaches to coding the AAI. Based on all

available evidence from the SECCYD and the pragmatic challenges and advantages of different narrative methods for assessing adult attachment representations, researchers seeking to measure attachment representations should strongly consider the strengths of the ASA in term of practicality, performance, and adaptability to various age groups across development.

Highlights:

- The present report examines the extent to which secure base script knowledge, as assessed by the Adult Attachment Interview (AAI_{sbs}) has its origins in early caregiving experiences, and to report how AAI_{sbs} performs in comparison to existing measures of adult attachment, in a large scale, normative-risks sample of adolescents.
- Data were drawn from the newly re-coded AAIs from the NICHD Study of Early Childcare and Youth Development.
- Overall, the AAI_{sbs} system performs as well as traditional AAI measures, but researchers looking to examine adult attachment representations should consider using the Attachment Script Assessment both for its empirical and pragmatic advantages.

KEYWORDS

adult attachment interview, attachment, maternal sensitivity, secure base script knowledge

Bowlby's (Bowlby, 1969/1982) attachment theory proposes that the quality and consistency of primary caregivers' secure base support directed to their young children is internalized and carried forward across development as a mental representation of those early relationship experiences. Bowlby, unfortunately, did not specify the precise form that these representations take. Nonetheless, the most well-established method for assessing adult attachment representations in developmental science focuses on the *coherence* of adults' discourse while discussing their childhood experiences with their primary caregivers during the Adult Attachment Interview (AAI; Main et al., 1985). More specifically, adults who produce coherent discourse during the AAI tell autobiographical stories about their early experiences with their parents that are internally consistent (i.e., credible) but not emotionally overwrought (e.g., Main et al., 2003/2008; Roisman, 2009). Such adults are, in turn, more likely to have infants who form secure attachments to them (Verhage et al., 2018).

Despite the considerable amount of work that has been published in this area over the last 35 years, the AAI presents at least three distinct challenges. First, practically, the standard approach to administering and coding the AAI is highly resource intensive (see Figure 1). Second, there is a significant gap between the way in which attachment representations in the AAI are conceptualized versus how AAIs are coded. More specifically, Main et al. (1985, pp. 66–67) aimed to operationalize adult attachment representations as "a set of conscious and/or unconscious rules

AAI Coding	$AAI_{traditional}$	AAI_{sbs}
Training*	2 weeks ($2600)	2-3 days ($0)
Reliability Test	1.5 years	1 month
AAI Coding (J)	3-4 hours/AAI	0.75-1 hour/AAI
AAI Coding (E)	2-3 hours/AAI	0.5 hour/AAI

FIGURE 1 Comparison of time and financial resources necessary to code the AAI using the traditional coding system for the AAI (Main et al., 2003/2008) versus the secure base script coding systems (AAI_{sbs}; Waters & Facompré, 2021). J = Junior coder; E = Expert coder.

for the organization of information relevant to attachment and for obtaining access to that information", but the coding system scales themselves are not directly descriptive of these rules. Instead, by examining the coherence of adults' discourse, the traditional coding system focuses on to what extent there is evidence that adults defensively discuss early attachment-relevant information, as evidenced in either dismissing or preoccupied discourse about their childhood experiences, without mapping or otherwise directly assessing the underlying attachment representations. Third and finally, evidence has demonstrated that AAI coherence is only weakly associated with attachment security in infancy ($r \sim 0.10–0.15$; Groh et al., 2014; Pinquart et al., 2013; Weinfield et al., 2000), though it is moderately associated with childhood maternal sensitivity ($r \sim 0.30$; e.g., Haydon et al., 2014). In short, it is possible that focusing on the coherence of adults' discourse during the AAI may not be a maximally valid, conceptually straightforward, or efficient way in which to assess adult attachment representations.

More recently, adult attachment representations have been measured with respect to the degree to which adults' discourse reflects *access to and knowledge of the secure base script* (Waters et al., 2021; Waters & Waters, 2006). The secure base script is a temporal-casual generalization that reflects the basic characteristics of receiving support and care from an attachment figure, and individual differences in access to and knowledge of it can be measured reliably in two distinct ways. First, the attachment script assessment (ASA) is a story telling task in which individuals are (a) presented with a list of words that outline the themes of the secure base script and (b) instructed to tell the best story they can based on these words (see Waters & Waters, 2021 for more information). Second, researchers have begun to use a secure base script coding scheme developed for the AAI (AAI_{sbs}), which focuses on the identification of secure base content from individuals' own personal narratives pertinent to their childhood experiences with their primary caregivers (Waters et al., 2013; Waters & Facompré, 2021; Waters et al., 2017). Both the ASA and AAI_{sbs} are scored for the extent to which the narrative provided follows the temporal-causal structure of the secure base script. Elements of this script include: (1) the individual is meaningfully engaged in the environment; (2) there is a disruption to that engagement; (3) support is sought from the secure base; (4) support is offered by the secure base; (5) support is accepted; (6) this support effectively solves the problem; (7) comfort is provided; and (8) finally, the individual reengages in meaningful activity in the environment. The AAI_{sbs} coding system focuses specifically on two main types of content: secure base expectations and secure base scenes. Secure base expectations are general statements that highlight expectations of availability, responsivity, and sensitivity of primary caregivers during childhood. Secure base scenes give insight into the extent to which the temporal causal structure of autobiographical memories follow the secure base script. The AAI_{sbs} coding system also codes for evidence of alternative schemas—expectations that directly contradict the secure base script, such as expectations of recurring abuse (see Nivison, Facompré, et al., 2021; Waters & Facompré, 2021 for more information).

The caregiving antecedents of secure base script knowledge as measured in the ASA have thus far been assessed in two longitudinal studies. The largest sample evidence to date is from a comparative analysis of attachment representations in a subsample ($n = 673$) of the normative-risk NICHD Study of Early Child Care and Youth Development cohort (SECCYD; NICHD Early Child Care Research Network, 2005). More specifically, Steele and colleagues (2014) reported that direct observations of both maternal and paternal sensitivity across the first 15 years of life predicted variation in secure base script knowledge at age 18 years, as measured by the ASA. Importantly, the association between maternal caregiving and ASA secure base script knowledge was roughly comparable in magnitude to the

correlation generated using the traditional scales used to code the AAI ($r \sim 0.27$), and the association between paternal caregiving and ASA scores ($r = 0.28$) was actually larger in magnitude than the correlation between paternal caregiving and AAI coherence ($r \sim 0.17$) as assessed using the traditional coding system. Similarly, in an adoption study by Schoenmaker et al. (2015) parental sensitivity was predictive of secure base script knowledge, as measured with the ASA, above and beyond AAI coherence. Using genetically unrelated parents and children, such findings bolster evidence for environmentally mediated pathways linking sensitive caregiving early in life and secure base script knowledge in adulthood.

Similarly, the origins of secure base script knowledge as measured in the Adult Attachment Interview (AAI_{sbs}) have been investigated in two reports drawing on data from the at-risk Minnesota Longitudinal Study of Risk and Adaptation cohort (MLSRA; Sroufe et al., 2005). More specifically, Waters et al. (2017) reported that AAI_{sbs} scores at 19 and 26 years were significantly more strongly associated with antecedent, observed maternal sensitivity (measured from infancy through age 13 years; $r \sim 0.35$) than were traditional ratings of coherence applied to the same AAIs at 19 and 26 years ($r \sim 0.15$). In the same cohort, Nivison, Facompré, et al. (2021) found that prospectively assessed experiences of abuse and neglect from birth to 17.5 years were likewise associated with lower scores on AAI_{sbs} above and beyond previously documented associations with maternal sensitivity and demographic covariates.

The AAI_{sbs} coding system has both practical and conceptual advantages over the traditional system focused on coherence. First, practically, the AAI_{sbs} coding system is much less resource intensive in terms of training and coding because it relies on a single rating that can be reliably assessed from the first 6 questions of the AAI (see Figure 1). Second, conceptually, the AAI_{sbs} coding system directly assesses the content of the underlying attachment representation (i.e., access to and knowledge of cognitive script outlining prior secure base interactions), in contrast to the traditional coding system, which indirectly assesses the underlying representations with reference to *how* an individual discusses their childhood experiences (see Nivison, Facompré, et al., 2021; Waters & Roisman, 2019, for more information). Third and as already noted, analyses of the MLSRA demonstrated that when AAIs were coded for secure base script knowledge, they were in fact significantly more strongly associated with the observed quality of antecedent caregiving ($r = \sim 0.35$) than were the existing, traditional ratings of coherence ($r = \sim 0.15$; Waters et al., 2017). However, whether these associations might replicate in a larger, non-poverty sample has yet to be examined. Furthermore, the associations between AAI_{sbs} and other caregiving variables such as paternal sensitivity and infant attachment have also not been examined.

1 | THE PRESENT STUDY

Taken together, the pre-registered analyses presented here extend the work described above by examining the caregiving antecedents of secure base script knowledge as measured by the AAI (AAI_{sbs}) in a large ($n = 857$), normative-risk longitudinal study, the SECCYD. Furthermore, this study investigated the extent to which AAI_{sbs} more strongly and/or incrementally retrodicts early caregiving experiences compared to other measures of attachment representations (i.e., ASA secure base script knowledge and the traditional AAI coding system, which measures adults' states of mind regarding childhood attachment experiences). Note that this study was pre-registered on OSF[1] and statistical significance in this project is operationalized as an alpha less than 0.05. That said, the principle interpretive focus of this work is on the magnitude of effects generated in the largest sample available to precisely estimate the magnitude of associations between direct observations of childhood caregiving and adult attachment representations as measured by the AAI.

The present study had five aims. *Aim 1* estimated how strongly secure base script knowledge as measured by the AAI (i.e., AAI_{sbs}) was contemporaneously associated with: (a) secure base script knowledge as measured by the ASA and (b) AAI states of mind, as assessed using the traditional coding system (i.e., secure vs. insecure, coherence of mind, dismissing, and preoccupied states of mind). Recent evidence has found that AAI_{sbs} and ASA are only moderately associated ($r = 0.50$; Waters, Facompré, Dagan, et al., 2021). The goal of Aim 1 was to determine whether

AAI_{sbs} demonstrates convergent validity with existing, validated measures of adult attachment. Evidence from the MLSRA has demonstrated a moderate-sized association between AAI_{sbs} and the AAI coherence of mind scale at age 19 years ($r = 0.23$) and age 26 years ($r = 0.29$) as well as between AAI security versus insecurity at age 26 years, $r = 0.33$. (AAI security vs. insecurity at age 19 years was not significantly associated with AAI_{sbs} at age 19 years; $r = 0.15$, $p > 0.05$). Furthermore, Steele et al. (2014) reported that ASA scores were moderately associated with AAI coherence ($r = 0.42$), AAI dismissing states of mind ($r = -0.39$), and preoccupied states of mind ($r = -0.20$) in the SECCYD. No study to date has examined the associations between AAI_{sbs} and AAI dismissing and preoccupied states of mind. Given the prior evidence, we hypothesized that AAI_{sbs} will be at least moderately and positively associated ($r = \sim 0.24$, consistent with Cohen's criteria; Cohen, 1994) with all other indicators of adult attachment drawn from the AAI and ASA.

Aim 2 examined the extent to which AAI_{sbs} has its origins in attachment-related experiences in childhood and adolescence (i.e., maternal and paternal sensitivity, attachment security). Previous evidence (i.e., Schoenmaker et al., 2015; Steele et al., 2014; Waters et al., 2017) supports the claim that secure base script knowledge has its origins in early experiences (i.e., parental sensitivity and attachment quality). The goal of Aim 2 was to examine the extent to which AAI_{sbs} has its origins in early caregiving experiences, consistent with a key tenet of attachment theory (Bowlby, 1969/1982). Waters et al. (2017) found that maternal sensitivity was moderately-to-strongly associated with AAI_{sbs} assessed at age 19 ($r = 0.33$) and 26 ($r = 0.37$) in the MLSRA. The extent to which infant attachment and AAI_{sbs} are associated has yet to be examined. However, Steele et al. (2014) found in the SECCYD that secure base script knowledge as measured by the ASA was moderately associated with maternal ($r = 0.27$) and paternal ($r = 0.28$) sensitivity and modestly associated with attachment security ($r = 0.14$). Schoenmaker et al. (2015) found in their adoption study that parental sensitivity was also predictive of ASA scores assessed at 23 years ($r = \sim 0.20$). Given prior evidence, we hypothesized that AAI_{sbs} would be at least moderately and positively associated ($r = \sim 0.24$, consistent with Cohen's criteria; Cohen, 1994) with antecedent maternal and paternal sensitivity. Given that previous evidence examining the associations between existing adult attachment measures and infant attachment security found a fairly-weak association in light of relevant theory ($r = 0.14$; Steele et al., 2014), we were not well positioned to estimate how strongly infant attachment is associated with AAI_{sbs}. Therefore, examining the association between AAI_{sbs} and infant attachment security was largely exploratory.

Aim 3 compared associations between early caregiving experiences and AAI_{sbs} relative to those already established between early caregiving experiences and: (a) secure base script knowledge as assessed by the ASA and (b) the traditional coding scales of the AAI. The goal of Aim 3 was to understand the extent to which AAI_{sbs} coding systems might perform *as well or better than* existing adult attachment measures given both the conceptual and practical benefits of the AAI_{sbs} coding system. *Aim 3a* examined whether AAI_{sbs} *more strongly* retrodicts early experiences compared to the ASA and the traditional coding scales of the AAI. Previously documented evidence investigating the extent to which AAI_{sbs} was more strongly associated with early experiences compared to the AAI was reported in two studies based on the MLSRA (i.e., Nivison, Facompré, et al., 2021; Waters et al., 2017). Waters et al. (2017) found that AAI_{sbs} at both ages 19 and 26 years were more strongly associated with antecedent, observed maternal sensitivity than was AAI coherence as assessed via a Steiger's Z comparison. The extent to which AAI_{sbs} is more strongly associated with early experiences compared to the ASA, AAI security, and AAI dismissing/preoccupied states of mind have yet to be examined. However, Steele et al. (2014) found that, apart from paternal sensitivity, AAI dimensions tended to be as strongly predicted by security in infancy and antecedent maternal sensitivity as was secure base script knowledge as measured in the ASA. Given the results of Waters et al. (2017), we attempted here to replicate evidence that AAI_{sbs} will be more strongly associated with maternal sensitivity than is AAI coherence and other traditional indicators of AAI states of mind in the SECCYD. Evidence in support of replication would be that relevant Steiger's Z comparison tests will be significant, $p < 0.05$.

Aim 3b extends Aim 3 a by examining whether AAI_{sbs} *incrementally* retrodicts early experiences compared to the ASA and the traditional coding scales of the AAI. The extent to which AAI_{sbs} incrementally retrodicts the early experiences to be studied here (i.e., parental sensitivity, attachment security) compared with the ASA and the traditional coding scales of the AAI has yet to be examined and is exploratory in nature.

Aim 3c examined, using mediational analyses, whether AAI_{sbs} *accounts for* already established associations between early experiences and the ASA/AAI traditional system. The goal of the mediation analyses was to assess the extent to which AAI_{sbs} overlaps in its association with early caregiving compared to previously established associations between early caregiving and traditional measures of adult attachment (Booth-LaForce, & Roisman, 2014; Steele et al., 2014). Results from Steele et al. (2014) indicated that ASA scores accounted for statistically significant proportions of the variance in the associations between the caregiving antecedents (i.e., parental sensitivity, attachment security) and traditional AAI coding scales. The size of these mediated effects ranged from 0.04–0.10 for maternal sensitivity, 0.05–0.11 for paternal sensitivity, and 0.02–0.06 for the proportion of times secure. According to Preacher and Kelley's (2011) effect size metric (small effect = 0.01, medium effect = 0.09, large effect = 0.25), the mediation effects were approximately small-to-medium in magnitude. Given prior evidence, we hypothesized that AAI_{sbs} would significantly mediate the association between maternal sensitivity and AAI coherence, and that these mediated effects would be small-to-medium in magnitude (0.01–0.09; Preacher & Kelley, 2011). Whether AAI_{sbs} mediates the associations between paternal sensitivity/infant attachment and AAI coherence has yet to be examined. In addition, whether AAI_{sbs} mediates the associations between maternal and paternal sensitivity/infant attachment and ASA scores has also not yet been examined and is exploratory.

When statistically significant evidence of mediation was found, Preacher and Kelley's (2011) effect size metric (small effect = 0.01, medium effect = 0.09, large effect = 0.25) was used to determine the magnitude of the mediated effect. These benchmarks will be leveraged in our interpretation of to what extent the AAI_{sbs} "recovers" previously documented associations between more transitional assessments of adult attachment representations and the prospective indicators of early caregiving and early attachment status.

Aim 4 studied whether and how family risk status (i.e., family income-to-needs) moderated the association between childhood caregiving experiences and each measure of adult attachment (i.e., AAI_{sbs}, ASA, and AAI traditional systems) in the SECCYD and compared to existing data from a cohort born into poverty, the Minnesota Longitudinal Study of Risk and Adaptation (MLSRA). The goal of Aim 4 was to understand the extent to which the findings from the MLSRA generalize to a larger, normative-risk sample.

There is increasing evidence that the traditional coding system for the AAI, which focuses on the coherence of adults' discourse about their childhood experiences with primary caregivers, underperforms in higher-risk families compared to lower-risk ones. Perhaps the most compelling evidence for this claim comes from the Verhage et al. (2016, 2018) meta-analyses of the literature on the intergenerational transmission of attachment security, which demonstrate that the association between the coherence of adults' narratives about experiences with their primary caregivers is significantly more strongly associated with the attachment security of their own children in lower risk ($r = 0.39$) compared with higher-risk families ($r = 0.14$). Although only a handful of studies exist with respect to the *developmental origins* of coherent AAI states of mind, the observed quality of early maternal caregiving likewise more strongly predicted the coherence of adults' AAI discourse in the large, normative risk SECCYD ($r = 0.33$; Steele et al., 2014) than in the MLSRA ($r = 0.19$; Nivison, Facompré, et al., 2021), a study of children all of whom were born into poverty (see also Fraley, 2002, for similar evidence related to the stability of attachment in the first two decades of life).

Taken together, existing evidence supports a view that the traditional system for coding the AAI produces less robust evidence that coherent AAI states of mind have theory-consistent roots in early caregiving and predict attachment security in the next generation in families at risk (e.g., low income) compared to those who are not. In the current report, we further extended such work by examining for the first time whether, *within the SECCYD*, family income-to-needs moderates associations between observations of maternal and paternal caregiving and AAI states of mind as assessed using the traditional coding system. In light of the results of existing work just reviewed, we expected that the observed quality of early caregiving would be more strongly associated with coherent AAI states of mind among children from more well-resourced families compared to those with lower income-to-needs. Although the precise form of these interactions is difficult to predict in advance (e.g., it is no clear whether we should expect an ordinal or disordinal interaction), we assume that higher quality early caregiving will be positively associated with more coherent states of mind as assessed by the AAI, albeit more strongly in the case of individuals from higher income families.

Prior evidence that the traditional coding system for the AAI underperforms in higher-risk families can be interpreted *substantively* to suggest that, in the context of poverty, unmeasured factors outside the quality of early care are disproportionately important in the development of adult attachment representations. However, an alternative hypothesis is that the traditional approach to measuring adult attachment security itself (i.e., with attention to individual differences in the coherence of adults' discourse) may simply be a less valid assessment strategy among participants who grew up in lower compared to higher income families. Furthermore, it could be that more direct assessments of individuals' underlying attachment representations (e.g., secure base script knowledge) perform just as well in the higher- and lower-risk case. Though no direct test of this hypothesis exists in the literature, partial support for this possibility exists by way of published analyses of the MLSRA, which show that, when coded for secure base script knowledge, AAIs in this high-risk sample were notably more strongly associated with observations of maternal caregiving ($r = 0.34$) and with attachment in the next generation ($r = 0.38$) compared to assessments of coherence leveraging the very same AAIs administered at ages 19 and 26 years ($r = 0.19$ for maternal sensitivity-coherence and $r = 0.08$ for coherence-infant attachment). (Please note that the ASA subsample, $n = 673$, is smaller than the AAI subsample ($n = 857$), which will be considered when comparing the possible moderating role of family-risk status between AAI_{sbs}, AAI traditional systems, and ASAs. We will compare relevant effects in the full sample available *and* in the sample available for the ASA data).

In the current study, we more formally tested the hypothesis that secure base script knowledge is a valid assessment of attachment security in both higher and lower-risk families in two ways. First, we examined in the SECCYD whether the magnitude of associations between parental caregiving and AAI_{sbs} are roughly comparable among participants from relatively well-resourced and lower-income families in the sample. Such a result would be consistent with the view that adult attachment representations—at least when assessed with a focus on individual differences in secure base script knowledge—are comparably valid assessments for individuals growing up in higher and lower-risk conditions. Because we anticipated a null result (i.e., we did not expect that associations between observations of early caregiving and AAI_{sbs} would be moderated by family income to needs), we initially planned to use equivalence testing to assess whether the expected absence of a significant difference between the interaction terms is indeed negligible (i.e., an effect size that is below the smallest effect size of interest). Based on the attachment field-specific effect sizes proposed by Schuengel et al. (2021), we intended to test three sets of equivalence bounds (with alpha of 0.05): for small effect size ($-0.1 < r < 0.1$), medium effect size ($-0.2 < r < 0.2$), and large effect size ($-0.3 < r < 0.3$). Second, we examined whether the already established association between maternal caregiving and AAI_{sbs} in the MLSRA ($r = 0.34$)—again a higher risk cohort due to poverty—is roughly equivalent to the same association that we are now poised to estimate in the SECCYD—a normative risk cohort. We examined whether there was a significant difference between these two independent correlations (i.e., SECCYD and MLSRA) by applying a Fisher's *r* to *z* transformation as outlined in Weaver and Wuensch (2013). If the difference between the magnitude of the associations in the MLSRA and SECCYD is non-significant then we would conclude that secure base script knowledge as measured in the AAI is comparably valid for individuals growing up in both higher and lower-risk environments.

Finally, *Aim 5* examined to what extent the antecedents of AAI_{sbs} are generalizable across varying populations (e.g., ethnicity, sex, etc.). *Aim 5a* studied whether and how child ethnicity and child sex moderate the associations between childhood caregiving experiences and AAI_{sbs}. Although direct comparisons across race/ethnicity and sex do not yet exist with respect to the antecedents and consequences of AAI_{sbs} specifically, existing evidence using the traditional AAI system suggests similar caregiving antecedents and parenting correlates of AAI states of mind across males and females and Black and White individuals in the US (Haltigan et al., 2014, 2019). Given previous evidence, as well as the universality claims implicit in attachment theory (Bowlby, 1969/1982), we did not expect that race or sex would significantly moderate the association between caregiving antecedents and $AAI_{sbs.}$ We again planned to use equivalence testing to assess whether the expected absence of a significant difference between the interaction terms is indeed negligible following the effect sizes proposed by Schuengel et al. (2021).

Aim 5b examined whether the associations outlined in Aims 2-5a are robust to demographic covariates (i.e., child sex, child ethnicity, childhood income-to-needs, maternal education) and child cognitive functioning. In light of

previously documented evidence (e.g., Nivison, Facompré, et al., 2021; Steele et al., 2014; Waters et al., 2017) we expected the analyses outlined in Aims 2-5a to be robust to child sex, child ethnicity, childhood SES, and maternal education. The extent to which the association between caregiving and AAI_{sbs} is robust to cognitive functioning has yet to be explored and therefore is exploratory in nature.

2 | METHOD

2.1 | Participants

Participants were drawn from the NICHD Study of Early Child and Youth Development (SECCYD). The SECCYD is an ongoing longitudinal that has followed (initially) 1364 target participants and their families sampled from 10 sites across the United States from birth to 30-years (for detailed information see NICHD Early Child Care Research Network, 2005). The NICHD SECCYD dataset is publicly available through the age 15-year assessment of the cohort.[2] Subsequent assessments are not publicly available, though variables are available from the authors upon request to reproduce the analyses presented here. The present study leveraged two subsamples of the SECCYD: (1) participants who completed an Adult Attachment Interview (AAI; Main et al., 1985) at the age 18 assessment ($n = 857$) and (2) those who completed an ASA at age 18 (Waters & Waters, 2006). To maximize sample sizes, participants were included in the first set of analyses if the following two criteria were met: (1) data were available for the AAI at age 18 years and (2) data were available for any of the predictor variables at any time point. Participants were included in the second set of analyses if the following three criteria were met: (1) data were available for the ASA at age 18 years, (2) data were available for the AAI at age 18 years, and (3) data were available for any of the predictor variables at any time point. The follow-up of the SECCYD and related analyses were approved by the University of Minnesota ethics review board (title: "Follow- up of the NICHD Study of Early Child Care and Youth Development"; IRB ID 1207S16927).

As reported in Steele et al. (2014), the AAI and ASA subsamples did not differ significantly from one another on sex composition, ethnicity, maternal years of education, or average income-to-needs ratio. There were significant differences in demographic composition between the AAI and ASA sample and the full sample at the first assessment (see Booth-LaForce & Roisman, 2014; Steele et al., 2014, for more information). Importantly, these differences were trivial to small in magnitude based on Cohen's (1992) criteria.

3 | MEASURES

3.1 | Adult attachment measures

3.1.1 | Adult Attachment Interview

At age 18 years, the Adult Attachment Interview (AAI; George et al., 1985) was administered. The AAI was originally developed to study the intergenerational transmission of attachment and is a semi-structured, 20-question protocol (approximately 1–1.5 hours in duration), that requires participants to describe their early relationships with their parents, revisit salient separation episodes, explore instances of perceived childhood rejection, recall encounters with loss, describe aspects of their current relationship with parents, and discuss salient changes that may have occurred from childhood to maturity.

3.1.2 | AAI_{sbs}

AAIs were coded using a recently developed system based on the extent to which an individual's narrative provides evidence of access to and elaborated knowledge of the secure base script ($AAI_{sbs;}$ Waters & Facompré, 2021; Waters

TABLE 1 Bivariate associations among all study variables within the AAI sample ($N = 857$).

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. AAI_{sbs}	–												
2. AAI coherence	0.42**	–											
3. AAI secure/insecure	0.34**	0.79**	–										
4. AAI dismissing	−0.38**	−0.83**	−0.81**	–									
5. AAI preoccupied	−0.29**	−0.39**	−0.33**	0.07*	–								
6. Maternal sensitivity	0.21**	0.32**	0.28**	−0.33**	−0.20**	–							
7. Paternal sensitivity	0.12**	0.18**	0.17**	−0.16**	−0.11**	0.40**	–						
8. Infant attachment	0.08*	0.13**	0.11**	−0.11**	−0.13**	0.34**	0.15**	–					
9. Child sex	0.13**	0.19**	0.14**	−0.25**	0.10**	0.08*	0.07	0.03	–				
10. Child ethnicity	0.15**	0.16**	0.14**	−0.14**	−0.14**	0.40**	0.13**	0.15**	0.04	–			
11. Family income-to-needs ratio	0.12**	0.20**	0.14**	−0.16**	−0.14**	0.42**	0.21**	0.16**	0.03	−0.23**	–		
12. Maternal education	0.14**	0.25**	0.17**	−0.23**	−0.12**	0.51**	0.24**	0.18**	0.05	0.25**	0.55**	–	
13. Cognitive functioning	0.14**	0.31**	0.26**	−0.28**	−0.15**	0.49**	0.27**	0.26**	−0.04	0.31**	0.40**	0.48**	–
Mean	4.03	4.99	0.59	−0.22	−0.23	0.00	0.00	0.60	1.51	0.78	4.13	14.56	105.81
SD	1.93	1.44	0.49	0.40	0.22	1.00	1.00	0.30	0.50	0.41	3.13	2.44	10.38
N	857	857	857	857	857	857	745	825	857	857	856	857	857

Note: AAI_{sbs} = secure base script knowledge measured in the Adult Attachment Interview; AAI coherence = AAI coherence of mind; AAI secure/insecure = categorical AAI security code; AAI Dismissing and Preoccupied = Dismissing and Preoccupied based on the AAI Q-set; Maternal Sensitivity = composite variable of observed maternal sensitivity; Paternal sensitivity = composite variable of observed paternal sensitivity; Infant attachment = proportion of times secure in infant attachment assessments; Child sex = male coded as 1, female coded as 2; Child Ethnicity = white/non-Hispanic coded as 1, other coded as 0; Family income-to-needs ratio = composite Family income-to-needs ratio; Maternal education = total number of years of mother education; Cognitive functioning = composite of the standard scores of the Woodcock-Johnson.
*$p < 0.05$.**$p < 0.01$.

TABLE 2 Bivariate associations among all study variables within the ASA sample ($N = 673$).

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. AAI_{sbs}	–													
2. AAI coherence	0.41**	–												
3. AAI secure/insecure	0.34**	0.79**	–											
4. AAI dismissing	−0.38**	−0.82**	−0.80**	–										
5. AAI preoccupied	−0.28**	−0.40**	−0.35**	0.06	–									
6. ASA	0.31**	0.42**	0.33**	−0.39**	−0.20**	–								
7. Maternal sensitivity	0.19**	0.33**	0.29**	−0.34**	−0.19**	0.27**	–							
8. Paternal sensitivity	0.12**	0.17**	0.15**	−0.15**	−0.09*	0.28**	0.40**	–						
9. Infant attachment	0.05	0.13**	0.09**	−0.09*	−0.15**	0.14**	0.30**	0.14**	–					
10. Child sex	0.10**	0.18**	0.13**	−0.24**	0.10**	0.21**	0.10**	0.09*	0.02	–				
11. Child ethnicity	0.14**	0.17**	0.15**	−0.15**	−0.14**	0.14**	0.41**	0.12**	0.14**	0.03	–			
12. Family income-to-needs ratio	0.13**	0.23**	0.14**	−0.18**	−0.15**	0.17**	0.45**	0.24**	0.16**	0.06	0.27**	–		
13. Maternal education	0.14**	0.25**	0.18**	−0.25**	−0.11**	0.20**	0.50**	0.23**	0.17**	0.07	0.29**	0.58**	–	
14. Cognitive functioning	0.10*	0.30**	0.24**	−0.26**	−0.15**	0.25**	0.50**	0.25**	0.25**	−0.06	0.34**	0.42**	0.49**	–
Mean	3.97	4.98	0.60	−0.03	−0.22	3.71	−0.02	−0.02	0.60	1.52	0.77	4.10	14.53	105.88
SD	1.94	1.45	0.49	0.41	0.24	1.05	0.99	1.03	0.30	0.50	0.42	2.95	2.41	10.28
N	673	673	673	673	673	673	673	581	652	673	673	672	673	673

Note: AAI_{sbs} = secure base script knowledge measured in the Adult Attachment Interview; AAI coherence = AAI coherence of mind; AAI secure/insecure = categorical AAI security code; AAI Dismissing and Preoccupied = Dismissing and Preoccupied based on the AAI Q-set; ASA = composite attachment script assessment score; Maternal Sensitivity = composite variable of observed maternal sensitivity; Paternal sensitivity = composite variable of observed paternal sensitivity; Infant attachment = proportion of times secure in infant attachment assessments; Child sex = male coded as 1, female coded as 2; Child Ethnicity = white/non-Hispanic coded as 1, other coded as 0; Family income-to-needs ratio = composite Family income-to-needs ratio; Maternal education = total number of years of mother education; Cognitive functioning = composite of the standard scores of the Woodcock-Johnson.
*$p < 0.05$.**$p < 0.01$.

TABLE 3 Linear regression of all caregiving variables predicting AAI_{sbs} including demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
Maternal sensitivity	0.39	0.08	0.19	4.60	<0.01	0.04	
Paternal sensitivity	0.08	0.08	0.04	1.07	0.28		
Infant attachment	0.00	0.25	0.00	−0.01	0.99		
Step 2							
Maternal sensitivity	0.29	0.10	0.14	2.94	<0.01	0.07	0.03**
Paternal sensitivity	0.08	0.08	0.04	1.05	0.29		
Infant attachment	0.01	0.25	0.00	0.02	0.98		
Child sex	0.43	0.14	0.11	3.07	<0.01		
Child ethnicity	0.44	0.19	0.09	2.30	0.02		
Family income-to-needs ratio	−0.01	0.03	−0.02	−0.39	0.70		
Maternal education							
Step 3							
Maternal sensitivity	0.28	0.10	0.14	2.82	0.01	0.07	0.00
Paternal sensitivity	0.08	0.08	0.04	1.01	0.31		
Infant attachment	0.00	0.25	0.00	−0.01	0.99		
Child sex	0.43	0.14	0.11	3.09	<0.01		
Child ethnicity	0.44	0.19	0.09	2.26	0.02		
Family income-to-needs ratio	−0.01	0.03	−0.02	−0.41	0.68		
Maternal education	0.02	0.04	0.02	0.49	0.63		
Cognitive functioning	0.00	0.01	0.01	0.33	0.74		

Note: $N = 720$. AAI_{sbs} = secure base script knowledge measured in the Adult Attachment Interview.
**$p < 0.01$.

TABLE 4 Steiger's Z comparisons of associations between all attachment measures and maternal sensitivity.

	ASA & Maternal sensitivity		AAI Security & Maternal sensitivity		AAI Coherence & Maternal sensitivity		AAI dismissing & maternal sensitivity		AAI Preoccupied & Maternal sensitivity	
Comparisons	*Z*	*p*	*Z*	*p*	*Z*	*p*	*Z*	*p*	*Z*	*p*
AAI_{sbs} & Maternal sensitivity	−1.83	0.07	−1.86	0.06	−3.14	<0.01	−3.32	<0.01	0.25	0.80
N	673		857		857		857		857	

Note: Positive significant Z value indicates the AAI_{sbs} variable was more strongly associated with maternal sensitivity, negative significant Z value indicates the other attachment measure (AAI security, coherence, dismissing, preoccupied) variable was more strongly associated with maternal sensitivity. No significant difference means that neither AAI_{sbs} or the other attachment measure was more strongly associated with the caregiving variable.

et al., 2017). The AAI_{sbs} coding system focuses only on the first 6 questions of the AAI (up to and including the upset question) and is rated on a 9-point scale for the extent to which the narratives produced in the interview follow, or imply, the secure base script. The AAI_{sbs} coding system evaluates two types of content: (1) explicit or implied secure

base expectations (e.g., caregiver responsivity, availability, and provision of effective comfort) and (2) recall of specific autobiographical memories that follow the secure base script (i.e., secure base scenes). Those receiving the highest score produce multiple specific memories that follow the secure base script. Those receiving the lowest score provide evidence that is a direct contradiction to the themes of the secure base script (e.g., harsh or even abusive parenting).

Transcripts were coded for this analysis by a team of two coders with one master coder coding a subset of reliability cases. The team of coders began with coding 80 randomly chosen calibration cases. ICCs for the first 80 transcripts for AAI_{sbs} ranged from 0.83–0.91. (Coder 1 [MDN] and Coder 2 [OD], ICC = 0.83; Coder 1 and Expert Coder [TW], ICC = 0.88; Coder 2 and Expert Coder = 0.91). The remaining sample ($n = 777$) was coded by Coders 1 and 2 with 33% of reliability cases overlapped. Coders 1 and 2 demonstrated moderately high reliability (ICC = 0.88, $n = 259$). The Expert Coder also coded 60% of these reliability cases ($n = 156$). Coder 1 and Coder 2 demonstrated high reliability with the Expert Coder (ICC = 0.96, 0.91, respectively). Overall, the full sample ($n = 857$) was coded by Coder 1 and Coder 2 with ~40% cases ($n = 339$) overlapping for reliability. For the full reliability sample (including the first 80 calibration cases) Coder 1 and Coder 2 demonstrated moderately high reliability (ICC = 0.86). For the full sample, ~28% of cases ($n = 236$) were coded by the Expert Coder. Coders 1 and 2 demonstrated moderately high reliability with the Expert Coder (ICC = 0.93, 0.91, respectively, $n = 236$). All reported ICCs are mixed model, absolute agreement, and average measures. To date, these data have not been analyzed in relation to any other data from the SECCYD.

TABLE 5 Steiger's Z comparisons of associations between all attachment measures and paternal sensitivity.

	ASA & Paternal sensitivity		AAI Security & Paternal sensitivity		AAI Coherence & Paternal sensitivity		AAI dismissing & paternal sensitivity		AAI Preoccupied & Paternal sensitivity	
Comparisons	***Z***	***p***	***Z***	***p***	***Z***	***p***	***Z***	***p***	***Z***	***p***
AAI_{sbs} & Paternal sensitivity	−3.43	<0.01	−1.20	0.23	−1.54	0.12	−0.99	0.32	0.23	0.82
N	581		745		745		745		745	

Note: Positive significant Z value indicates the AAI_{sbs} variable was more strongly associated with paternal sensitivity, negative significant Z value indicates the other attachment measure (AAI security, coherence, dismissing, preoccupied) variable was more strongly associated with paternal sensitivity. No significant difference means that neither AAI_{sbs} or the other attachment measure was more strongly associated with the caregiving variable.

TABLE 6 Steiger's Z comparisons of associations between all attachment measures and infant attachment.

	ASA & Infant Attachment		AAI Security & Infant Attachment		AAI Coherence & Infant Attachment		AAI dismissing & infant attachment		AAI Preoccupied & Infant Attachment	
Comparisons	***Z***	***p***	***Z***	***p***	***Z***	***p***	***Z***	***p***	***Z***	***p***
AAI_{sbs} & Infant Attachment	−1.97	0.05	−0.75	0.45	−1.33	0.18	−0.78	0.44	−1.21	0.23
N	652		825		825		825		825	

Note: Positive significant *Z* value indicates the AAI_{sbs} variable was more strongly associated with infant attachment, negative significant *Z* value indicates the other attachment measure (AAI security, coherence, dismissing, preoccupied) variable was more strongly associated with infant attachment. No significant difference means that neither AAI_{sbs} or the other attachment measure was more strongly associated with the caregiving variable.

TABLE 7 Hierarchal linear regressions of ASA predicting maternal sensitivity controlling for AAI_{sbs}, demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
ASA	0.25	0.04	0.27	7.27	<0.01	0.07	
Step 2							
ASA	0.22	0.04	0.24	6.04	<0.01	0.09	0.02**
AAI_{sbs}	0.06	0.02	0.12	2.97	<0.01		
Step 3							
ASA	0.12	0.03	0.13	3.83	<0.01	0.38	0.29**
AAI_{sbs}	0.02	0.02	0.05	1.44	0.15		
Child sex	0.06	0.06	0.03	0.90	0.37		
Child ethnicity	0.58	0.08	0.25	7.62	<0.01		
Family income-to-needs ratio	0.06	0.01	0.19	4.94	<0.01		
Maternal education	0.12	0.02	0.29	7.48	<0.01		
Step 4							
ASA	0.08	0.03	0.09	2.69	<0.01	0.41	0.03**
AAI_{sbs}	0.03	0.02	0.05	1.68	0.09		
Child sex	0.12	0.06	0.06	1.95	0.05		
Child ethnicity	0.50	0.08	0.20	6.27	<0.01		
Family income-to-needs ratio	0.05	0.01	0.15	3.97	<0.01		
Maternal education	0.09	0.02	0.21	5.43	<0.01		
Cognitive functioning	0.02	0.00	0.24	6.44	<0.01		

Note: $N = 672$. ASA = Attachment Script Assessment. AAI_{sbs} = secure base script knowledge measured in the Adult Attachment Interview.
**$p < 0.01$.

3.1.3 | AAI traditional coding

Transcripts were previously coded using Main and Goldwyn's (1998) standard classification-based coding system. More specifically, the Adult Attachment Interview Classification System was used by trained and reliable AAI coders to categorize participants' transcripts into one of three primary attachment classifications (secure/autonomous, dismissing, or preoccupied) according to the criteria outlined by Main and Goldwyn (1998). Coders also assessed several "state of mind" scales including idealization, derogation, anger, passivity, meta-cognitive monitoring, fear of loss, unresolved loss, and trauma. Overall narrative coherence of each transcript is rated along a 9-point scale, "coherence of mind." In addition, in light of factor-analytic and taxometric evidence indicating that AAI narratives vary along two key dimensions (i.e., dismissing and preoccupied) and recommendations by Haydon et al. (2014), we also used the AAI Q-set (Kobak, 1993) to scale participants on dismissing and preoccupied states of mind (this choice is also consistent with prior analysis of these data in Booth-LaForce & Roisman, 2014). Importantly, two separate groups of researchers coded transcripts for AAI_{sbs} and the traditional coding systems. In order to be cautiously comprehensive, examined three sets of summary indicators based on the traditional coding systems for the AAI: (1) secure vs insecure (categorical) from the Main and Goldwyn scoring system, (2) the summary coherence score from the traditional coding system from the Main and Goldwyn scoring system, and (3) the combination of the i. dismissing and ii. preoccupied state of mind scale based on the AAI Q-set (Kobak, 1993).

3.1.4 | Attachment script assessment

At the age 18 assessment the adolescent version of the attachment script assessment (ASA; Dykas et al., 2006; Waters & Waters, 2006; Waters & Waters, 2021; Waters et al., 2019) was administered. The ASA is a narrative-based measure of attachment where individuals are asked to tell the best story that they can based on a list of 12 words that serve as a word-prompt outline. Four stories focus on parent–child relationships (two mother- and two father-child stories). Each of the stories outlines a distressing event (e.g., studying for an exam, a tennis match) that triggers the adolescent to seek out an attachment figure. The narratives were coded for the extent to which the content follows the themes of the secure base script. Each ASA story was coded on a 7-point secure base script knowledge scale (1 = No secure base script content is apparent to 7 = extensive secure base script organization with substantial elaboration) developed by Waters and Rodrigues (2001). None of the ASA coders were involved with the coding of the AAIs and all were blind to all other data available on the SECCYD participants. As in most prior studies using the ASA (e.g., Bost et al., 2006) and all prior analyses of the SECCYD ASA data (e.g., Steele et al., 2014), analyses in the current report focused on a single composite score derived by averaging the secure base script knowledge scores across all four stories (see also Waters et al., 2015, for evidence that the four stories load on a single factor). As reported in Steele et al. (2014) coder reliability within and across coding sites produced ICCs between 0.93 and 0.95 and were considered high. ASA scores for each story were averaged to produce a single score (α = 0.78; Steele et al., 2014).

TABLE 8 Hierarchal linear regressions of AAI security predicting maternal sensitivity controlling for AAI_{sbs}, demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
AAI_{sec}	0.58	0.07	0.29	8.71	<0.01	0.08	
Step 2							
AAI_{sec}	0.49	0.07	0.24	6.95	<0.01	0.10	0.02**
AAI_{sbs}	0.07	0.02	0.13	3.81	<0.01		
Step 3							
AAI_{sec}	0.31	0.06	0.15	5.30	<0.01	0.39	0.29**
AAI_{sbs}	0.03	0.02	0.06	1.93	0.05		
Child sex	0.05	0.05	0.02	0.83	0.41		
Child ethnicity	0.61	0.07	0.25	9.01	<0.01		
Family income-to-needs ratio	0.05	0.01	0.16	4.76	<0.01		
Maternal education	0.13	0.01	0.33	9.90	<0.01		
Step 4							
AAI_{sec}	0.24	0.06	0.12	4.07	<0.01	0.42	0.03**
AAI_{sbs}	0.03	0.02	0.05	1.93	0.06		
Child sex	0.09	0.05	0.04	1.62	0.11		
Child ethnicity	0.52	0.07	0.22	7.73	<0.01		
Family income-to-needs ratio	0.04	0.01	0.12	7.52	<0.01		
Maternal education	0.10	0.01	0.25	6.82	<0.01		
Cognitive functioning	0.02	0.00	0.22	6.82	<0.01		

Note: $N = 856$. AAI_{sec} = 2-way categorical AAI security code (secure versus insecure). AAI_{sbs} = secure base script knowledge measured in the Adult Attachment Interview.
**$p < 0.01$.

TABLE 9 Hierarchal linear regressions of AAI coherence predicting maternal sensitivity controlling for AAI_{sbs}, demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
AAI_{coh}	0.22	0.02	0.32	9.85	<0.01	0.10	
Step 2							
AAI_{coh}	0.19	0.03	0.28	7.85	<0.01	0.11	0.01**
AAI_{sbs}	0.05	0.02	0.10	2.78	<0.01		
Step 3							
AAI_{coh}	0.10	0.02	0.15	4.82	<0.01	0.38	0.27**
AAI_{sbs}	0.03	0.02	0.05	1.65	0.10		
Child sex	0.03	0.06	0.02	0.60	0.55		
Child ethnicity	0.62	0.07	0.26	9.06	<0.01		
Family income-to-needs ratio	0.05	0.01	0.15	4.62	<0.01		
Maternal education	0.13	0.01	0.32	9.58	<0.01		
Step 4							
AAI_{coh}	0.07	0.02	0.10	3.38	<0.01	0.42	0.04**
AAI_{sbs}	0.03	0.02	0.05	1.80	0.07		
Child sex	0.08	0.05	0.04	1.47	0.14		
Child ethnicity	0.53	0.07	0.22	7.78	<0.01		
Family income-to-needs ratio	0.04	0.01	0.12	3.65	<0.01		
Maternal education	0.10	0.01	0.25	7.33	<0.01		
Cognitive functioning	0.02	0.00	0.12	6.79	<0.01		

Note: $N = 856$. AAI_{coh} = AAI coherence of mind; AAI_{sbs} = secure base script knowledge measured in the Adult Attachment Interview.
**$p < 0.01$.

3.2 | Antecedent caregiving variables and covariates

3.2.1 | Parental sensitivity

Direct observations 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 in 15-minute semi-structured tasks in which children were videotaped engaging in developmentally appropriate tasks their mother/father provided assistance at younger ages, at older ages joint tasks, such as discussion tasks were used (Owen et al., 1996). Qualities of parenting and child behavior in the parent–child interaction tasks were rated from the videotaped interactions by trained coders under the supervision of Dr. Margaret Owen (UT-Dallas). Seven-point rating scales were adapted from Egeland and Hiester (1993) for age- and task appropriateness and include parent supportive presence, respect for autonomy, hostility, cognitive stimulation, and quality of assistance, and child agency, negativity, affection for parent, and felt security. The videotaped interactions at age 15 were coded using 7-point global rating scales developed for the study by Owen from Joseph Allen's Autonomy and Relatedness coding system (Allen et al., 2000; Allen et al., 2001) and rating scales from the SECCYD used at previous ages. For more information regarding the tasks, scoring system, and reliability data see Booth-LaForce et al. (2014). As in prior studies in the SECCYD, and specifically studies in the SECCYD examining the predictors of adult attachment (Haltigan et al., 2019; Nivison,

TABLE 10 Hierarchal linear regressions of AAI dismissing and preoccupied states of mind predicting maternal sensitivity controlling for AAI_{sbs}, demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
AAI_{dism}	−0.78	0.08	−0.32	−9.93	<0.01	0.14	
AAI_{Prec}	−0.78	0.14	−0.18	−5.48	<0.01		
Step 2							
AAI_{dism}	−0.74	0.09	−0.30	−8.63	<0.01	0.14	0.00
AAI_{prec}	−0.72	0.15	−0.16	−4.84	<0.01		
AAI_{sbs}	0.03	0.02	0.06	1.53	0.13		
Step 3							
AAI_{dism}	−0.45	0.08	−0.18	−6.01	<0.01	0.40	0.26**
AAI_{prec}	−0.38	0.13	−0.09	−3.02	<0.01		
AAI_{sbs}	0.01	0.02	0.02	0.66	0.51		
Child sex	0.03	0.06	0.01	0.44	0.66		
Child ethnicity	0.60	0.07	0.25	8.86	<0.01		
Family income-to-needs ratio	0.05	0.01	0.15	4.62	<0.01		
Maternal education	0.13	0.01	0.31	9.39	<0.01		
Step 4							
AAI_{dism}	−0.35	0.08	−0.14	−4.71	<0.01	0.43	0.03**
AAI_{prec}	−0.35	0.12	−0.08	−2.78	<0.01		
AAI_{sbs}	0.01	0.02	0.02	0.78	0.44		
Child sex	0.07	0.06	0.04	1.30	0.19		
Child ethnicity	0.51	0.07	0.21	7.63	<0.01		
Family income-to-needs ratio	0.04	0.01	0.12	3.64	<0.01		
Maternal education	0.10	0.01	0.24	7.23	<0.01		
Cognitive functioning	0.02	0.00	0.21	6.55	<0.01		

Note: $N = 856$. AAI_{dism}/AAI_{prec} = Dismissing and Preoccupied coded via the AAI Q-set; AAI_{sbs} = secure base script knowledge measured in the Adult Attachment Interview.
**$p < 0.01$.

Vandell, et al., 2021; Steele et al., 2014; Waters et al., 2021), sensitivity scores at all ages were first standardized and then averaged to create the observed maternal sensitivity and observed paternal sensitivity composites.

3.2.2 | Infant attachment security

In early childhood, attachment security with the mother 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. Given the variety of early attachment assessments collected in the SECCYD, a composite measure of early security was created (see Groh et al., 2014, for more information). To do so, first a secure versus insecure variable was created for the SSP. For the AQS, children whose Q-sorts were correlated at 0.30 or above with the security criterion sort were classified as secure (vs. insecure; as suggested by Waters, 2003). For the MSSP, a secure versus insecure variable also was computed. If data were available on two or more early attachment assessments, the proportion of times the child was coded secure was

TABLE 11 Hierarchal linear regressions of ASA predicting paternal sensitivity controlling for AAI_{sbs}, demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
ASA	0.27	0.04	0.28	6.91	<0.01	0.08	
Step 2							
ASA	0.27	0.04	0.27	6.29	<0.01	0.08	0.00
AAI_{sbs}	0.02	0.02	0.03	0.67	0.50		
Step 3							
ASA	0.22	0.04	0.22	5.10	<0.01	0.12	0.04**
AAI_{sbs}	0.00	0.02	0.01	0.16	0.87		
Child sex	0.04	0.08	0.02	0.54	0.59		
Child ethnicity	0.09	0.11	0.04	0.86	0.39		
Family income-to-needs ratio	0.05	0.02	0.13	2.80	0.01		
Maternal education	0.04	0.02	0.10	1.98	0.05		
Step 4							
ASA	0.19	0.04	0.20	4.48	<0.01	0.13	0.01*
AAI_{sbs}	0.01	0.02	0.01	0.33	0.74		
Child sex	0.07	0.08	0.04	0.90	0.37		
Child ethnicity	0.05	0.11	0.02	0.47	0.64		
Family income-to-needs ratio	0.04	0.02	0.12	2.42	0.02		
Maternal education	0.02	0.02	0.05	1.07	0.28		
Cognitive functioning	0.01	0.01	0.13	2.72	<0.01		

Note: $N = 580$. $N = 672$. ASA = Attachment Script Assessment. AAI_{sbs} = secure base script knowledge measured in the Adult Attachment Interview.
*$p < 0.05$.**$p < 0.01$.

determined by taking the number of times the child was classified secure for each available attachment assessment and dividing by the number of attachment assessments available for that child, consistent with Steele et al. (2014).

3.2.3 | Covariates

As in prior studies focused on the origins of adult attachment in SECCYD (e.g., Nivison, Vandell, et al., 2021; Steele et al., 2014), covariates included child race/ethnicity, child sex, maternal years of education collected at the outset of the SECCYD, and family income-to-needs assessed at 1, 6, 15, 24, 36, and 54 months; Grades 1, 3, 4, 5, and 6; and age 15 years. In addition, we controlled for antecedent measures of cognitive functioning. More specifically, in order to address questions related to the potential confounding role of general cognitive functioning in the relation between early caregiving and later secure base script knowledge in the AAI, we used as covariates data drawn from a relatively objective assessment of cognitive functioning, the Woodcock-Johnson Psycho-Educational Battery-Revised (WJ-R; Woodcock & Johnson, 1989; Woodcock, 1990; scores available at 54 months, Grades 1, 3, and 5, and age 15). Child race/ethnicity was operationalized as 1 = White/non-Hispanic, 0 = other, child sex as 1 = male, 2 = female, maternal years of education will be the number of years of education mother has completed, and family income-to-needs will be measured as the mean of all income-to-needs assessments—family income divided by the year-specific poverty threshold for the appropriate family size. Cognitive functioning was measured via the Woodcock-Johnson Psycho-Educational Battery-Revised (WJ-R; Woodcock &

TABLE 12 Hierarchal linear regressions of AAI security predicting paternal sensitivity controlling for AAI_{sbs}, demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
AAI_{sec}	0.34	0.07	0.17	4.58	<0.01	0.03	
Step 2							
AAI_{sec}	0.29	0.08	0.14	3.68	<0.01	0.03	0.00
AAI_{sbs}	0.04	0.02	0.07	1.83	0.07		
Step 3							
AAI_{sec}	0.21	0.08	0.10	2.64	0.01	0.09	0.06**
AAI_{sbs}	0.02	0.02	0.04	1.08	0.28		
Child sex	0.06	0.07	0.03	0.89	0.38		
Child ethnicity	0.16	0.10	0.06	1.73	0.08		
Family income-to-needs ratio	0.03	0.01	0.10	2.39	0.02		
Maternal education	0.06	0.02	0.15	3.62	<0.01		
Step 4							
AAI_{sec}	0.15	0.08	0.07	1.87	0.06	0.11	0.02**
AAI_{sbs}	0.02	0.02	0.04	1.13	0.26		
Child sex	0.09	0.07	0.04	1.23	0.22		
Child ethnicity	0.11	0.10	0.04	1.14	0.26		
Family income-to-needs ratio	0.03	0.01	0.08	1.89	0.06		
Maternal education	0.04	0.02	0.10	2.25	0.03		
Cognitive functioning	0.02	0.00	0.17	4.06	<0.01		

Note: $N = 744$. AAI_{sec} = 2-way categorical AAI security code (secure versus insecure). AAI_{sbs} = secure base script knowledge measured in the Adult Attachment Interview.
**$p < 0.01$.

Johnson, 1989; Woodcock, 1990; scores available at 54 months, grades 1, 3, and 5, and age 15). Note that a slightly different sub-set of scales were used at each time point. As such, we averaged the standard scores for all available sub-scales at each time point and created a reliable composite from 54 months through age 15 years.

3.3 | Planned analysis, and power analysis

To address *Aim 1*, zero-order correlations were computed between AAI_{sbs} and all other focal study variables. Consistent with rules of thumb from the literature on factor analysis (e.g., Fabrigar et al., 1999), when associations between AAI_{sbs} and other measures of attachment representations (i.e., ASA, AAI coherence, security, dismissing/preoccupied states of mind) were 0.30 or less we concluded that the AAI_{sbs} and the attachment variable of interest are relatively distinct ways of assessing adult attachment representations. Had associations between AAI_{sbs} and the attachment variable of interest been between $r = 0.30$–0.70 we would instead have concluded that these methods of assessing attachment representations are partially distinct indicators of underlying attachment representations (additional analyses detailed below examine the value added of AAI_{sbs} over more traditional methods of assessing attachment representations). Finally, if the associations were 0.70 or higher, we would conclude that AAI_{sbs} and the attachment variable of interest are potentially indicators of a common latent construct.

TABLE 13 Hierarchal linear regressions of AAI coherence predicting paternal sensitivity controlling for AAI_{sbs}, demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
AAI_{coh}	0.12	0.03	0.18	4.85	<0.01	0.03	
Step 2							
AAI_{coh}	0.11	0.03	0.15	3.82	<0.01	0.03	0.00
AAI_{sbs}	0.03	0.02	0.06	1.39	0.17		
Step 3							
AAI_{coh}	0.06	0.03	0.09	2.29	0.02	0.09	0.06**
AAI_{sbs}	0.02	0.02	0.04	0.97	0.33		
Child sex	0.06	0.07	0.03	0.79	0.43		
Child ethnicity	0.17	0.10	0.06	1.76	0.08		
Family income-to-needs ratio	0.03	0.01	0.10	2.36	0.02		
Maternal education	0.06	0.02	0.15	3.51	<0.01		
Step 4							
AAI_{coh}	0.04	0.03	0.06	1.43	0.15	0.11	0.02**
AAI_{sbs}	0.02	0.02	0.04	1.11	0.27		
Child sex	0.09	0.07	0.04	1.18	0.24		
Child ethnicity	0.11	0.10	0.04	1.16	0.15		
Family income-to-needs ratio	0.03	0.01	0.08	1.85	0.07		
Maternal education	0.04	0.02	0.10	2.19	0.03		
Cognitive functioning	0.02	0.00	0.17	4.09	<0.01		

Note: $N = 744$. AAI_{coh} = AAI coherence of mind; AAI_{sbs} = secure base script knowledge measured in the Adult Attachment Interview.
**$p < 0.01$.

To address *Aim 2*, zero-order correlations were estimated between AAI_{sbs} and each of the caregiving measures: maternal sensitivity, paternal sensitivity, and infant attachment. Next, in order to address the unique associations between AAI_{sbs} and each caregiving measure, a linear regression analysis was performed in which all three caregiving measures (predictors) were entered into the regression simultaneously. If the associations between AAI_{sbs} and each of the measures of early caregiving (i.e., maternal/paternal sensitivity, infant attachment) were correlated at 0.10 or less we would conclude that AAI_{sbs} is weakly associated with early experiences. If $r = \sim 0.24$ we would conclude that AAI_{sbs} has moderately demonstrated its origins in early experiences. Correlations equal to 0.37+ would indicate that AAI_{sbs} has strongly demonstrated its origins in early experiences, consistent with Cohen's criteria (Cohen, 1994).

To address whether AAI_{sbs} was more strongly associated with early experiences compared to the ASA and traditional coding scales of the AAI (*Aim 3a*), zero-order correlations were calculated between all caregiving measures (i.e., maternal/paternal sensitivity, infant attachment) and each measure of adult attachment (i.e., AAI_{sbs}, ASA scores, AAI security, AAI coherence, AAI dismissing and preoccupied states of mind), resulting in 18 correlations. These correlations were then compared using Steiger's Z comparison test (Steiger, 1980) to understand the extent to which AAI_{sbs} is associated with each caregiving measure relative to other attachment measures, resulting in 15 Steiger's Z tests (see Figure 2).

When results of the relevant Steiger's *Z* comparison tests were significant (and in the predicted direction) we concluded that the AAI_{sbs} is more strongly associated with early experiences than are other measures of attachment

TABLE 14 Hierarchal linear regressions of AAI dismissing and preoccupied states of mind predicting paternal sensitivity controlling for AAI_{sbs}, demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
AAI_{dism}	−0.39	0.09	−0.16	−4.35	<0.01	0.04	
AAI_{Prec}	−0.44	0.16	−0.10	−2.67	0.01		
Step 2							
AAI_{dism}	−0.36	0.10	−0.14	−3.68	<0.01	0.04	0.00
AAI_{prec}	−0.39	0.17	−0.09	−2.29	0.02		
AAI_{sbs}	0.02	0.02	0.04	0.98	0.33		
Step 3							
AAI_{dism}	−0.22	0.10	−0.09	−2.26	0.02	0.09	0.05**
AAI_{prec}	−0.26	0.17	−0.06	−1.55	0.12		
AAI_{sbs}	0.01	0.02	0.03	0.65	0.52		
Child sex	0.06	0.07	0.03	0.85	0.40		
Child ethnicity	0.16	0.10	0.06	1.67	0.10		
Family income-to-needs ratio	0.03	0.01	0.10	2.36	0.02		
Maternal education	0.06	0.02	0.15	3.41	<0.01		
Step 4							
AAI_{dism}	−0.15	0.10	−0.06	−1.48	0.14	0.11	0.02**
AAI_{prec}	−0.23	0.17	−0.05	−1.36	0.17		
AAI_{sbs}	0.02	0.02	0.03	0.78	0.44		
Child sex	0.09	0.07	0.05	1.24	0.22		
Child ethnicity	0.10	0.10	0.04	1.07	0.28		
Family income-to-needs ratio	0.02	0.01	0.08	1.83	0.07		
Maternal education	0.04	0.02	0.09	2.12	0.03		
Cognitive functioning	0.02	0.00	0.17	4.06	<0.01		

Note: $N = 744$. AAI_{dism}/AAI_{prec} = Dismissing and Preoccupied based on the AAI Q-set; AAI_{sbs} = secure base script knowledge measured in the Adult Attachment Interview.
**$p < 0.01$.

representations. Should the results of the Steiger's *Z* comparison be non-significant we would conclude that AAI_{sbs} is not more strongly associated with early experiences than are the other measure of attachment representations.

To address whether AAI_{sbs} either more strongly or incrementally retrodicts early experiences compared to the ASA and the traditional coding scales of the AAI (*Aim 3b*), a series of hierarchal linear regression analyses was performed. For these analyses, the outcome variables were each caregiving measure in separate regressions (i.e., maternal/paternal sensitivity, infant attachment). In the initial step, ASA, AAI security, AAI coherence, AAI dismissing and preoccupied states of mind were swapped into four different regression models, and AAI_{sbs} was entered in the second and final step. Parallel analyses were run for each attachment measure per each caregiving outcome, for a total of 12 hierarchal regressions (AAI dismissing and preoccupied states of mind were entered in one block). If the addition of AAI_{sbs} in the hierarchal regression examining the associations between other measures of attachment representations (i.e., ASA and traditional AAI coding systems) and early caregiving (i.e., parental sensitivity, infant attachment) explained significantly more variance in early caregiving above and beyond the other measures of attachment representations we concluded that AAI_{sbs} incrementally retrodicts early experiences compared to other measures of attachment representations.

TABLE 15 Hierarchal linear regressions of ASA predicting infant attachment controlling for AAI_{sbs}, demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
ASA	0.04	0.01	0.14	3.46	<0.01	0.02	
Step 2							
ASA	0.04	0.01	0.13	3.17	<0.01	0.02	0.00
AAI_{sbs}	0.00	0.01	0.02	0.42	0.68		
Step 3							
ASA	0.03	0.01	0.10	2.41	0.02	0.05	0.03**
AAI_{sbs}	0.00	0.01	0.00	−0.09	0.93		
Child sex	−0.01	0.02	−0.01	−0.35	0.73		
Child ethnicity	0.06	0.03	0.08	2.03	0.04		
Family income-to-needs ratio	0.01	0.01	0.07	1.48	0.14		
Maternal education	0.01	0.01	0.09	1.77	0.08		
Step 4							
ASA	0.02	0.01	0.07	1.64	0.10	0.07	0.02**
AAI_{sbs}	0.00	0.01	0.00	0.07	0.95		
Child sex	0.01	0.02	0.01	0.24	0.81		
Child ethnicity	0.04	0.03	0.05	1.19	0.24		
Family income-to-needs ratio	0.00	0.01	0.04	0.82	0.41		
Maternal education	0.00	0.01	0.03	0.59	0.56		
Cognitive functioning	0.01	0.00	0.18	3.86	<0.01		

Note: $N = 651$. $N = 580$. $N = 672$. ASA = Attachment Script Assessment. AAI_{sbs} = secure base script knowledge measured in the Adult Attachment Interview.
**$p < 0.01$.

To address if AAI_{sbs} accounts for associations between early experiences and the ASA/AAI (*Aim 3c*) we used the PROCESS SPSS macro to determine whether and to what extent the bivariate associations between each caregiving measure and each attachment measure were significantly accounted for (i.e., mediated by) AAI_{sbs} (for a total of 15 mediational analyses). When statistically significant evidence for mediation were found, Preacher and Kelley's (2011) effect size metric (small effect = 0.01, medium effect = 0.09, large effect = 0.25) was used to determine the magnitude of the mediated effect.

To address *Aim 4*, interaction terms were created between all caregiving measures and family income-to-needs, resulting in 3 interaction terms. To examine whether family-risk status moderates the association between caregiving measures and any of the attachment measures (i.e., AAI_{sbs}, ASA, AAI security, AAI coherence, AAI preoccupied/dismissing states of mind), hierarchal linear regression analyses was performed. Parallel analyses were run for each interaction term for each outcome measure, resulting in 16 hierarchal linear regressions. The caregiving variable of interest (i.e., maternal/paternal sensitivity, infant attachment) was included in the initial step, the second step included the family income-to-needs ratio, and the third and final step included the interaction term between the caregiving and demographic variables. Because we anticipated null results (i.e., we did not expect that associations between observations of early caregiving and AAI_{sbs} would be moderated by family income-to- needs), we initially planned to assess whether the difference in the effect size of the correlation between AAI_{sbs} and caregiving antecedents within each level of the moderators (e.g., within female and within male when assessing the moderating effect

TABLE 16 Hierarchal linear regressions of AAI security predicting infant attachment controlling for AAI_{sbs}, demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
AAI_{sec}	0.07	0.02	0.11	3.17	<0.01	0.01	
Step 2							
AAI_{sec}	0.06	0.02	0.09	2.51	0.01	0.01	0.00
AAI_{sbs}	0.01	0.01	0.05	1.42	0.16		
Step 3							
AAI_{sec}	0.04	0.02	0.06	1.67	0.10	0.05	0.04**
AAI_{sbs}	0.00	0.01	0.03	0.77	0.44		
Child sex	0.00	0.02	0.00	0.02	0.99		
Child ethnicity	0.07	0.03	0.09	2.60	0.01		
Family income-to-needs ratio	0.01	0.00	0.07	1.64	0.10		
Maternal education	0.01	0.01	0.11	2.69	0.01		
Step 4							
AAI_{sec}	0.02	0.02	0.03	0.85	0.40	0.08	0.03**
AAI_{sbs}	0.00	0.01	0.03	0.77	0.45		
Child sex	0.01	0.02	0.02	0.48	0.63		
Child ethnicity	0.05	0.03	0.06	1.70	0.09		
Family income-to-needs ratio	0.00	0.00	0.04	0.99	0.32		
Maternal education	0.01	0.01	0.05	1.18	0.24		
Cognitive functioning	0.01	0.00	0.18	4.53	<0.01		

Note: $N = 824$. AAI_{sec} = 2-way categorical AAI security code (secure versus insecure). AAI_{sbs} = secure base script knowledge measured in the Adult Attachment Interview.
**$p < 0.01$.

of sex) was indeed negligible (i.e., an interaction effect size that is below the smallest effect size of interest). Based on the attachment field-specific effect sizes proposed by Schuengel et al. (2021), we initially planned to test three sets of equivalence bounds (with alpha of 0.05): for small effect size ($-0.1 < r < 0.1$), medium effect size ($-0.2 < r < 0.2$), and large effect size ($-0.3 < r < 0.3$). To further address *Aim 4*, the association between maternal sensitivity and AAI_{sbs} in the SECCYD was compared to the previously documented associations between maternal sensitivity and AAI_{sbs} in the MLSRA as reported by Waters et al. (2017). If the association between maternal sensitivity and AAI_{sbs} in the SECCYD was roughly comparable to the same association already observed in the MLSRA ($r = \sim 0.35$) we would view this as additional evidence that risk status does not moderate the extent to which AAI_{sbs} has its origins in early experiences. If the association between AAI_{sbs} and maternal sensitivity was weaker in the SECCYD, we would view this as evidence that risk status may substantively moderate the extent to which AAI_{sbs} has its origins in early experiences. Using the method outlined by Weaver and Wuensch (2013) we tested whether there is a significant difference between the SECCYD and MLSRA correlations. Correlations were transformed using Fisher's *r*-to-*z* transformation using code that also computed a *p*-value indicating whether the correlations are statistically significant at an alpha of 0.05. If the difference between the SECCYD and MLSRA correlations was not significant, we initially planned to conduct equivalence testing, with equivalence bounds identical to the ones described above.

Note that, across within- and between-study analyses described immediately above, had we found no evidence of moderation for associations between parental sensitivity and AAI secure base script knowledge, but moderation

TABLE 17 Hierarchal linear regressions of AAI coherence predicting infant attachment controlling for AAI_{sbs}, demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
AAI_{coh}	0.03	0.01	0.13	3.88	<0.01	0.02	
Step 2							
AAI_{coh}	0.03	0.01	0.12	3.17	<0.01	0.02	0.00
AAI_{sbs}	0.01	0.01	0.03	0.90	0.37		
Step 3							
AAI_{coh}	0.02	0.01	0.08	1.95	0.05	0.06	0.04**
AAI_{sbs}	0.00	0.01	0.02	0.51	0.61		
Child sex	0.00	0.02	0.00	−0.12	0.90		
Child ethnicity	0.07	0.03	0.09	2.61	0.01		
Family income-to-needs ratio	0.01	0.00	0.07	1.58	0.12		
Maternal education	0.01	0.01	0.11	2.54	0.01		
Step 4							
AAI_{coh}	0.01	0.01	0.04	1.02	0.31	0.08	0.02**
AAI_{sbs}	0.00	0.01	0.02	0.61	0.54		
Child sex	0.01	0.02	0.01	0.39	0.70		
Child ethnicity	0.05	0.03	0.06	1.71	0.09		
Family income-to-needs ratio	0.00	0.00	0.04	0.97	0.34		
Maternal education	0.01	0.01	0.05	1.13	0.26		
Cognitive functioning	0.01	0.00	0.18	4.45	<0.01		

Note: $N = 824$. AAI_{coh} = AAI coherence of mind; AAI_{sbs} = secure base script knowledge measured in the Adult Attachment Interview.
**$p < 0.01$.

of the associations between parental sensitivity and traditional indicators of AAI states of mind, we would take this as evidence that the secure base script knowledge system may produce more valid assessments in the low-risk case than does the traditional AAI state of mind coding system. Of course, other scenarios are possible, including that the AAI secure base script knowledge system is more strongly associated with earlier experiences than is the traditional AAI state of mind system, even if both systems are relatively less valid in the context of families experiencing more risk. The same comparative logic holds for the ASA.

To address *Aim 5a*, interaction terms were created between all caregiving measures and demographic variables of interest resulting in 6 interaction terms: maternal sensitivity × child race/ethnicity, maternal sensitivity × child sex; paternal sensitivity × child race/ethnicity, paternal sensitivity × child sex; infant attachment × child race/ethnicity, infant attachment × child sex. To examine whether any of the demographic variables moderated the association between caregiving measures and AAI_{sbs}, hierarchal linear regression analyses were performed. Parallel analyses were run for each interaction of interest resulting in 6 hierarchal linear regressions. The caregiving variable of interest (i.e., maternal/paternal sensitivity, infant attachment) was included in the initial step, the second step included the demographic variable of interest (child sex and child race/ethnicity), and the third and final step included the interaction term between the caregiving and demographic variables. Comparable associations between early caregiving and AAI_{sbs} within each level of each moderator (e.g., males and females) would support a conclusion of sociocultural generalizability. In addition, and given the large *N*, we assumed we were well positioned to also use equivalence testing (Lakens, 2017) to further probe demographic generalizability (equivalence testing allows one to reject the hypothesis of non-negligible differences in the focal

TABLE 18 Hierarchal linear regressions of AAI dismissing and preoccupied states of mind predicting infant attachment controlling for AAI_{sbs}, demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
AAI_{dism}	−0.08	0.03	−0.10	−2.99	<0.01	0.03	
AAI_{Prec}	−0.16	0.05	−0.12	−3.43	<0.01		
Step 2							
AAI_{dism}	−0.07	0.03	−0.10	−2.65	0.01	0.03	0.00
AAI_{prec}	−0.16	0.05	−0.12	−3.19	<0.01		
AAI_{sbs}	0.00	0.01	0.01	0.33	0.74		
Step 3							
AAI_{dism}	−0.04	0.03	−0.06	−1.49	0.14	0.06	0.03**
AAI_{prec}	−0.12	0.05	−0.09	−2.45	0.01		
AAI_{sbs}	0.00	0.01	0.00	0.06	0.95		
Child sex	0.01	0.02	0.01	0.22	0.83		
Child ethnicity	0.06	0.03	0.09	2.44	0.02		
Family income-to-needs ratio	0.01	0.00	0.06	1.51	0.13		
Maternal education	0.01	0.01	0.11	2.52	0.01		
Step 4							
AAI_{dism}	−0.02	0.03	−0.02	−0.63	0.53	0.08	0.02**
AAI_{prec}	−0.11	0.05	−0.08	−2.27	0.02		
AAI_{sbs}	0.00	0.01	0.01	0.16	0.87		
Child sex	0.02	0.02	0.03	0.75	0.46		
Child ethnicity	0.04	0.03	0.06	1.56	0.12		
Family income-to-needs ratio	0.00	0.00	0.04	0.88	0.38		
Maternal education	0.01	0.01	0.05	1.11	0.27		
Cognitive functioning	0.01	0.00	0.18	4.46	<0.01		

Note: $N = 824$. AAI_{dism}/AAI_{prec} = Dismissing and Preoccupied coded via the AAI Q-set; AAI_{sbs} = secure base script knowledge measured in the Adult Attachment Interview.
**$p < 0.01$.

associations across groups). As noted previously, we originally planned to use equivalence testing to assess whether the difference in the effect size of the correlation between AAI_{sbs} and caregiving antecedents within each level of the moderators was indeed negligible (i.e., an effect size that is below the smallest effect size of interest) using the effect sizes proposed by Schuengel et al. (2021; i.e., for small effect size [−0.1 < *r* < 0.1], medium effect size [−0.2 < *r* < 0.2], and large effect size [−0.3 < *r* < 0.3]).

Finally, to address *Aim 5b*, analyses above for Aims 2-5a were recomputed to assess the extent to which the associations are robust to (1) a standard set of demographic covariates (child sex, race/ethnicity, family income-to-needs, and maternal education) and (2) the standard set of demographic covariates in addition to cognitive functioning (i.e., objective tests of academic skills). Cognitive functioning was examined in order to understand whether variables orthogonal to relationship quality might explain variation in secure base script knowledge. Each of the following tests were run twice: first with only the demographic covariates, and second with the demographic covariates plus cognitive functioning. To test the robustness of the associations outlined in Aim 2, a final step was added to all the regressions consisting of the covariates. To test the robustness of the associations outlined in Aim 3a, partial correlations were rerun between all caregiving measures and each measure of adult attachment net of covariates. These partial associations were then compared using Steiger's *Z* test parallel to the analyses outlined in

TABLE 19 Path coefficients and indirect effects for mediation models with maternal sensitivity as independent variable and AAI_{sbs} as mediator.

	Path A			Path B			Path C′			Indirect effects		
Outcome variable (*n*)	***b***	***SE***	***t***	***b***	***SE***	***t***	***b***	***SE***	***t***	**Effect**	**BootLLCI**	**BootULCI**
AAI security												
No covariates (857)	0.41**	0.06	6.35	0.39**	0.05	8.36	0.52**	0.08	6.33	0.16	0.10	0.23
With demographic covariates (856)	0.29**	0.08	3.68	0.38**	0.05	8.08	0.50**	0.10	4.96	0.11	0.05	0.19
With cognitive functioning (856)	0.27**	0.08	3.26	0.38**	0.05	7.98	0.40**	0.10	3.83	0.10	0.04	0.18
AAI Coherence												
No covariates (857)	0.41**	0.06	6.35	0.27**	0.02	11.81	0.35**	0.04	7.83	0.11	0.07	0.15
With demographic covariates (856)	0.29**	0.08	3.68	0.26**	0.02	11.21	0.26**	0.05	4.82	0.08	0.04	0.12
With cognitive functioning (856)	0.27**	0.08	3.26	0.25**	0.02	11.18	0.18**	0.05	3.38	0.07	0.03	0.11
AAI dismissing												
No covariates (857)	0.41**	0.06	6.35	−0.07**	0.01	−10.52	−0.10**	0.01	−8.27	−0.03	−0.04	−0.02
With demographic covariates (856)	0.29**	0.08	3.68	−0.06**	0.01	−9.84	−0.09**	0.02	−5.88	−0.02	−0.03	−0.01
With cognitive functioning (856)	0.27**	0.08	3.26	−0.06**	0.01	−9.78	−0.07**	0.02	−4.58	−0.02	−0.03	−0.01
AAI preoccupied												
No covariates (857)	0.41**	0.06	6.35	−0.03**	0.01	−7.73	−0.03**	0.01	−4.34	−0.01	−0.02	−0.01
With demographic covariates (856)	0.29**	0.08	3.68	−0.03**	0.01	−8.13	−0.02*	0.01	−2.77	−0.01	−0.02	−0.01
With cognitive functioning (856)	0.27**	0.08	3.26	−0.03**	0.00	−8.10	−0.02*	0.01	−2.56	−0.01	−0.01	−0.003
ASA												
No covariates (673)	0.37**	0.07	4.90	0.14**	0.02	7.32	0.24**	0.04	6.07	0.05	0.03	0.08
With demographic covariates (672)	0.23*	0.09	2.53	0.13**	0.02	6.86	0.18**	0.05	3.83	0.03	0.01	0.06
With cognitive functioning (672)	0.24*	0.10	2.49	0.14**	0.02	6.96	0.13**	0.05	2.69	0.03	0.01	0.06

Note: Path A = Direct effect of the independent variable (Maternal Sensitivity) on the mediator (AAI Secure Base Script Knowledge; AAI_{sbs}); Path B = Direct effect of the mediator (AAI_{sbs}) on the dependent variable; Path C′ = Direct effect of the independent variable (Maternal Sensitivity) on the dependent variable, controlling for the mediator (AAI_{sbs}); BootLLCI = Bootstrapping lower limit confidence interval; BootULCI = Bootstrapping upper limit confidence interval; SE = Standard Error. Demographic covariates are Child sex, Child ethnicity, maternal education, Income-to-Needs Ratio. The final step includes both demographic covariates and cognitive functioning in the mediation model.
*$p < 0.05$.**$p < 0.01$.

TABLE 20 Path coefficients and indirect effects for mediation models with paternal sensitivity as independent variable and AAI_{sbs} as mediator.

	Path A			Path B			Path C′			Indirect effects		
Outcome variable (*n*)	***b***	***SE***	***t***	***b***	***SE***	***t***	***b***	***SE***	***t***	**Effect**	**BootLLCI**	**BootULCI**
AAI security												
No covariates (745)	0.23**	0.07	3.24	0.43**	0.05	8.55	0.29**	0.08	3.50	0.10	0.04	0.16
With demographic covariates (744)	0.14*	0.07	1.98	0.40**	0.05	7.90	0.22*	0.08	2.54	0.06	0.01	0.12
With Cognitive functioning (744)	0.13	0.07	1.79	0.40**	0.05	7.81	0.16	0.09	1.85	0.05	−0.001	0.11
AAI coherence												
No covariates (745)	0.23**	0.07	3.24	0.30**	0.02	12.19	0.18**	0.05	3.82	0.07	0.03	0.11
With demographic covariates (744)	0.14*	0.07	1.98	0.27**	0.03	11.03	0.11*	0.05	2.29	0.04	0.01	0.08
With cognitive functioning (744)	0.13	0.07	1.79	0.27**	0.02	11.03	0.07	0.05	1.43	0.04	−0.001	0.07
AAI dismissing												
No covariates (745)	0.23**	0.07	3.24	−0.08**	0.01	−10.76	−0.05**	0.01	−3.57	−0.01	−0.03	−0.01
With demographic covariates (744)	0.14*	0.07	1.98	−0.07**	0.01	−9.52	−0.03*	0.01	−2.23	−0.01	−0.02	−0.001
With cognitive functioning (744)	0.13	0.07	1.79	−0.07**	0.01	−9.48	−0.01	0.01	−1.44	−0.01	−0.02	0.00
AAI preoccupied												
No covariates (745)	0.23**	0.07	3.24	−0.03**	0.00	−7.98	−0.02*	0.01	−2.18	−0.01	−0.01	−0.003
With demographic covariates (744)	0.14*	0.07	1.98	−0.03**	0.00	−8.04	−0.01	0.01	−1.51	−0.004	−0.01	−0.001
With cognitive functioning (744)	0.13	0.07	1.79	−0.03**	0.00	−8.00	−0.01	0.01	−1.32	−0.004	−0.01	0.00
ASA												
No covariates (581)	0.22*	0.08	2.82	0.16**	0.02	7.98	0.24**	0.04	6.31	0.04	0.01	0.06
With demographic covariates (580)	0.13	0.08	1.67	0.14**	0.02	7.00	0.20**	0.04	5.09	0.02	−0.002	0.04
With cognitive functioning (580)	0.14	0.08	1.70	0.14**	0.02	7.16	0.18**	0.04	4.48	0.02	0.00	0.04

Note: Path A = Direct effect of the independent variable (Paternal Sensitivity) on the mediator (AAI Secure Base Script Knowledge; AAI_{sbs}); Path B = Direct effect of the mediator (AAI_{sbs}) on the dependent variable; Path C′ = Direct effect of the independent variable (Paternal Sensitivity) on the dependent variable, controlling for the mediator (AAI_{sbs});
BootLLCI = Bootstrapping lower limit confidence interval; BootULCI = Bootstrapping upper limit confidence interval; SE = Standard Error. Demographic covariates are Child sex, Child ethnicity, maternal education, Income-to-Needs Ratio. The final step includes both demographic covariates and cognitive functioning in the mediation model.
*$p < 0.05$.**$p < 0.01$.

TABLE 21 Path coefficients and indirect effects for mediation models with infant attachment as independent variable and AAI_{sbs} as mediator.

	Path A			Path B			Path C′			Indirect effects		
Outcome variable (*n*)	***b***	***SE***	***t***	***b***	***SE***	***t***	***b***	***SE***	***t***	**Effect**	**BootLLCI**	**BootULCI**
AAI security												
No covariates (825)	0.51*	0.22	2.32	0.42**	0.05	8.92	0.56*	0.25	2.24	0.21	0.03	0.42
With demographic covariates (824)	0.29	0.22	1.33	0.39**	0.05	8.16	0.39	0.26	1.52	0.11	−0.05	0.30
With cognitive functioning (824)	0.24	0.22	1.06	0.39**	0.05	8.02	0.18	0.27	0.68	0.09	−0.08	0.27
AAI coherence												
No covariates (825)	0.51*	0.22	2.32	0.30**	0.02	12.65	0.47**	0.15	3.14	0.15	0.02	0.29
With demographic covariates (824)	0.29	0.22	1.33	0.27**	0.02	11.33	0.29	0.15	1.95	0.08	−0.04	0.19
With cognitive functioning (824)	0.24	0.22	1.06	0.26**	0.02	11.24	0.15	0.15	1.02	0.06	−0.06	0.18
AAI dismissing												
No covariates (825)	0.51*	0.22	2.32	−0.08**	0.01	−11.58	−0.10*	0.04	−2.44	−0.04	−0.08	−0.01
With demographic covariates (824)	0.29	0.22	1.33	−0.07**	0.01	−10.15	−0.06	0.04	−1.43	−0.02	−0.05	0.01
With cognitive functioning (824)	0.24	0.22	1.06	−0.07**	0.01	−10.02	−0.02	0.04	−0.55	−0.02	−0.05	0.02
AAI preoccupied												
No covariates (825)	0.51*	0.22	2.32	−0.03**	0.04	−8.36	−0.08**	0.02	−3.13	−0.02	−0.03	−0.002
With demographic covariates (824)	0.29	0.22	1.33	−0.03**	0.00	−8.40	−0.06*	0.02	−2.41	−0.01	−0.02	0.004
With cognitive functioning (824)	0.24	0.22	1.06	−0.03**	0.00	−8.34	−0.06*	0.03	−2.45	−0.01	−0.02	0.01
ASA												
No covariates (652)	0.34	0.25	1.36	0.16**	0.02	8.05	0.41**	0.13	3.20	0.05	−0.02	0.14
With demographic covariates (651)	0.14	0.25	0.57	0.14**	0.02	7.01	0.31*	0.13	2.41	0.02	−0.05	0.09
With cognitive functioning (651)	0.13	0.26	0.53	0.14**	0.02	7.09	0.21	0.13	1.64	0.02	−0.05	0.09

Note: Path A = Direct effect of the independent variable (Infant Attachment) on the mediator (AAI Secure Base Script Knowledge; AAI_{sbs}); Path B = Direct effect of the mediator (AAI_{sbs}) on the dependent variable; Path C′ = Direct effect of the independent variable (Infant Attachment) on the dependent variable, controlling for the mediator (AAI_{sbs});
BootLLCI = Bootstrapping lower limit confidence interval; BootULCI = Bootstrapping upper limit confidence interval; SE = Standard Error. Demographic covariates are Child sex, Child ethnicity, maternal education, Income-to-Needs Ratio. The final step includes both demographic covariates and cognitive functioning in the mediation model.
*$p < 0.05$.**$p < 0.01$.

Aim 3a. To test the robustness of the associations outlined in Aim 3b a final step were added to all the regressions consisting of the covariates. The set of 5 covariate analyses were added to the mediation analyses outlined in Aim 3c to test whether results differed materially with covariates entered in the analyses. To address Aim 4 and 5a, a final step including covariates was added to the regressions.

3.3.1 | Power analysis

The SECCYD AAI corpus ($N = 857$) has 80% power to detect bivariate $rs \sim 0.10$ (the lower end of the range defining small effects by Cohen's criteria) and was well positioned to study moderation as well. In addition, to test a small difference in correlations between antecedents/outcomes and AAI outcomes (e.g., $r$secure base script knowledge - $r$coherence = 0.10), a sample size of $N = 433$ would be enough to achieve 0.80 power. Participants are roughly half male and female. However, for the conditional effects analyses focused on cross-race generalizability, a subset of the age 18 participants ($n = 760$) was examined, consistent with Haltigan et al. (2019). Given that there are 90 Black participants (670 White/non-Hispanic participants) in the SECCYD (Aim 5a), these analyses are somewhat underpowered and will be regarded as exploratory in nature.

4 | RESULTS

As the AAI ($n = 857$) and ASA ($n = 673$) sub-samples of the SECCYD differ in terms of sample size, correlation results are presented separately in Table 1 and Table 2, respectively. To address Aim 5b, and for the sake of simplicity, analyses are presented both without and with covariates for Aims 2-5a.

4.1 | How strongly is AAI_{sbs} contemporaneously associated with all other measures of adult attachment?

To address Aim 1, we ran bivariate correlations between AAI_{sbs} and all traditional measures of adult attachment. AAI_{sbs} was significantly correlated with traditional measures of adult attachment. Specifically, AAI_{sbs} was correlated

AAI_{sbs} & Maternal sensitivity	vs	Test 1: ASA & Maternal sensitivity Test 2: AAI Security & Maternal sensitivity Test 3: AAI Coherence & Maternal sensitivity Test 4: AAI Dismissing & Maternal sensitivity Test 5: AAI Preoccupied & Maternal sensitivity
AAI_{sbs} & Paternal sensitivity	vs	Test 6: ASA & Paternal sensitivity Test 7: AAI Security & Paternal sensitivity Test 8: AAI Coherence & Paternal sensitivity Test 9: AAI Dismissing & Paternal sensitivity Test 10: AAI Preoccupied & Paternal sensitivity
AAI_{sbs} & Infant attachment	vs	Test 11: ASA & Infant attachment Test 12: AAI Security & Infant attachment Test 13: AAI Coherence & Infant attachment Test 14: AAI Dismissing & Infant attachment Test 15: AAI Preoccupied & Infant attachment

FIGURE 2 Steiger's Z comparison test outlining each test to be run to compare the extent to which AAI_{sbs} is more strongly associated with each caregiving measure relative to other attachment measures.

TABLE 22 Hierarchal linear regression of the interaction of maternal sensitivity and income-to-needs ratio predicting AAI_{sbs} including demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
Maternal sensitivity	0.41	0.06	0.21	6.40	<0.01	0.05	
Step 2							
Maternal sensitivity	0.39	0.07	0.20	5.45	<0.01	0.05	0.00
Family income-to-needs ratio	0.02	0.02	0.03	0.84	0.40		
Step 3							
Maternal sensitivity	0.35	0.08	0.18	4.41	<0.01	0.05	0.00
Family income-to-needs ratio	0.03	0.03	0.05	1.22	0.22		
Maternal sensitivity × family income-to-needs ratio	−0.03	0.03	−0.04	−0.99	0.32		
Step 4							
Maternal sensitivity	0.26	0.09	0.14	3.04	<0.01	0.07	0.02**
Family income-to-needs ratio	0.02	0.03	0.04	0.74	0.46		
Maternal sensitivity × family income-to-needs ratio	−0.03	0.03	−0.04	−1.01	0.31		
Child sex	0.43	0.13	0.11	3.35	<0.01		
Child ethnicity	0.35	0.17	0.08	2.05	0.04		
Maternal education	0.02	0.03	0.03	0.71	0.48		
Step 5							
Maternal sensitivity	0.24	0.09	0.13	2.78	0.01	0.07	0.00
Family income-to-needs ratio	0.02	0.03	0.02	0.56	0.57		
Maternal sensitivity × family income-to-needs ratio	−0.02	0.03	−0.04	−0.88	0.38		
Child sex	0.44	0.13	0.12	3.43	<0.01		
Child ethnicity	0.33	0.17	0.07	1.92	0.06		
Maternal education	0.02	0.04	0.02	0.46	0.65		
Cognitive functioning	0.01	0.01	0.04	0.99	0.32		

Note: $N = 856$. AAI_{sbs} = secure base script knowledge measured in the Adult Attachment Interview. Maternal sensitivity, Family income-to-needs ratio, maternal education, and cognitive functioning variables centered.
**$p < 0.01$.

with AAI coherence ($r = 0.42$), AAI security ($r = 0.34$), AAI dismissing states of mind ($r = -0.38$), AAI preoccupied states of mind ($r = -0.29$), and ASA secure base script knowledge ($r = 0.31$). Overall, these results are consistent with our hypothesis that AAI_{sbs} would be moderately associated with all other measures of adult attachment. Moreover, results largely suggested that these methods of assessing attachment representations are partially distinct indicators of adults' attachment representations.

4.2 | To what extent is AAI_{sbs} associated with early caregiving?

To address Aim 2, we ran bivariate correlations between AAI_{sbs} and measures of early caregiving. Specifically, AAI_{sbs} was significantly and weakly-to-moderately associated with maternal sensitivity ($r = 0.21$), paternal sensitivity ($r = 0.12$) and infant attachment ($r = 0.08$). To further address Aim 2, we ran a linear regression in which all three measures of early caregiving were entered simultaneously to predict AAI_{sbs}. As reported in Table 3, maternal

TABLE 23 Hierarchal linear regression of the interaction of paternal sensitivity and income-to-needs ratio predicting AAI_{sbs} including demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
Paternal sensitivity	0.23	0.07	0.12	3.27	<0.01	0.01	
Step 2							
Paternal sensitivity	0.20	0.07	0.10	2.81	0.01	0.02	0.01
Family income-to-needs ratio	0.04	0.02	0.07	1.89	0.06		
Step 3							
Paternal sensitivity	0.20	0.07	0.11	2.82	0.01	0.02	0.00
Family income-to-needs ratio	0.04	0.02	0.07	1.78	0.08		
Paternal sensitivity × family income-to-needs ratio	0.01	0.03	0.01	0.24	0.81		
Step 4							
Paternal sensitivity	0.15	0.07	0.08	2.02	0.04	0.06	0.04**
Family income-to-needs ratio	0.00	0.03	0.00	0.02	0.98		
Paternal sensitivity × family income-to-needs ratio	0.02	0.03	0.02	0.58	0.56		
Child sex	0.47	0.14	0.12	3.43	<0.01		
Child ethnicity	0.60	0.18	0.12	3.26	<0.01		
Maternal education	0.07	0.04	0.09	2.00	0.05		
Step 5							
Paternal sensitivity	0.13	0.07	0.07	1.82	0.07	0.06	0.00
Family income-to-needs ratio	0.00	0.03	−0.01	−0.12	0.90		
Paternal sensitivity × family income-to-needs ratio	0.02	0.03	0.02	0.65	0.52		
Child sex	0.48	0.14	0.13	3.50	<0.01		
Child ethnicity	0.57	0.19	0.11	3.07	<0.01		
Maternal education	0.06	0.04	0.07	1.60	0.11		
Cognitive functioning	0.01	0.01	0.04	1.06	0.29		

Note: $N = 744$. AAI_{sbs} = secure base script knowledge measured in the Adult Attachment Interview. Paternal sensitivity, Family income-to-needs ratio, maternal education, and cognitive functioning variables centered.
**$p < 0.01$.

sensitivity (but not paternal sensitivity or infant attachment) was uniquely associated with AAI_{sbs} above and beyond paternal sensitivity and infant attachment ($\beta = 0.19$, t [716] = 4.60, $p < 0.05$). Importantly, maternal sensitivity remained uniquely associated with AAI_{sbs} even with the addition of demographic covariates and cognitive functioning ($\beta = 0.14$, t [711] = 2.82, $p < 0.05$), which addressed Aim 5b. These results suggest that AAI_{sbs}, in part, has its origins in early caregiving experiences, and that maternal sensitivity may be a unique predictor of later secure base script knowledge in adulthood.

4.3 | Does AAI_{sbs} more strongly retrodict early experiences compared to the ASA and the traditional coding scales of the AAI?

To address Aim 3a, we ran a series of Steiger's Z comparison tests to assess whether AAI_{sbs} was more strongly associated with measures of early caregiving than were traditional measures of adult attachment. As outlined in Table 4,

TABLE 24 Hierarchal linear regression of the interaction of infant attachment and income-to-needs ratio predicting AAI_{sbs} including demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
Infant attachment	0.53	0.22	0.08	2.40	0.02	0.01	
Step 2							
Infant attachment	0.45	0.22	0.07	2.01	0.05	0.01	0.00*
Family income-to-needs ratio	0.05	0.02	0.08	2.27	0.02		
Step 3							
Infant attachment	0.38	0.22	0.06	1.70	0.09	0.02	0.01*
Family income-to-needs ratio	0.06	0.02	0.09	2.64	0.01		
Infant attachment × family income-to-needs ratio	−0.19	0.08	−0.09	−2.41	0.02		
Step 4							
Infant attachment	0.25	0.22	0.04	1.11	0.27	0.05	0.03**
Family income-to-needs ratio	0.02	0.03	0.03	0.68	0.50		
Infant attachment × family income-to-needs ratio	−0.16	0.08	−0.07	−2.06	0.04		
Child sex	0.47	0.13	0.12	3.59	<0.01		
Child ethnicity	0.54	0.17	0.12	3.28	0.01		
Maternal education	0.06	0.03	0.07	1.65	0.10		
Step 5							
Infant attachment	0.20	0.23	0.03	0.88	0.38	0.06	0.00
Family income-to-needs ratio	0.01	0.03	0.02	0.47	0.64		
Infant attachment × family income-to-needs ratio	−0.15	0.08	−0.07	−1.96	0.05		
Child sex	0.49	0.13	0.13	3.69	<0.01		
Child ethnicity	0.50	0.17	0.11	2.96	<0.01		
Maternal education	0.04	0.04	0.05	1.17	0.24		
Cognitive functioning	0.01	0.01	0.06	1.36	0.17		

Note: $N = 824$. AAI_{sbs} = secure base script knowledge measured in the Adult Attachment Interview. Infant Attachment, Family income-to-needs ratio, maternal education, and cognitive functioning variables centered.
*p < 0.05.**p < 0.01.

AAI_{sbs} was not more strongly associated with maternal sensitivity than were any of the traditional measures of adult attachment. However, AAI coherence and AAI dismissing states of mind were more strongly associated with maternal sensitivity than was AAI_{sbs}. However, with the inclusion of demographic covariates and cognitive functioning in relevant models (Tables S1 & S4, Aim 5b), neither AAI coherence nor AAI dismissing states of mind were more strongly associated with maternal sensitivity than was AAI_{sbs}.

As outlined in Table 5, AAI_{sbs} was not more strongly associated with paternal sensitivity than were any traditional measures of adult attachment. However, the ASA was more strongly associated with paternal sensitivity than was AAI_{sbs}. Addressing Aim 5b, the pattern of results held with the inclusion of demographic covariates and cognitive functioning (Tables S2 & S5). As outlined in Table 6, AAI_{sbs} was not more strongly associated with infant attachment than were any traditional measures of adult attachment. However, the ASA was marginally ($p = 0.05$) more strongly associated with infant attachment than was $AAI_{sbs.}$ Addressing Aim 5b, the pattern of results largely held with the inclusion of demographic covariates and cognitive functioning (Tables S3 & S6), although in these models the ASA was no longer more strongly associated with infant

TABLE 25 Hierarchal linear regression of the interaction of maternal sensitivity and income-to-needs ratio predicting AAI Security including demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
Maternal sensitivity	0.14	0.02	0.29	8.71	<0.01	0.08	
Step 2							
Maternal sensitivity	0.14	0.02	0.28	7.67	<0.01	0.08	0.00
Family income-to-needs ratio	0.00	0.01	0.02	0.55	0.58		
Step 3							
Maternal sensitivity	0.14	0.02	0.29	7.16	<0.01	0.08	0.00
Family income-to-needs ratio	0.00	0.01	0.01	0.12	0.91		
Maternal sensitivity × family income-to-needs ratio	0.01	0.01	0.03	0.72	0.47		
Step 4							
Maternal sensitivity	0.13	0.02	0.26	5.94	<0.01	0.10	0.02**
Family income-to-needs ratio	0.00	0.01	0.00	−0.09	0.93		
Maternal sensitivity × family income-to-needs ratio	0.00	0.01	0.02	0.57	0.57		
Child sex	0.11	0.03	0.11	3.44	<0.01		
Child ethnicity	0.03	0.04	0.03	0.75	0.46		
Maternal education	0.01	0.01	0.03	0.59	0.56		
Step 5							
Maternal sensitivity	0.11	0.02	0.22	4.96	<0.01	0.12	0.02**
Family income-to-needs ratio	−0.01	0.01	−0.04	−0.87	0.39		
Maternal sensitivity × family income-to-needs ratio	0.01	0.01	0.05	1.14	0.25		
Child sex	0.13	0.03	0.13	3.91	<0.01		
Child ethnicity	0.01	0.04	0.01	0.20	0.64		
Maternal education	0.00	0.01	−0.02	−0.47	0.64		
Cognitive functioning	0.01	0.00	0.19	4.64	<0.01		

Note: $N = 856$. AAI_{sec} = dichotomous secure/insecure classification in the Adult Attachment Interview. Maternal sensitivity, Family income-to-needs ratio, maternal education, and cognitive functioning variables centered.
**$p < 0.01$.

attachment than was AAI_{sbs}. Overall, and inconsistent with prior results from Waters et al. (2017) from the MLSRA, AAI_{sbs} was not more strongly associated with early experiences than were the traditional measure of attachment representations in the SECCYD.

4.4 | Does AAI_{sbs} incrementally retrodict early experiences compared with traditional adult attachment measures?

To address Aim 3b and 5b, a series of hierarchal linear regression analyses were performed. For all the following analyses, the outcome variables had the caregiving measure in separate regressions (i.e., maternal/paternal sensitivity, infant attachment). In the initial step, ASA, AAI security, AAI coherence, AAI dismissing and preoccupied states of mind were swapped into four different regression models, and AAI_{sbs} was entered in the second step, with demographic covariates in third step, and cognitive functioning in the fourth and final step. Full information on these regressions is presented in Tables 7–18.

TABLE 26 Hierarchal linear regression of the interaction of paternal sensitivity and income-to-needs ratio predicting AAI security including demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
Paternal sensitivity	0.08	0.02	0.17	4.58	<0.01	0.03	
Step 2							
Paternal sensitivity	0.07	0.02	0.14	3.92	<0.01	0.04	0.01*
Family income-to-needs ratio	0.02	0.01	0.10	2.79	0.01		
Step 3							
Paternal sensitivity	0.07	0.02	0.15	3.91	<0.01	0.04	0.00
Family income-to-needs ratio	0.02	0.01	0.10	2.69	0.01		
Paternal sensitivity × family income-to-needs ratio	0.00	0.01	0.01	0.14	0.89		
Step 4							
Paternal sensitivity	0.06	0.02	0.12	3.15	<0.01	0.07	0.03**
Family income-to-needs ratio	0.01	0.01	0.03	0.72	0.47		
Paternal sensitivity × family income-to-needs ratio	0.00	0.01	0.02	0.47	0.64		
Child sex	0.12	0.04	0.12	3.33	<0.01		
Child ethnicity	0.10	0.05	0.08	2.09	0.04		
Maternal education	0.02	0.01	0.10	2.43	0.02		
Step 5							
Paternal sensitivity	0.04	0.02	0.09	2.38	0.02	0.10	0.03**
Family income-to-needs ratio	0.00	0.01	0.00	0.07	0.95		
Paternal sensitivity × family income-to-needs ratio	0.01	0.01	0.03	0.80	0.43		
Child sex	0.13	0.04	0.13	3.71	<0.01		
Child ethnicity	0.06	0.05	0.05	1.38	0.17		
Maternal education	0.01	0.01	0.04	0.94	0.35		
Cognitive functioning	0.01	0.00	0.20	4.89	<0.01		

Note: $N = 744$. AAI_{sec} = dichotomous secure/insecure classification in the Adult Attachment Interview. Paternal sensitivity, Family income-to-needs ratio, maternal education, and cognitive functioning variables centered.
*$p < 0.05$.**$p < 0.01$.

4.4.1 | Maternal sensitivity

AAI_{sbs} did explain significantly more variation in maternal sensitivity above and beyond all traditional measures of adult attachment except AAI dismissing and preoccupied states of mind. However, with the inclusion of demographic covariates and cognitive functioning, AAI_{sbs} was no longer uniquely associated with maternal sensitivity above and beyond any of the traditional measures of adult attachment (Tables 7–10). In contrast, each traditional indicator of adult attachment (i.e., ASA, AAI security, AAI coherence, AAI dismissing and preoccupied) was uniquely associated with maternal sensitivity above and beyond AAI_{sbs}, demographic covariates, and cognitive functioning. Overall, when accounting for covariates, AAI_{sbs} did not incrementally retrodict maternal sensitivity above and beyond the traditional measures of adult attachment.

4.4.2 | Paternal sensitivity

AAI_{sbs} did not explain significantly more variance in paternal sensitivity than did traditional measures of adult attachment—this pattern of results held when including demographic covariates and cognitive functioning

TABLE 27 Hierarchal linear regression of the interaction of infant attachment and income-to-needs ratio predicting AAI security including demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
Infant attachment	0.18	0.06	0.11	3.17	<0.01	0.01	
Step 2							
Infant attachment	0.15	0.06	0.09	2.65	0.01	0.02	0.01*
Family income-to-needs ratio	0.02	0.01	0.11	3.08	<0.01		
Step 3							
Infant attachment	0.14	0.06	0.09	2.41	0.02	0.03	0.01
Family income-to-needs ratio	0.02	0.01	0.12	3.33	<0.01		
Infant attachment × family income-to-needs ratio	−0.04	0.02	−0.06	−1.76	0.08		
Step 4							
Infant attachment	0.10	0.06	0.06	1.84	0.07	0.06	0.03**
Family income-to-needs ratio	0.01	0.01	0.05	1.09	0.28		
Infant attachment × family income-to-needs ratio	−0.03	0.02	−0.05	−1.41	0.16		
Child sex	0.13	0.03	0.13	3.95	<0.01		
Child ethnicity	0.11	0.04	0.09	2.65	0.01		
Maternal education	0.02	0.01	0.09	2.17	0.03		
Step 5							
Infant attachment	0.06	0.06	0.04	1.02	0.31	0.09	0.03**
Family income-to-needs ratio	0.00	0.01	0.01	0.32	0.75		
Infant attachment × family income-to-needs ratio	−0.02	0.02	−0.04	−1.08	0.28		
Child sex	0.15	0.03	0.15	4.39	<0.01		
Child ethnicity	0.07	0.04	0.06	1.64	0.10		
Maternal education	0.01	0.01	0.02	0.54	0.59		
Cognitive functioning	0.01	0.00	0.21	5.18	<0.01		

Note: $N = 824$. AAI_{sec} = dichotomous secure/insecure classification in the Adult Attachment Interview. Infant attachment, Family income-to-needs ratio, maternal education, and cognitive functioning variables centered.
*$p < 0.05$.**$p < 0.01$.

(Tables 11-14). Of note, the ASA (but not AAI security, AAI coherence, or AAI dismissing and preoccupied) was uniquely associated with paternal sensitivity above and beyond AAI_{sbs}, demographic covariates, and cognitive functioning. Overall, AAI_{sbs} did not incrementally retrodict paternal sensitivity above and beyond traditional measures of adult attachment.

4.4.3 | Infant attachment

AAI_{sbs} did not explain significantly more variance in infant attachment than did traditional measures of adult attachment—this pattern of results held when including demographic covariates and cognitive functioning (Tables 15-18). However, interestingly enough, within the traditional measures of adult attachment—only AAI preoccupied states of mind were uniquely associated with infant attachment above and beyond AAI_{sbs}, demographic covariates, or cognitive functioning either. In summary, AAI_{sbs} did not incrementally retrodict infant attachment

TABLE 28 Hierarchal linear regression of the interaction of maternal sensitivity and income-to-needs ratio predicting AAI Coherence including demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
Maternal sensitivity	0.46	0.05	0.32	9.85	<0.01	0.10	
Step 2							
Maternal sensitivity	0.41	0.05	0.29	8.00	<0.01	0.11	0.01*
Family income-to-needs ratio	0.04	0.02	0.08	2.29	0.02		
Step 3							
Maternal sensitivity	0.40	0.06	0.28	7.02	<0.01	0.11	0.00
Family income-to-needs ratio	0.04	0.02	0.09	2.11	0.04		
Maternal sensitivity × family income-to-needs ratio	−0.01	0.02	−0.01	−0.25	0.80		
Step 4							
Maternal sensitivity	0.32	0.06	0.23	5.28	<0.01	0.14	0.03**
Family income-to-needs ratio	0.02	0.02	0.05	1.14	0.26		
Maternal sensitivity × family income-to-needs ratio	−0.01	0.02	−0.02	−0.40	0.69		
Child sex	0.48	0.09	0.17	5.26	<0.01		
Child ethnicity	0.08	0.12	0.02	0.68	0.50		
Maternal education	0.05	0.02	0.09	2.19	0.03		
Step 5							
Maternal sensitivity	0.26	0.06	0.18	4.18	<0.01	0.17	0.03**
Family income-to-needs ratio	0.01	0.02	0.01	0.01	0.81		
Maternal sensitivity × family income-to-needs ratio	0.01	0.02	0.01	0.26	0.79		
Child sex	0.53	0.09	0.18	5.83	<0.01		
Child ethnicity	0.01	0.12	0.00	0.05	0.35		
Maternal education	0.02	0.03	0.04	0.94	0.35		
Cognitive functioning	0.03	0.01	0.21	5.36	<0.01		

Note: $N = 856$. Maternal sensitivity, Family income-to-needs ratio, maternal education, and cognitive functioning variables centered.
*$p < 0.05$.**$p < 0.01$.

above and beyond traditional measures of adult attachment, though it is important to note that most of the traditional measures of adult attachment were no longer uniquely associated with infant attachment after controlling for covariates, which is consistent with prior work in the SECCYD (Steele et al., 2014).

4.5 | Does AAI_{sbs} account for associations between early caregiving experiences and traditional measures of adult attachment?

To address Aim 3c, mediation analyses were run to examine whether AAI_{sbs} accounted for the associations between early caregiving experiences and traditional measures of adult attachment (previously reported in Steele et al., 2014). To address Aim 5c, mediation analyses were then run with the inclusion of demographic covariates, then again with demographic covariates and the omnibus indicator of cognitive functioning. In the interest of simplicity, the results described below are the models that include both demographic covariates and cognitive functioning. Full results are outlined in Tables 19-21.

TABLE 29 Hierarchal linear regression of the interaction of paternal sensitivity and income-to-needs ratio predicting AAI coherence including demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
Paternal sensitivity	0.25	0.05	0.18	4.85	<0.01	0.03	
Step 2							
Paternal sensitivity	0.21	0.05	0.14	3.93	<0.01	0.05	0.02**
Family income-to-needs ratio	0.07	0.02	0.15	4.13	<0.01		
Step 3							
Paternal Sensitivity	0.20	0.05	0.14	3.82	<0.01	0.05	0.00
Family income-to-needs ratio	0.07	0.02	0.16	4.26	<0.01		
Paternal sensitivity × family income-to-needs ratio	−0.02	0.02	−0.04	−1.02	0.31		
Step 4							
Paternal sensitivity	0.15	0.05	0.10	2.83	0.01	0.11	0.06**
Family income-to-needs ratio	0.03	0.02	0.06	1.39	0.17		
Paternal sensitivity × family income-to-needs ratio	−0.01	0.02	−0.02	−0.58	0.56		
Child sex	0.49	0.10	0.17	4.87	<0.01		
Child ethnicity	0.28	0.13	0.08	2.13	0.03		
Maternal education	0.10	0.03	0.16	3.77	<0.01		
Step 5							
Paternal sensitivity	0.10	0.05	0.07	1.98	0.05	0.14	0.03**
Family income-to-needs ratio	0.01	0.02	0.03	0.67	0.49		
Paternal sensitivity × family income-to-needs ratio	−0.01	0.02	−0.01	−0.24	0.81		
Child sex	0.52	0.10	0.18	5.31	<0.01		
Child ethnicity	0.18	0.13	0.05	1.35	0.18		
Maternal education	0.06	0.03	0.09	2.12	0.04		
Cognitive functioning	0.03	0.01	0.21	5.33	<0.01		

Note: $N = 744$. Paternal sensitivity and Family income-to-needs ratio variables both centered.
**$p < 0.01$.

AAI_{sbs} accounted for statistically significant proportions of the variance in the associations between maternal sensitivity and all traditional measures of adult attachment. The sizes of the mediation effects ranged from small for AAI coherence (0.07), AAI dismissing (0.02), AAI preoccupied (0.01), and the ASA (0.03), to a medium-sized effect for AAI security (0.10). With the inclusion of demographic covariates and cognitive functioning, AAI_{sbs} did not account for statistically significant proportions of the variance in the associations between either paternal sensitivity or infant attachment and all other traditional measures of adult attachment. In sum and consistent with our hypothesis, these results suggest that AAI_{sbs} at least partially accounts for the associations between maternal sensitivity and traditional measures of adult attachment. These results also suggest that AAI_{sbs} does not account for the associations between paternal sensitivity or infant attachment and traditional measures of adult attachment, though these latter analyses were exploratory in nature.

4.6 | Does family-risk status (i.e., family income-to-needs) moderate the association between early caregiving measures and any of the attachment measures?

To address Aim 4 and 5b, a series of hierarchal linear regressions were performed. Parallel analyses were run for each interaction term for each outcome measure, resulting in 16 hierarchal linear regressions. The caregiving variable of interest (i.e., maternal/paternal sensitivity, infant attachment) was included in the initial step, the second step

TABLE 30 Hierarchal linear regression of the interaction of infant attachment and income-to-needs ratio predicting AAI coherence including demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
Infant attachment	0.63	0.16	0.13	3.88	<0.01	0.02	
Step 2							
Infant attachment	0.51	0.16	0.11	3.11	<0.01	0.04	0.02**
Family income-to-needs ratio	0.08	0.02	0.17	4.81	<0.01		
Step 3							
Infant attachment	0.45	0.16	0.10	2.78	0.01	0.05	0.01*
Family income-to-needs ratio	0.09	0.02	0.18	5.18	<0.01		
Infant attachment × family income-to-needs ratio	−0.15	0.06	−0.09	−1.55	0.01		
Step 4							
Infant attachment	0.33	0.16	0.07	2.07	0.04	0.12	0.07**
Family income-to-needs ratio	0.04	0.02	0.08	1.92	0.06		
Infant attachment × family income-to-needs ratio	−0.12	0.06	−0.07	−2.15	0.03		
Child sex	0.54	0.09	0.19	5.74	<0.01		
Child ethnicity	0.30	0.12	0.09	2.48	0.01		
Maternal education	0.09	0.02	0.15	3.66	<0.01		
Step 5							
Infant attachment	0.19	0.16	0.04	1.17	0.24	0.15	0.03**
Family income-to-needs ratio	0.02	0.02	0.04	1.07	0.29		
Infant attachment × family income-to-needs ratio	−0.10	0.05	−0.06	−1.79	0.07		
Child sex	0.58	0.09	0.20	6.27	<0.01		
Child ethnicity	0.16	0.12	0.05	1.37	0.17		
Maternal education	0.05	0.03	0.08	1.82	0.07		
Cognitive functioning	0.03	0.01	0.22	5.76	<0.01		

Note: $N = 824$. AAI_{sec} = dichotomous secure/insecure classification in the Adult Attachment Interview. Infant attachment, Family income-to-needs ratio, maternal education, and cognitive functioning variables centered.
*$p < 0.05$.**$p < 0.01$.

included the family income-to-needs ratio, and the third step included the interaction term between the caregiving and demographic variables, the fourth step included demographic covariates, and the fifth and final step included cognitive functioning.

4.6.1 | AAI_{sbs}

As reported in Tables 22–24, family income-to-needs did not moderate the association between maternal sensitivity and AAI_{sbs}, paternal sensitivity and AAI_{sbs}, or infant attachment and AAI_{sbs}.

4.6.2 | AAI security

As reported in Tables 25–27, family income-to-needs did not moderate the association between maternal or paternal sensitivity or infant attachment and AAI security. Given that AAI security is a dichotomous variable we also ran binominal logistic regressions (results presented in Tables S7–S9 in the supplemental materials)—family income-to-needs did not moderate the association between maternal or paternal sensitivity or infant attachment and AAI security.

TABLE 31 Hierarchal linear regression of the interaction of maternal sensitivity and income-to-needs ratio predicting AAI Dismissing including demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
Maternal sensitivity	−0.13	0.01	−0.33	−10.19	<0.01	0.11	
Step 2							
Maternal sensitivity	−0.13	0.01	−0.32	−8.87	<0.01	0.11	0.00
Family income-to-needs ratio	0.00	0.01	−0.03	−0.89	0.37		
Step 3							
Maternal sensitivity	−0.12	0.02	−0.31	−7.67	<0.01	0.11	0.00
Family income-to-needs ratio	−0.01	0.01	−0.04	−1.04	0.30		
Maternal sensitivity × family income-to-needs ratio	0.00	0.01	0.02	0.53	0.59		
Step 4							
Maternal sensitivity	−0.10	0.02	−0.25	−5.98	<0.01	0.17	0.06**
Family income-to-needs ratio	0.00	0.01	−0.02	−0.33	0.74		
Maternal sensitivity × family income-to-needs ratio	0.01	0.01	0.03	0.90	0.37		
Child sex	−0.19	0.03	−0.23	−7.28	<0.01		
Child ethnicity	−0.01	0.03	−0.01	−0.14	0.89		
Maternal education	−0.01	0.01	−0.09	−2.09	0.04		
Step 5							
Maternal sensitivity	−0.09	0.02	−0.21	−4.98	<0.01	0.19	0.02**
Family income-to-needs ratio	0.00	0.01	0.02	0.46	0.64		
Maternal sensitivity × family income-to-needs ratio	0.00	0.01	0.01	0.32	0.75		
Child sex	−0.20	0.03	−0.24	−7.79	<0.01		
Child ethnicity	0.01	0.03	0.01	0.42	0.67		
Maternal education	−0.01	0.01	−0.04	−0.98	0.33		
Cognitive functioning	−0.01	0.00	−0.18	−4.71	<0.01		

Note: $N = 856$. Maternal sensitivity, Family income-to-needs ratio, maternal education, and cognitive functioning variables centered.
**$p < 0.01$.

4.6.3 | AAI coherence

As reported in Tables 28–30 family income-to-needs did not moderate the association between maternal or paternal sensitivity or infant attachment and AAI coherence.

4.6.4 | AAI dismissing

As reported in Tables 31–33, family income-to-needs did not moderate the association between maternal or paternal sensitivity or infant attachment and AAI dismissing states of mind.

4.6.5 | AAI preoccupied

As reported in Tables 34–36, family income-to-needs did not moderate the association between maternal sensitivity or paternal sensitivity and AAI preoccupied states of mind. However, family risk status did once again

TABLE 32 Hierarchal linear regression of the interaction of paternal sensitivity and income-to-needs ratio predicting AAI Dismissing including demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
Paternal sensitivity	−0.07	0.02	−0.17	−4.57	<0.01	0.03	
Step 2							
Paternal Sensitivity	−0.06	0.02	−0.14	−3.87	<0.01	0.04	0.01**
Family income-to-needs ratio	−0.01	0.01	−0.11	−2.97	<0.01		
Step 3							
Paternal sensitivity	−0.06	0.02	−0.14	−3.87	<0.01	0.04	0.00
Family income-to-needs ratio	−0.01	0.01	−0.11	−2.87	<0.01		
Paternal sensitivity × family income-to-needs ratio	0.00	0.01	0.00	−0.11	0.91		
Step 4							
Paternal sensitivity	−0.04	0.01	−0.10	−2.83	0.01	0.13	0.09**
Family income-to-needs ratio	0.00	0.01	0.00	0.01	0.99		
Paternal sensitivity × family income-to-needs ratio	0.00	0.01	−0.02	−0.60	0.55		
Child sex	−0.19	0.03	−0.24	−6.94	<0.01		
Child ethnicity	−0.06	0.04	−0.05	−1.51	0.13		
Maternal education	−0.03	0.01	−0.18	−4.21	<0.01		
Step 5							
Paternal sensitivity	−0.03	0.01	−0.07	−2.01	0.05	0.15	0.02**
Family income-to-needs ratio	0.00	0.01	0.03	0.68	0.50		
Paternal sensitivity × family income-to-needs ratio	−0.01	0.01	−0.03	−0.94	0.35		
Child sex	−0.20	0.03	−0.25	−7.37	<0.01		
Child ethnicity	−0.03	0.04	−0.03	−0.78	0.44		
Maternal education	−0.02	0.01	−0.11	−2.64	<0.01		
Cognitive functioning	−0.01	0.00	−0.20	−4.97	<0.01		

Note: $N = 744$. Paternal sensitivity, Family income-to-needs ratio, maternal education, and cognitive functioning variables centered.
**$p < 0.01$.

moderate the association between infant attachment and AAI preoccupied states of mind ($\beta = 0.07$, $t\,[816] = 2.02$, $p < 0.05$).

4.6.6 | Attachment script assessment

As reported in Tables 37–39, family income-to-needs did not moderate the association between maternal, and paternal sensitivity, or infant attachment and AAI security.

In summary, family income-to-needs did not moderate the association between maternal or paternal sensitivity and adult attachment which suggests that these measures of adult attachment (i.e., traditional AAI, AAI_{sbs}, ASA) are valid assessments of attachment quality in both higher and lower-risk families. Family income-to-needs did significantly moderate the association between infant attachment and AAI preoccupied (but not AAI_{sbs}, AAI coherence, AAI security nor ASA). Post hoc simple slope analyses were performed wherein the lower range of family income-to-needs was operationalized as one standard deviation below the mean and the higher range of family income-to-

TABLE 33 Hierarchal linear regression of the interaction of infant attachment and income-to-needs ratio predicting AAI Dismissing including demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
Infant attachment	−0.15	0.05	−0.11	−3.24	<0.01	0.01	
Step 2							
Infant attachment	−0.12	0.05	−0.09	−2.62	0.01	0.03	0.02**
Family income-to-needs ratio	−0.02	0.01	−0.13	−3.76	<0.01		
Step 3							
Infant attachment	−0.11	0.05	−0.08	−2.35	0.02	0.03	0.00*
Family income-to-needs ratio	−0.02	0.01	−0.14	−4.06	<0.01		
Infant attachment × family income-to-needs ratio	0.03	0.02	0.07	2.08	0.04		
Step 4							
Infant attachment	−0.07	0.05	−0.05	−1.60	0.11	0.13	0.10**
Family income-to-needs ratio	−0.01	0.01	−0.04	−0.87	0.38		
Infant attachment × family income-to-needs ratio	0.03	0.02	0.06	1.74	0.08		
Child sex	−0.21	0.03	−0.26	−7.84	<0.01		
Child ethnicity	−0.08	0.03	−0.08	−2.44	0.02		
Maternal education	−0.03	0.01	−0.16	−3.90	<0.01		
Step 5							
Infant attachment	−0.03	0.04	−0.03	−0.74	0.46	0.16	0.03**
Family income-to-needs ratio	0.00	0.01	0.00	−0.06	0.96		
Infant attachment × family income-to-needs ratio	0.02	0.02	0.05	1.39	0.17		
Child sex	−0.22	0.03	−0.27	−8.38	<0.01		
Child ethnicity	−0.05	0.03	−0.05	−1.38	0.17		
Maternal education	−0.02	0.01	−0.09	−2.13	0.03		
Cognitive functioning	−0.01	0.00	−0.21	−5.48	<0.01		

Note: $N = 824$. Infant attachment, Family income-to-needs ratio, maternal education, and cognitive functioning variables centered.
*$p < 0.05$.**$p < 0.01$.

needs was operationalized as one standard deviation above the mean. A graphic representations of the interaction is presented in Figure S1. Post hoc simple slope analyses revealed that infant attachment and AAI preoccupied were associated at the lower range of family income-to-needs ($m = -0.11$, $p < 0.05$) but not at the higher range of family income-to-needs ($m = -0.002$, $p = 0.97$). In sum, we found little evidence to suggest that family income-to-needs moderates the association between infant attachment and adult attachment—with the sole exception of AAI preoccupied states of mind.

4.7 | Is AAI_{sbs} in this normative-risk sample roughly comparable to existing associations between AAI_{sbs} and maternal sensitivity in a high-risk cohort?

To further address Aim 4, we conducted a Fisher *r*-to-*z* transformation to compare the magnitude of associations between two independent correlations from the present report and previously established correlations

TABLE 34 Hierarchal linear regression of the interaction of maternal sensitivity and income-to-needs ratio predicting AAI Preoccupied including demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
Maternal sensitivity	−0.04	0.01	−0.20	−5.91	<0.01	0.04	
Step 2							
Maternal sensitivity	−0.04	0.01	−0.17	−4.58	<0.01	0.04	0.00
Family income-to-needs ratio	−0.01	0.00	−0.07	−1.87	0.06		
Step 3							
Maternal sensitivity	−0.04	0.01	−0.16	−3.97	<0.01	0.04	0.00
Family income-to-needs ratio	−0.01	0.00	−0.07	−1.75	0.08		
Maternal sensitivity × family income-to-needs ratio	0.00	0.01	0.01	0.25	0.81		
Step 4							
Maternal sensitivity	−0.04	0.01	−0.16	−3.48	<0.01	0.06	0.02**
Family income-to-needs ratio	0.00	0.00	−0.06	−1.28	0.20		
Maternal sensitivity × family income-to-needs ratio	0.00	0.00	−0.01	−0.19	0.85		
Child sex	0.05	0.02	0.12	3.58	<0.01		
Child ethnicity	−0.04	0.02	−0.07	−2.03	0.04		
Maternal education	0.00	0.00	0.00	0.03	0.98		
Step 5							
Maternal sensitivity	−0.03	0.01	−0.15	−3.25	<0.01	0.06	0.00
Family income-to-needs ratio	0.00	0.00	−0.05	−1.13	0.26		
Maternal sensitivity × family income-to-needs ratio	0.00	0.00	−0.01	−0.28	0.78		
Child sex	0.05	0.02	0.12	3.35	<0.01		
Child ethnicity	−0.04	0.02	−0.07	−1.92	0.06		
Maternal education	0.00	0.00	0.01	0.20	0.84		
Cognitive functioning	0.00	0.00	−0.03	−0.76	0.48		

Note: $N = 856$. Maternal sensitivity and Family income-to-needs ratio variables both centered.
**$p < 0.01$.

in the Minnesota Longitudinal Study of Risk and Adaptation (MLSRA; Sroufe et al., 2005). The MLSRA contains two assessments of AAI_{sbs} at 19 and 26. To be cautiously comprehensive we operationalized AAI_{sbs} in three ways: the aggregate score of 19 and 26 years ($r = 0.39$, $N = 178$), the 19-year assessment alone ($r = 0.33$, $N = 169$), and the 26-year assessment alone ($r = 0.37$, $N = 162$). Results revealed that the difference between magnitude of associations between maternal sensitivity and AAI_{sbs} in the SECCYD and using the 19/26 year aggregate assessment of AAI_{sbs} in MLSRA was significant ($Z = 2.39$, $p < 0.05$). The difference between the magnitude of associations between maternal sensitivity and AAI_{sbs} in the SECCYD versus the 26-year MLSRA was also significant ($Z = 2.03$, $p < 0.05$). The difference between the magnitude of associations between maternal sensitivity and AAI_{sbs} in the SECCYD versus the 19-year MLSRA, however, was nonsignificant ($Z = 1.53$, $p = 0.13$). Overall, given that both the aggregate MLSRA and the 26-year MLSRA AAI_{sbs} were significantly more strongly associated with maternal sensitivity in the MLSRA than the SECCYD indicates that there is some evidence that the association between maternal sensitivity and AAI_{sbs} was larger in a higher- versus lower-risk cohort.

TABLE 35 Hierarchal linear regression of the interaction of paternal sensitivity and income-to-needs ratio predicting AAI Preoccupied including demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
Paternal sensitivity	−0.02	0.01	−0.11	−3.01	<0.01	0.01	
Step 2							
Paternal sensitivity	−0.02	0.01	−0.09	−2.34	0.02	0.02	0.01**
Family income-to-needs ratio	−0.01	0.00	−0.11	−2.97	<0.01		
Step 3							
Paternal sensitivity	−0.02	0.01	−0.08	−2.19	0.03	0.03	0.00
Family income-to-needs ratio	−0.01	0.00	−0.12	−3.22	<0.01		
Paternal sensitivity × family income-to-needs ratio	0.00	0.00	0.05	1.46	0.15		
Step 4							
Paternal sensitivity	−0.02	0.01	−0.07	−1.92	0.06	0.06	0.03**
Family income-to-needs ratio	−0.01	0.00	−0.08	−1.90	0.06		
Paternal sensitivity × family income-to-needs ratio	0.00	0.00	0.05	1.24	0.22		
Child sex	0.06	0.02	0.13	3.48	<0.01		
Child ethnicity	−0.07	0.02	−0.11	−3.07	<0.01		
Maternal education	−0.01	0.00	−0.06	−1.29	0.20		
Step 5							
Paternal sensitivity	−0.01	0.01	−0.06	−1.70	0.09	0.06	0.00
Family income-to-needs ratio	−0.01	0.00	−0.08	−1.72	0.09		
Paternal sensitivity × family income-to-needs ratio	0.00	0.00	0.04	1.16	0.25		
Child sex	0.05	0.02	0.12	3.39	<0.01		
Child ethnicity	−0.06	0.02	−0.11	−2.86	<0.01		
Maternal education	0.00	0.00	−0.04	−0.88	0.38		
Cognitive functioning	0.00	0.00	−0.05	−1.22	0.22		

Note: $N = 744$. Paternal sensitivity, Family income-to-needs ratio, maternal education, and cognitive functioning variables centered.
**$p < 0.01$.

4.8 | Do child sex and child race/ethnicity moderate the associations between childhood caregiving experiences and AAI_{sbs}?

To address Aim 5a and 5b, hierarchal linear regression analyses were run. Parallel analyses were run for each interaction of interest resulting in 6 hierarchal linear regressions. The caregiving variable of interest (i.e., maternal/paternal sensitivity, infant attachment) was included in the initial step, the second step included the demographic variable of interest (child sex and child race/ethnicity), the third step included the interaction term between the caregiving and demographic variable, the fourth step included demographic covariates, and the fifth and final step include cognitive functioning.

4.8.1 | Child sex

As outlined in Tables 40–42, child sex did not moderate the association between maternal or paternal sensitivity or infant attachment and AAI_{sbs}. Consistent with our hypothesis, sex did not moderate the association between AAI_{sbs} and early caregiving.

TABLE 36 Hierarchal linear regression of the interaction of infant attachment and income-to-needs ratio predicting AAI preoccupied including demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
Infant attachment	−0.09	0.03	−0.13	−3.65	<0.01	0.02	
Step 2							
Infant attachment	−0.08	0.03	−0.11	−3.11	0.01	0.03	0.01**
Family income-to-needs ratio	−0.01	0.00	−0.12	−3.21	<0.01		
Step 3							
Infant attachment	−0.07	0.03	−0.10	−2.78	0.01	0.04	0.01*
Family income-to-needs ratio	−0.01	0.00	−0.13	−3.59	<0.01		
Infant attachment × family income-to-needs ratio	0.02	0.01	0.09	2.52	0.01		
Step 4							
Infant attachment	−0.06	0.03	−0.09	−2.46	0.01	0.06	0.02**
Family income-to-needs ratio	−0.01	0.00	−0.08	−2.02	0.04		
Infant attachment × family income-to-needs ratio	0.02	0.01	0.07	2.09	0.04		
Child sex	0.05	0.02	−0.12	3.49	<0.01		
Child ethnicity	−0.05	0.02	−0.10	−2.79	0.01		
Maternal education	0.00	0.00	−0.04	−0.96	0.34		
Step 5							
Infant attachment	−0.06	0.03	−0.08	−2.27	0.02	0.06	0.00
Family income-to-needs ratio	−0.01	0.00	−0.08	−1.63	0.07		
Infant attachment × family income-to-needs ratio	0.02	0.01	0.07	2.02	0.04		
Child sex	0.05	0.02	0.12	3.40	<0.01		
Child ethnicity	−0.05	0.02	−0.09	−2.53	0.01		
Maternal education	0.00	0.00	−0.03	−0.59	0.55		
Cognitive functioning	0.00	0.00	−0.04	−1.05	0.29		

Note: $N = 824$. Infant attachment, Family income-to-needs ratio, maternal education, and cognitive functioning variables centered.
*$p < 0.05$.**$p < 0.01$.

4.8.2 | Child race/ethnicity

Child race/ethnicity did not moderate the association between maternal and paternal sensitivity or infant attachment and AAI_{sbs} (as outlined in Tables 43–45, respectively). This evidence is consistent with previous findings from the SECCYD, which have demonstrated that child race/ethnicity does not moderate the association between maternal sensitivity and traditional scales of the AAI (Haltigan et al., 2019). In that context, we conclude that the pattern of results obtained was consistent with our hypothesis that race/ethnicity would not moderate the association between AAI_{sbs} and early caregiving.

4.9 | Equivalence testing: A modification to our pre-registration

Although we proposed to conduct equivalence tests on any null interactions for Aims 4 and 5 in the Stage 1 manuscript, upon beginning to conduct these analyses, we discovered that conducting equivalence tests on interaction

TABLE 37 Hierarchal linear regression of the interaction of maternal sensitivity and income-to-needs ratio predicting ASA including demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
Maternal sensitivity	0.29	0.04	0.27	7.27	<0.01	0.07	
Step 2							
Maternal sensitivity	0.26	0.04	0.24	5.85	<0.01	0.08	0.01
Family income-to-needs ratio	0.02	0.02	0.06	1.43	0.15		
Step 3							
Maternal sensitivity	0.25	0.05	0.24	5.04	<0.01	0.08	0.00
Family income-to-needs ratio	0.03	0.02	0.07	1.41	0.16		
Maternal sensitivity × family income-to-needs ratio	−0.01	0.02	−0.02	−0.37	0.72		
Step 4							
Maternal sensitivity	0.20	0.05	0.19	3.85	<0.01	0.11	0.03**
Family income-to-needs ratio	0.01	0.02	0.04	0.75	0.46		
Maternal sensitivity × family income-to-needs ratio	−0.01	0.02	−0.02	−0.50	0.62		
Child sex	0.40	0.08	0.19	5.12	<0.01		
Child ethnicity	0.07	0.10	0.03	0.64	0.52		
Maternal education	0.03	0.02	0.06	1.20	0.23		
Step 5							
Maternal sensitivity	0.16	0.05	0.16	3.05	<0.01	0.13	0.02**
Family income-to-needs ratio	0.00	0.02	0.01	0.12	0.91		
Maternal sensitivity × family income-to-needs ratio	0.00	0.02	0.00	−0.03	0.98		
Child sex	0.44	0.08	0.21	5.65	<0.01		
Child ethnicity	0.01	0.10	0.01	0.13	0.89		
Maternal education	0.01	0.02	0.02	0.33	0.74		
Cognitive functioning	0.02	0.01	0.17	3.75	<0.01		

Note: $N = 672$. ASA = Attachment Script Assessment. Maternal sensitivity, Family income-to-needs ratio, maternal education, and cognitive functioning variables centered.
**$p < 0.01$.

terms was not straightforward to implement given that such tests require specifying criteria for small, medium, or large interaction effects (i.e., differences in the effects across levels of the socio-demographic moderators of a magnitude that would be theoretically relevant). We originally proposed to use the equivalence bounds outlined in Schuengel et al. (2021). However, those effect sizes were framed in terms of main effects, not moderated ones. Without a strong theoretical rationale, we decided that it would be unwise to move forward with the equivalence analyses we proposed, a decision supported by the fact that these moderation analyses were furthermore largely exploratory in nature.

5 | DISCUSSION

This report is a part of a programmatic line of work investigating the caregiving antecedents of various measures of adult attachment (i.e., Booth-LaForce & Roisman, 2014; Steele et al., 2014; Schoenmaker et al., 2015;

TABLE 38 Hierarchal linear regression of the interaction of paternal sensitivity and income-to-needs ratio predicting ASA including demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
Paternal sensitivity	0.28	0.04	0.28	6.91	<0.01	0.08	
Step 2							
Paternal sensitivity	0.25	0.04	0.25	6.08	<0.01	0.09	0.01**
Family income-to-needs ratio	0.04	0.01	0.12	2.93	<0.01		
Step 3							
Paternal Sensitivity	0.25	0.04	0.25	6.00	<0.01	0.09	0.00
Family income-to-needs ratio	0.05	0.02	0.13	3.08	<0.01		
Paternal sensitivity × family income-to-needs ratio	−0.02	0.02	−0.04	−0.97	0.33		
Step 4							
Paternal sensitivity	0.22	0.04	0.21	5.31	<0.01	0.14	0.05**
Family income-to-needs ratio	0.01	0.02	0.04	0.80	0.43		
Paternal sensitivity × family income-to-needs ratio	−0.01	0.02	−0.03	−0.86	0.39		
Child sex	0.34	0.08	0.17	4.24	<0.01		
Child ethnicity	0.26	0.11	0.10	2.48	0.01		
Maternal education	0.05	0.02	0.11	2.38	0.01		
Step 5							
Paternal sensitivity	0.19	0.04	0.19	4.75	<0.01	0.16	0.02**
Family income-to-needs ratio	0.01	0.02	0.01	0.29	0.78		
Paternal sensitivity × family income-to-needs ratio	−0.01	0.02	−0.03	−0.68	0.50		
Child sex	0.38	0.08	0.18	4.69	<0.01		
Child ethnicity	0.20	0.11	0.08	1.91	0.06		
Maternal education	0.02	0.02	0.06	1.13	0.26		
Cognitive functioning	0.02	0.01	0.17	3.89	<0.01		

Note: $N = 580$. ASA = Attachment Script Assessment. Paternal sensitivity, Family income-to-needs ratio, maternal education, and cognitive functioning variables centered.
**$p < 0.01$.

Waters et al., 2017; Nivison, et al., 2021). The primary goal of this preregistered set of analyses was to examine the extent to which secure base script knowledge, as assessed by the Adult Attachment Interview (AAI_{sbs}), has its origins in early caregiving experiences, and to report how the relatively new AAI_{sbs} performs in comparison to existing measures of adult attachment, in a large scale, normative-risk sample of adolescents.

Consistent with our hypothesis, AAI_{sbs} was moderately associated with existing measures of adult attachment ($rs = 0.29$–0.42). The association between AAI_{sbs} and ASA, another assessment of secure base script knowledge, was, however, smaller than previously documented in the Minnesota Longitudinal Study of Risk and Adaptation (MLSRA) ($r = 0.31$ in SECCYD, and $r = 0.50$ in the MLSRA). Because AAI_{sbs} and the ASA are conceptualized as measures of the same underlying construct (parallel forms), the appropriate index of common variability is the un-squared correlation (Jensen, 1971; Johnson, 2011; Ozer, 1985). In the present study, shared variation (r) was 31% compared with 50% in prior work (Waters, Facompré & Dagan, et al., 2021). Both results are in line with expected levels of convergent validity. In contrast, the association between AAI_{sbs} and AAI coherence was larger in the SECCYD ($r = 0.42$) than previously documented in the MLSRA ($r = 0.23$–0.29) but was not high enough so as to raise "old wine in a

TABLE 39 Hierarchal linear regression of the interaction of infant attachment and income-to-needs ratio predicting ASA including demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
Infant attachment	0.47	0.13	0.14	3.46	<0.01	0.02	
Step 2							
Infant attachment	0.39	0.14	0.11	2.92	<0.01	0.04	0.02**
Family income-to-needs ratio	0.05	0.01	0.13	3.38	<0.01		
Step 3							
Infant attachment	0.39	0.14	0.11	2.88	<0.01	0.04	0.00
Family income-to-needs ratio	0.05	0.01	0.13	3.39	<0.01		
Infant attachment × family income-to-needs ratio	−0.02	0.05	−0.01	−0.31	0.76		
Step 4							
Infant attachment	0.33	0.13	0.09	2.45	0.01	0.09	0.05**
Family income-to-needs ratio	0.01	0.02	0.04	0.81	0.42		
Infant attachment × family income-to-needs ratio	−0.01	0.05	−0.01	−0.14	0.89		
Child sex	0.42	0.08	0.20	5.30	<0.01		
Child ethnicity	0.20	0.10	0.08	2.05	0.04		
Maternal education	0.05	0.02	0.11	2.40	0.02		
Step 5							
Infant attachment	0.23	0.13	0.07	1.73	0.08	0.12	0.03**
Family income-to-needs ratio	0.00	0.02	0.00	0.03	0.98		
Infant attachment × family income-to-needs ratio	0.01	0.05	0.01	0.21	0.83		
Child sex	0.46	0.08	0.22	5.88	<0.01		
Child ethnicity	0.1	0.10	0.04	1.09	0.28		
Maternal education	0.02	0.02	0.05	0.99	0.32		
Cognitive functioning	0.02	0.01	0.21	4.57	<0.01		

Note: $N = 651$. ASA = Attachment Script Assessment. Infant attachment, Family income-to-needs ratio, maternal education, and cognitive functioning variables centered.
**$p < 0.01$.

new bottle" type critiques (see Waters & Roisman, 2019). Finally, the magnitude of the association between AAI_{sbs} and AAI security was consistent across SECCYD and MLSRA ($r = \sim 0.33$). Overall, these findings suggest that AAI_{sbs} and traditional measures of adult attachment may be tapping into a common construct, but also that these measures are at least partially distinct indicators of adult attachment representations.

Furthermore, AAI_{sbs} was significantly and moderately associated with maternal ($r = 0.21$) and paternal ($r = 0.12$) sensitivity and weakly associated with infant attachment ($r = 0.08$). These findings are in the predicted direction although descriptively slightly weaker in magnitude than comparable associations generated with the ASA and with Main and Goldwyn's standard coding system applied to the same AAIs in the SECCYD (Steele et al., 2014). Moreover, the association we observed in this analysis between infant attachment and AAI_{sbs} was weaker than the association between maternal and paternal sensitivity and AAI_{sbs}, which is consistent with prior analyses of the SECCYD that have examined the associations between early caregiving quality and other assessments of adult attachment in the SECCYD (Roisman et al., 2014; Steele et al., 2014). Further examination into the extent to which AAI_{sbs} has its origins in early caregiving revealed that maternal sensitivity was uniquely associated with AAI_{sbs} above and beyond

TABLE 40 Hierarchal linear regression of the interaction of maternal sensitivity and Sex predicting AAI_{sbs} including demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
Maternal sensitivity	0.41	0.06	0.21	6.40	<0.01	0.05	
Step 2							
Maternal sensitivity	0.40	0.06	0.21	6.16	<0.01	0.06	0.01**
Child sex	0.42	0.13	0.11	3.29	<0.01		
Step 3							
Maternal sensitivity	0.30	0.21	0.16	1.47	0.14	0.06	0.00
Child sex	0.42	0.13	0.11	3.29	<0.01		
Maternal sensitivity × child sex	0.06	0.13	0.05	0.48	0.63		
Step 4							
Maternal sensitivity	0.21	0.21	0.11	1.00	0.32	0.07	0.01
Child sex	0.42	0.13	0.11	3.28	<0.01		
Maternal sensitivity × child sex	0.06	0.13	0.05	0.43	0.67		
Child ethnicity	0.36	0.17	0.08	2.13	0.03		
Family income-to-needs ratio	0.01	0.03	0.01	0.26	0.79		
Maternal education	0.03	0.03	0.04	0.81	0.42		
Step 5							
Maternal sensitivity	0.19	0.21	0.10	0.92	0.36	0.07	0.00
Child sex	0.44	0.13	0.11	3.38	<0.01		
Maternal sensitivity × child sex	0.05	0.13	0.04	0.40	0.69		
Child ethnicity	0.34	0.17	0.07	1.98	0.05		
Family income-to-needs ratio	0.00	0.03	0.01	0.12	0.90		
Maternal education	0.02	0.04	0.02	0.53	0.60		
Cognitive functioning	0.01	0.01	0.05	1.10	0.27		

Note: $N = 856$. AAI_{sbs} = secure base script knowledge measured in the Adult Attachment Interview. Maternal sensitivity, Family income-to-needs ratio, maternal education, and cognitive functioning variables centered.
**$p < 0.01$.

paternal sensitivity, infant attachment, demographic covariates, and cognitive functioning. Overall, these results support the prediction that AAI_{sbs} has its origins, at least in part, in early caregiving and that maternal sensitivity may be a unique predictor of later AAI_{sbs}.

We next sought to understand whether AAI_{sbs} performs as well or better than existing measures of adult attachment. Overall, AAI_{sbs} was not more strongly associated with maternal and paternal sensitivity or infant attachment compared to other assessments of adult attachment representations. These findings are not consistent with previously reported evidence from Waters et al. (2017), a study that documented stronger association between maternal sensitivity (assessed prospectively) and AAI_{sbs} than between maternal sensitivity and the more traditional coding of the same AAIs focused on the coherence of adults' discourse (Main et al., 1985). With that said, we did find some evidence that the ASA was more strongly associated with paternal sensitivity than was AAI_{sbs}. Additional analyses revealed that, with the inclusion of covariates, AAI_{sbs} did not incrementally retrodict early experiences better than traditional measures of adult attachment. Finally, we examined the potential mediation of associations between early caregiving and the quality of later attachment representations by AAI_{sbs}. This was a test for replication of previous

TABLE 41 Hierarchal linear regression of the interaction of paternal sensitivity and Sex predicting AAI_{sbs} including demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
Paternal sensitivity	0.23	0.07	0.12	3.27	<0.01	0.01	
Step 2							
Paternal sensitivity	0.21	0.07	0.11	3.03	<0.01	0.03	0.01**
Child sex	0.51	0.14	0.13	3.67	<0.01		
Step 3							
Paternal sensitivity	0.14	0.22	0.07	0.63	0.53	0.03	0.00
Child sex	0.51	0.14	0.13	3.66	<0.01		
Paternal sensitivity × child sex	0.05	0.14	0.04	0.36	0.72		
Step 4							
Paternal sensitivity	0.07	0.22	0.04	0.31	0.76	0.06	0.03**
Child sex	0.47	0.14	0.12	3.43	<0.01		
Paternal sensitivity × child sex	0.05	0.14	0.04	0.37	0.71		
Child ethnicity	0.59	0.18	0.12	3.23	<0.01		
Family income-to-needs ratio	0.00	0.03	0.01	0.15	0.88		
Maternal education	0.07	0.03	0.09	1.97	0.05		
Step 5							
Paternal sensitivity	0.06	0.22	0.03	0.29	0.77	0.06	0.00
Child sex	0.48	0.14	0.13	3.49	<0.01		
Paternal sensitivity × child sex	0.05	0.14	0.04	0.33	0.74		
Child ethnicity	0.57	0.19	0.11	3.05	<0.01		
Family income-to-needs ratio	0.00	0.03	0.00	0.03	0.98		
Maternal education	0.06	0.04	0.07	1.58	0.12		
Cognitive functioning	0.01	0.01	0.04	1.01	0.32		

Note: $N = 744$. AAI_{sbs} = secure base script knowledge measured in the Adult Attachment Interview. Paternal sensitivity variable centered.
**$p < 0.01$.

findings which suggested that scripted attachment representations support the development of coherence of autobiographical attachment representations like those assessed in the AAI. These mediation analyses revealed that AAI_{sbs} partially mediated the association between maternal sensitivity (but not paternal sensitivity or infant attachment) and traditional measures of adult attachment. Overall, these findings suggest that AAI_{sbs} does not perform better than existing measures of adult attachment but did generate evidence to suggest that, at least with respect to maternal sensitivity, AAI_{sbs} performs in a manner comparable to existing measures of adult attachment and supports prior arguments that secure base script knowledge mediates the link between early caregiving and AAI coherence (Waters, 2021; Waters et al., 2017).

To further investigate whether the association between early caregiving and adult attachment is generalizable in both high and low risk settings, several moderator analyses were run within the SECCYD cohort. Overall, risk status (i.e., family income-to-needs) largely did not moderate the association between early caregiving and adult attachment. For example, we found no evidence that income-to-needs moderated the associations between maternal or paternal sensitivity and traditional measures of adult attachment. Family income-to-needs did, however, moderate

TABLE 42 Hierarchal linear regression of the interaction of infant attachment and Sex predicting AAI_{sbs} including demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
Infant attachment	0.53	0.22	0.08	2.40	0.02	0.01	
Step 2							
Infant attachment	0.51	0.22	0.08	2.33	0.02	0.02	0.01**
Child sex	0.49	0.13	0.13	3.69	<0.01		
Step 3							
Infant attachment	−0.30	0.71	−0.5	−0.42	0.68	0.03	0.00
Child sex	0.49	0.13	0.13	3.69	<0.01		
Infant attachment × child sex	0.53	0.44	0.13	1.20	0.23		
Step 4							
Infant attachment	−0.51	0.70	−0.08	−0.73	0.47	0.05	0.02**
Child sex	0.46	0.13	0.12	3.52	<0.01		
Infant attachment × child sex	0.52	0.43	0.13	1.21	0.23		
Child ethnicity	0.57	0.17	0.12	3.41	<0.01		
Family income-to-needs ratio	0.01	0.03	0.01	0.22	0.82		
Maternal education	0.06	0.03	0.08	1.92	0.06		
Step 5							
Infant attachment	−0.59	0.70	−0.09	−0.84	0.40	0.05	0.00
Child sex	0.48	0.13	0.12	3.63	<0.01		
Infant attachment × child sex	0.54	0.43	0.14	1.24	0.21		
Child ethnicity	0.51	0.17	0.11	3.05	<0.01		
Family income-to-needs ratio	0.00	0.03	0.00	0.01	0.99		
Maternal education	0.05	0.04	0.06	1.36	0.18		
Cognitive functioning	0.01	0.01	0.06	1.52	0.13		

Note: $N = 824$. AAI_{sbs} = secure base script knowledge measured in the Adult Attachment Interview. Infant attachment, Family income-to-needs ratio, maternal education, and cognitive functioning variables centered.
**$p < 0.01$.

the association between infant attachment and AAI preoccupied states of mind, but no other measure of adult attachment. Given that this moderation was not observed across multiple infant attachment-adult attachment associations, conclusions based on this result should be made cautiously. In summary, these results suggest that measures of attachment including AAI_{sbs}, and traditional measures are valid assessments of attachment quality in both higher and lower-risk families. With that said, we did find that maternal sensitivity was more strongly associated with AAI_{sbs} in the high-risk MLSRA sample than the normative-risk SECCYD. More work should be done in larger high-risk samples to understand whether AAI_{sbs} performs better in such populations compared to lower-risk cohorts.

We also investigated whether child sex or child race/ethnicity moderated the association between caregiving variables and AAI_{sbs}. Consistent with our hypotheses, child sex did not moderate the association between any caregiving variable and AAI_{sbs}, which suggests that AAI_{sbs} is a comparably valid assessment across males and females, at least in terms of its antecedents. Child race/ethnicity did not moderate the association between caregiving variables and AAI_{sbs}, findings consistent with the universality claim of attachment (Bowlby, 1969/1982).

TABLE 43 Hierarchal linear regression of the interaction of maternal sensitivity and ethnicity predicting AAI_{sbs} including demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
Maternal Sensitivity	0.45	0.07	0.23	6.51	<0.01	0.05	
Step 2							
Maternal Sensitivity	0.42	0.08	0.22	5.54	<0.01	0.05	0.00
Child ethnicity	0.22	0.23	0.04	0.93	0.35		
Step 3							
Maternal sensitivity	0.25	0.18	0.13	1.43	0.15	0.06	0.01
Child ethnicity	0.39	0.28	0.07	1.36	0.17		
Maternal sensitivity × child ethnicity	0.20	0.20	0.09	1.05	0.30		
Step 4							
Maternal sensitivity	0.25	0.18	0.13	1.45	0.15	0.07	0.01*
Child ethnicity	0.31	0.29	0.05	1.10	0.27		
Maternal sensitivity × child ethnicity	0.12	0.20	0.05	0.61	0.54		
Child sex	0.38	0.14	0.10	2.75	0.01		
Family income-to-needs ratio	0.01	0.03	0.02	0.41	0.68		
Maternal education	0.03	0.04	0.04	0.82	0.42		
Step 5							
Maternal sensitivity	0.23	0.17	0.12	1.29	0.20	0.07	0.00
Child ethnicity	0.28	0.29	0.05	0.96	0.34		
Maternal sensitivity × child ethnicity	0.13	0.20	0.05	0.64	0.52		
Child sex	0.39	0.14	0.10	2.82	0.01		
Family income-to-needs ratio	0.01	0.03	0.01	0.32	0.75		
Maternal education	0.02	0.04	0.03	0.60	0.55		
Cognitive functioning	0.01	0.01	0.04	0.87	0.38		

Note: $N = 759$. AAI_{sbs} = secure base script knowledge measured in the Adult Attachment Interview. Maternal sensitivity, Family income-to-needs ratio, maternal education, and cognitive functioning variables centered.
*$p < 0.05$.

These findings are in line with prior evidence from the SECCYD that has examined whether child race/ethnicity moderates the association between caregiving and the traditional measures of adult attachment studied in this report (see Haltigan et al., 2019).

5.1 | Strengths, limitations, and future direction

The present report extends a long program of research that has investigated the caregiving antecedents of adult attachment (Booth-LaForce & Roisman, 2014; Steele et al., 2014; Waters et al., 2017; Nivison, Vandell, et al., 2021). Moreover, prior to this report, nearly all that was known about AAI_{sbs} resulted from analyses of the at-risk, moderately large MLSRA sample (which furthermore only focused on maternal sensitivity and abuse/neglect as the caregiving predictors). The present study extended this work in the SECCYD, which is both a normative risk sample and contains the largest corpus of AAIs coded for secure base script knowledge to date. Furthermore, the SECCYD has

TABLE 44 Hierarchal linear regression of the interaction of paternal sensitivity and ethnicity predicting AAI_{sbs} including demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
Paternal sensitivity	0.23	0.08	0.12	3.08	<0.01	0.01	
Step 2							
Paternal sensitivity	0.21	0.08	0.11	2.72	0.01	0.02	0.01*
Child ethnicity	0.58	0.28	0.08	2.08	0.04		
Step 3							
Paternal sensitivity	0.09	0.24	0.05	0.37	0.71	0.02	0.00
Child ethnicity	0.64	0.30	0.09	2.10	0.04		
Paternal sensitivity × child ethnicity	0.13	0.26	0.06	0.50	0.62		
Step 4							
Paternal sensitivity	0.08	0.24	0.04	0.34	0.74	0.05	0.03**
Child ethnicity	0.47	0.31	0.07	1.55	0.12		
Paternal sensitivity × child ethnicity	0.07	0.25	0.03	0.26	0.80		
Child sex	0.42	0.15	0.11	2.83	0.01		
Family income-to-needs ratio	0.00	0.03	0.01	0.15	0.88		
Maternal education	0.09	0.04	0.11	2.48	0.01		
Step 5							
Paternal sensitivity	0.08	0.24	0.04	0.34	0.74	0.05	0.00
Child ethnicity	0.42	0.31	0.06	1.34	0.18		
Paternal sensitivity × child ethnicity	0.05	0.26	0.03	0.21	0.84		
Child sex	0.43	0.15	0.11	2.88	<0.01		
Family income-to-needs ratio	0.00	0.03	0.00	0.09	0.93		
Maternal education	0.08	0.04	0.10	2.15	0.03		
Cognitive functioning	0.01	0.01	0.03	0.76	0.45		

Note: $N = 664$. AAI_{sbs} = secure base script knowledge measured in the Adult Attachment Interview. Paternal sensitivity, Family income-to-needs ratio, maternal education, and cognitive functioning variables centered.
*$p < 0.05$.

multiple measures of adult attachment, including the traditional codes of the AAI and ASAs, as well as the high-quality prospective assessments of observed parent–child sensitivity, with both mothers and fathers, at several time points throughout childhood. Given this, the SECCYD is arguably an ideal context to examine the childhood antecedents of AAI_{sbs}. In addition, the large sample size has allowed us to perform many analyses that would be otherwise underpowered in existing samples (e.g., moderation by child sex).

Although the SECCYD is roughly representative of the 1991 birth cohort from which it was drawn, the sample is predominately comprised of White, non-Hispanic participants. A similarly large but more representative sample of the current US population would therefore be valuable to examine how AAI_{sbs} performs in a more diverse sample. Though we found little evidence of moderation by race/ethnicity in the present study (consistent with the universality hypothesis of attachment), it is important to understand whether this result is likely to be robust across other race/ethnic groups beyond the Black and White/non-Hispanic participants studied here.

In addition, although there are several assessments of observed paternal sensitivity in the SECCYD, the first father-child assessment was not administered until 54 months of age. It is possible that early sensitivity may be

TABLE 45 Hierarchal linear regression of the interaction of infant attachment and ethnicity predicting AAI_{sbs} including demographic covariates and cognitive functioning.

Variable	*B*	*SE*	*β*	*t*	*p*	R^2	ΔR^2
Step 1							
Infant attachment	0.65	0.24	0.10	2.75	0.01	0.01	
Step 2							
Infant attachment	0.51	0.24	0.08	2.15	0.03	0.02	0.01**
Child ethnicity	0.69	0.23	0.11	3.04	<0.01		
Step 3							
Infant attachment	0.43	0.66	0.07	0.65	0.52	0.02	0.00
Child ethnicity	0.70	0.24	0.12	2.87	<0.01		
Infant attachment × child ethnicity	0.10	0.71	0.01	0.14	0.89		
Step 4							
Infant attachment	0.31	0.65	0.05	0.47	0.64	0.05	0.03**
Child ethnicity	0.56	0.25	0.09	2.27	0.02		
Infant attachment × child ethnicity	0.07	0.70	0.01	0.10	0.92		
Child sex	0.42	0.14	0.11	2.99	<0.01		
Family income-to-needs ratio	0.01	0.03	0.02	0.41	0.68		
Maternal education	0.08	0.04	0.09	2.08	0.04		
Step 5							
Infant attachment	0.24	0.65	0.04	0.37	0.71	0.05	0.00
Child ethnicity	0.49	0.26	0.08	1.90	0.06		
Infant attachment × child ethnicity	0.10	0.70	0.01	0.14	0.89		
Child sex	0.43	0.14	0.11	3.07	<0.01		
Family income-to-needs ratio	0.01	0.03	0.01	0.28	0.78		
Maternal education	0.06	0.04	0.08	1.62	0.10		
Cognitive functioning	0.01	0.01	0.05	1.23	0.22		

Note: $N = 730$. AAI_{sbs}, secure base script knowledge measured in the Adult Attachment Interview. Infant attachment, Family income-to-needs ratio, maternal education, and cognitive functioning variables centered.
**$p < 0.01$.

particularly important in the construction of secure base script knowledge and may explain why associations between paternal sensitivity and adult attachment are weaker than those between maternal sensitivity and adult attachment (as observed mother–child interactions were assessed four more times prior to the collection of father observations). Future work is needed to understand if paternal sensitivity is truly less strongly associated with AAI_{sbs} than is maternal sensitivity, or if these results are due to fewer observed father-child assessments in the SECCYD. Similarly, the infant attachment measures in this study were only administered with the mother. Given evidence to suggest that father-child attachment has incremental predictive validity on children's developmental outcomes (e.g., Dagan et al., 2021, 2022), future work should also investigate the father-child attachment relationship and its joint predictive value together with mother–child attachment, on adult secure base script knowledge. Finally, although we acknowledge that there were many analyses run in this report, as we noted in the Introduction our focus here was primarily on estimating the magnitude (versus statistical significance) of a relatively small number of novel associations (i.e., correlations between three predictor variables [maternal sensitivity, paternal sensitivity, and infant attachment] and one key dependent measure—AAI_{sbs}), all

estimated with a reasonably high degree of precision given the large sample size. Although multiple tests may generate opportunities for Type 1 errors, we regarded most of the analyses in the present study as robustness checks.

Several methodological limitations that have the potential to impact our results should also be noted. The SECCYD sample is comprised of participants in late adolescence ($M_{age} = 17.8$), which may have been slightly young for an autobiographical memory-based interview that was initially developed as an assessment of attachment for adults (i.e., the AAI). Several studies demonstrate that the narrative capacity to construct an interconnected history of one's early experience along with making causal connections between personal experience and self is only just emerging in adolescence and continues to develop well into the years of maturity (e.g., Habermas & de Silveira, 2008; Köber et al., 2015). These narrative abilities factor heavily in the AAI_{sbs} coding, and to a lesser extent the traditional AAI scoring systems. In contrast, the ASA has a version for adolescents tailored specifically toward developmentally appropriate attachment concerns and provides far more support of narrative structure via the prompt-word outlines given to participants during the task. As such, it is possible that the ASA may have been more developmentally appropriate for the SECCYD sample and may have played a role in the results including those examining convergent validity. In addition, the ASA gives equal weight to maternal and paternal items and also allows for counterbalancing of mother and father items. The AAI does not allow for counterbalancing and typically leads with questions focused on mother then follow up questions for father. This difference between the AAI and ASA may be relevant when evaluating the relative strength of the ASA in retrodicting paternal caregiving experiences. Finally, the order of administration of the AAI and ASA was not counterbalanced in the SECCYD. It is possible that priming participants regarding their attachment history via a 1–2 hour interview prior to completing the ASA improved or influenced retrodictive performance. Future work should, where possible, address these limitations. That being said, data from the SECCYD demonstrate that the ASA outperformed both AAI_{sbs} and traditional AAI measures. In light of this new data, researchers seeking to measure secure base script knowledge should strongly consider the strengths of the ASA in term of practicality, performance, and adaptability to various age groups across development (Waters & Waters, 2021).

6 | CONCLUSION

The development of the AAI_{sbs}, in part, was meant to resolve an incoherence in the attachment literature. Specifically, how, and why would early caregiving experience result in the production of a more coherent account of those experiences decades later via the AAI? Coherence itself is seemingly far removed from the attachment experiences thought to be its genesis or the outcomes it is meant to predict. Based on cognitive script theory, Waters et al. (2013); see also Waters and Facompré (2021) argued that early experiences with consistent and supportive care gives rise to the secure base script and that this script in turn helps structure narrative accounts of attachment experiences during the AAI. Thus, coherence is partly a result of learning the secure base script rather than a direct outgrowth of sensitive caregiving. The AAI_{sbs} is the first coding system to explicitly document and evaluate secure base content in the AAI and, in turn, was implemented in the first longitudinal test of the mediational model proposed by Waters et al. (2017). Support for this mediational model in the SECCYD has contributed to resolving a critical incoherence in attachment theory and research.

The AAI_{sbs}, like any new measure, must be evaluated in the context of existing measurement tools. In that regard the evidence suggests that the AAI_{sbs} performs adequately but is not superior in terms of its links to early caregiving experience. With that said, its role in predicting adult outcomes and security in the next generation has yet to be rigorously evaluated, but efforts are underway to do so in the context of the Collaboration on Attachment transmissions (CATS) Individual Participant Data meta-analytic corpus (Verhage et al., 2018) with a focus on the intergenerational transmission of attachment.

AUTHOR CONTRIBUTIONS

Marissa D. Nivison: Conceptualization; formal analysis; investigation; methodology; writing – original draft; writing – review and editing. **Or Dagan:** Conceptualization; investigation; methodology; writing – original draft; writing – review and editing. **Cathryn Booth-LaForce:** Data curation; funding acquisition; project administration; writing – review and editing. **Glenn I. Roisman:** Conceptualization; data curation; funding acquisition; investigation; methodology; resources; supervision; writing – original draft; writing – review and editing. **Theodore E. A. Waters:** Conceptualization; data curation; funding acquisition; investigation; methodology; writing – original draft; writing – review and editing.

ACKNOWLEDGEMENTS

Coding of secure base script knowledge for this study was supported by grants from the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD; R01 HD102035; R01 HD069442) to Glenn I. Roisman. A cooperative agreement (U10 HD027040) supported data collection for the Study of Early Child Care and Youth Development (SECCYD) from birth through age 15-years and the age 18-year data collection was supported by a R01 from the NICHD (R01 HD054822) to Cathryn Booth-LaForce. Research reported in this publication was also facilitated by the National Institute of Mental Health of the National Institutes of Health via a training grant (T32 MH015755) supporting pre-doctoral research by Marissa D. Nivison at the University of Minnesota. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Institutes of Health. Finally, we thank the study participants for their willingness to be a part of this longitudinal study that began shortly after their birth.

PEER REVIEW

The peer review history for this article is available at https://publons.com/publon/10.1002/icd.2410.

DATA AVAILABILITY STATEMENT

The NICHD SECCYD dataset is publicly available through the age 15-year assessment of the cohort (https://www.icpsr.umich.edu/icpsrweb/ICPSR/studies/21940/summary). Subsequent assessments are not publicly available.

ORCID

Marissa D. Nivison https://orcid.org/0000-0002-9436-722X

ENDNOTES

[1] Anonymized link: https://osf.io/ftew3/?view_only=66b6c0d8ed814f8d9eeb184320cbc16c.

[2] https://www.icpsr.umich.edu/icpsrweb/ICPSR/studies/21940/summary.

REFERENCES

Ainsworth, M. D. S., Blehar, M. C., Waters, E., & Wall, S. N. (1978). *Patterns of attachment: A psychological study of the strange situation*. Erlbaum.

Allen, J. P., Hall, F. D., Insabella, G. M., Land, D. J., Marsh, P. A., & Porter, M. R. (2001). *Supportive behavior coding system*. Unpublished manuscript, University of Virginia.

Allen, J. P., Hauser, S. T., Bell, K. L., McElhaney, K. B., Tate, D. C., et al. (2000). *The autonomy and relatedness coding system*. Unpublished manuscript, University of Virginia.

Booth-LaForce, C., Groh, A. M., Burchinal, M. R., Roisman, G. I., Owen, M. T., & Cox, M. J. (2014). Caregiving and contextual sources of continuity and change in attachment security from infancy to late adolescence. In C. Booth-LaForce & G. I. Roisman (Eds.), *The adult attachment interview: Psychometrics, stability and change from infancy, and developmental origins* (Vol. 79, pp. 67–84). Monographs of the Society for Research in Child Development.

Booth-LaForce, C., & Roisman, G. I. (Eds.). (2014). The adult attachment interview: Psychometrics, stability and change from infancy, and developmental origins. *Monographs of the Society for Research in Child Development*, *79*, 1–185.

Bost, K. K., Shin, N., McBride, B. A., Brown, G. L., Vaughn, B. E., Coppola, G., Veríssimo, M., Monteiro, L., & Korth, B. (2006). Maternal secure base scripts, children's attachment security, and mother–child narrative styles. *Attachment & Human Development*, *8*, 241–260.

Bowlby, J. (1969/1982). Attachment and loss, Vol. 1: Attachment (2nd ed.). Basic Books.

Cassidy, J., Marvin, R. S., the MacArthur Attachment Working Group of the John D, Catherine, T., & MacArthur network on the transition from infancy to early childhood. (1992). *Attachment organization in preschool children: Procedures and coding manual*. Unpublished coding manual, The Pennsylvania State University.

Cohen, J. (1992). A power primer. *Psychological Bulletin*, *112*, 155–159. https://doi.org/10.1037/0033-2909.112.1.155

Cohen, J. (1994). The earth is round (p<.05). *American Psychologist*, *49*, 997–1003.

Dagan, O., Schuengel, C., Verhage, M., Madigan, S., Roisman, G. I., … The Collaboration on Attachment to Multiple Parents and Outcomes Synthesis. (2022). Configurations of Mother-Child and Father-Child Attachment Relationships as Predictors of Child Language Competence: An Individual Participant Data Meta-Analysis (Preprint). https://doi.org/10.31234/osf.io/ts4hq

Dagan, O., Schuengel, C., Verhage, M. L., van IJzendoorn, M. H., Sagi-Schwartz, A., Madigan, S., … Collaboration on Attachment to Multiple Parents and Outcomes Synthesis. (2021). Configurations of mother-child and father-child attachment as predictors of internalizing and externalizing behavioral problems: An individual participant data (IPD) meta-analysis. *New Directions for Child and Adolescent Development*, *2021*, 67–94.

Dykas, M. J., Woodhouse, S. S., Cassidy, J., & Waters, H. S. (2006). Narrative assessment of attachment representations: Links between secure base scripts and adolescent attachment. *Attachment & Human Development*, *8*, 221–240.

Egeland, B., & Hiester, M. (1993). *Teaching task rating scales*. Institute of Child Development, University of Minnesota.

Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods*, *4*, 272–299.

Fraley, C. R. (2002). Attachment stability from infancy to adulthood: Meta-analysis and dynamic modeling of developmental mechanisms. *Personality and Social Psychology Review*, *6*, 123–151.

George, C., Kaplan, N., & Main, M. (1985). *Adult Attachment Interview*. Unpublished interview. University of California, Berkeley.

Groh, A. M., Roisman, G. I., Booth-LaForce, C., Fraley, R. C., Owen, M. T., Cox, M. J., & Burchinal, M. R. (2014). Stability of attachment security from infancy to late adolescence. In C. Booth-LaForce & G. I. Roisman (Eds.), *The adult attachment interview: Psychometrics, stability and change from infancy, and developmental origins* (Vol. 79, pp. 51–66). Monographs of the Society for Research in Child Development.

Habermas, T., & de Silveira, C. (2008). The development of global coherence in life narratives across adolescence: Temporal, causal, and thematic aspects. *Developmental Psychology*, *44*(3), 707–721. https://doi.org/10.1037/0012-1649.44.3.707

Haltigan, J. D., Leerkes, E. M., Wong, M. S., Fortuna, K., Roisman, G. I., Supple, A. J., O'Brien, M., Calkins, S. D., & Plamondon, A. (2014). Adult attachment states of mind: Measurement invariance across ethnicity and associations with maternal sensitivity. *Child Development*, *85*, 1019–1035.

Haltigan, J. D., Roisman, G. I., Groh, A. M., Holland, A. S., Booth-LaForce, C., Rogosch, F. A., & Cicchetti, D. (2019). Antecedents of attachment states of mind in normative-risk and high-risk caregiving: Cross-race and cross-sex generalizability in two longitudinal studies. *Journal of Child Psychology and Psychiatry*, *60*, 1309–1322.

Haydon, K. C., Roisman, G. I., Owen, M. T., Booth-LaForce, C., & Cox, M. J. (2014). Shared and distinctive antecedents of AAI state of mind and inferred experience dimensions. In C. Booth-LaForce & G. I. Roisman (Eds.), *The adult attachment interview: Psychometrics, stability and change from infancy, and developmental origins* (Vol. 79, pp. 108–125). Monographs of the Society for Research in Child Development.

Jensen, A. R. (1971). Note on why genetic correlations are not squared. *Psychological Bulletin*, *75*, 223–224.

Johnson, W. (2011). Correlation and explaining variance: To square or not to square? *Intelligence*, *39*, 249–254.

Kobak, R. R. (1993). *The Adult Attachment Interview Q-set*. Unpublished document, University of Delaware, Newark.

Köber, C., Schmiedek, F., & Habermas, T. (2015). Characterizing lifespan development of three aspects of coherence in life narratives: A cohort-sequential study. *Developmental Psychology*, *51*(2), 260–275. https://doi.org/10.1037/a0038668

Lakens, D. (2017). Equivalence tests: A practical primer for t tests, correlations, and meta-analyses. *Social Psychological and Personality Science*, *8*, 355–362.

Main, M., & Goldwyn, R. (1998). *Adult attachment scoring and classification system*. Unpublished manuscript, University of California at Berkeley.

Main, M., Goldwyn, R., & Hesse, E. (2003/2008). *Adult attachment scoring and classification system*. Unpublished manuscript, University of California at Berkeley.

Main, M., Kaplan, N., & Cassidy, J. (1985). Security in infancy, childhood, and adulthood: A move to the level of representation. *Monographs of the Society for Research in Child Development*, *50*(1–2), 66–104.

NICHD Early child care Research Network. (2005). *Child care and child development: Results from the NICHD study of early child care and youth development*. Guilford.

Nivison, M. D., Facompré, C. R., Raby, K. L., Simpson, J. A., Roisman, G. I., & Waters, T. E. A. (2021). Childhood abuse and neglect are prospectively associated with scripted attachment representations in young adulthood. *Development and Psychopathology*, *33*, 1143–1155.

Nivison, M. D., Vandell, D. L., Booth-LaForce, C., & Roisman, G. I. (2021). Convergent and discriminant validity of retrospective assessments of the quality of childhood parenting: Prospective evidence from infancy to age 26 years. *Psychological Science*, *32*, 721–734.

Owen, M. T., Vaughn, A., Barfoot, B., & Ware, A. (1996). *The NICHD Study of Early Child Care parent-child interaction scales: Early childhood*. Unpublished manuscript, University of Texas at Dallas.

Ozer, D. J. (1985). Correlation and the coefficient of determination. *Psychological Bulletin*, *97*, 307–315.

Pinquart, M., Feussner, C., & Ahnert, L. (2013). Meta-analytic evidence for stability in attachments from infancy to early adulthood. *Attachment & Human Development*, *15*, 189–218.

Preacher, K. J., & Kelley, K. (2011). Effect size measures for mediation models: Quantitative strategies for communicating indirect effects. *Psychological Methods*, *16*, 93–115.

Roisman, G., Haltigan, J., Haydon, K., & Booth-LaForce, C. (2014). Earned-security in retrospect: Depressive symptoms, family stress, and maternal and paternal sensitivity from early childhood to mid-adolescence. *Monographs of the Society for Research in Child Development*, *79*, 85–107.

Roisman, G. I. (2009). Adult attachment: Toward a rapprochement of methodological cultures. *Current Directions in Psychological Science*, *18*, 122–126.

Schoenmaker, C., Juffer, F., Van IJzendoorn, M. H., Linting, M., van der Voort, A., & Bakermans-Kranenburg, M. J. (2015). From maternal sensitivity in infancy to adult attachment representations: A longitudinal adoption study with secure base scripts. *Attachment & Human Development*, *17*, 241–256.

Schuengel, C., Verhage, M. L., & Duschinsky, R. (2021). Prospecting the attachment research field: A move to the level of engagement. *Attachment & Human Development*, *23*, 375–395. https://doi.org/10.1080/14616734.2021.1918449

Sroufe, L. A., Egeland, B., Carlson, E. A., & Collins, W. A. (2005). *The development of the person: The Minnesota study of risk and adaptation from birth to adulthood*. The Guilford Press.

Steele, R. D., Waters, T. E. A., Bost, K. K., Vaughn, B. E., Truitt, W., Waters, H. S., Booth-LaForce, C., & Roisman, G. I. (2014). Caregiving antecedents of secure base script knowledge: A comparative analysis of young adult attachment representations. *Developmental Psychology*, *50*, 2526–2538.

Steiger, J. H. (1980). Tests for comparing elements of a correlation matrix. *Psychological Bulletin*, *82*, 245–251.

Verhage, M. L., Fearon, R. M. P., Schuengel, C., Van IJzendoorn, M. H., Bakermans-Kranenburg, M. J., Madigan, S., Roisman, G. I., Oosterman, M., Behrens, K. Y., Wong, M. S., Mangelsdorf, S., Priddis, L. E., Brisch, K.-H., & The Collaboration on Attachment Transmission Synthesis. (2018). Examining ecological constraints on the intergenerational transmission of attachment via individual participant data meta-analysis. *Child Development*, *89*, 2023–2027.

Verhage, M. L., Schuengel, C., Madigan, S., Fearon, R. M. P., Oosterman, M., Cassibba, R., … van IJzen- doorn, M. H. (2016). Narrowing the transmission gap: A synthesis of three decades of research on intergenerational transmission of attachment. *Psychological Bulletin*, *142*, 337–366. https://doi.org/10.1037/bul0000038

Waters, E. (2003). Assessing secure base behavior and attachment security using the Q-Sort method. http://www.psychology.sunysb.edu/attachment/measures/content/aqs_method.html

Waters, E., & Deane, K. (1985). Defining and assessing individual differences in attachment relationships: Q- methodology and the organization of behavior in infancy and early childhood. In I. Bretherton & E. Waters (Eds.), *Growing points of attachment theory and research* (pp. 41–65). Monographs for the Society for Research in Child Development.

Waters, H. S., & Rodrigues, L. M. (2001). Are attachment scripts the building blocks of attachment representations? Narrative assessment of representations and the AAI. Paper presented at the biannual meeting of the Society for Research in Child Development, Minneapolis, MN.

Waters, H. S., & Waters, E. (2006). The attachment working models concept: Among other things, we build script-like representations of secure base experiences. *Attachment & Human Development*, *8*, 185–197.

Waters, H. S., & Waters, T. E. A. (2021). Measuring attachment representations as secure base script knowledge: The prompt-word outline method in adulthood, adolescence, and middle childhood. In E. Waters, B. E. Vaughn, & H. S. Waters (Eds.), *Measuring attachment* (pp. 262–296). Guilford Press.

Waters, H. S., Waters, T. E. A., & Waters, E. (2021). From internal working models to script-like attachment representations. In R. A. Thompson, J. A. Simpson, & L. J. Berlin (Eds.), *Attachment: The fundamental questions*. Guilford Press.

Waters, T. E. A. (2021). Representational measures of attachment: A secure base script perspective. In R. A. Thompson, J. A. Simpson, & L. J. Berlin (Eds.), *Attachment: The fundamental questions* (pp. 78–85). Guilford Press.

Waters, T. E. A., Brockmeyer, S. L., & Crowell, J. A. (2013). AAI coherence predicts caregiving and care seeking behavior: Secure base script knowledge helps explain why. *Attachment & Human Development*, *15*, 316–331.

Waters, T. E. A., & Facompré, C. R. (2021). Secure base content in the adult attachment interview. In E. Waters, B. Vaughn, & H. S. Waters (Eds.), *Measuring attachment*. New York, NY.

Waters, T. E. A., Facompré, C. R., Dagan, O., Martin, J., Johnson, W. F., Young, E. S., Shankman, J., Simpson, J. A., & Roisman, G. I. (2021). Convergent validity and stability of secure base script knowledge from young adulthood to midlife. *Attachment and Human Development*, *23*(5), 740–760.

Waters, T. E. A., Facompré, C. R., Van de Walle, M., Dujardin, A., De Winter, S., Heylen, J., Santens, T., Verhees, M. W. F. T., & Bosmans, G. (2019). Stability and change in secure base script development during middle childhood and early adolescence: A three-year longitudinal study. *Developmental Psychology*, *55*, 2379–2388.

Waters, T. E. A., Fraley, R. C., Groh, A. M., Steele, R. D., Vaughn, B. E., Bost, K. K., Veríssimo, M., Coppola, G., & Roisman, G. I. (2015). The latent structure of secure base script knowledge. *Developmental Psychology*, *51*, 823–830.

Waters, T. E. A., & Roisman, G. I. (2019). The secure base script concept: An overview. *Current Opinion in Psychology*, *25*, 162–166.

Waters, T. E. A., Ruiz, S. K., & Roisman, G. I. (2017). Origins of secure base script knowledge and the developmental construction of attachment representations. *Child Development*, *88*, 198–209.

Weaver, B., & Wuensch, K. L. (2013). SPSS and SAS programs for comparing Pearson correlations and OLS regression coefficients. *Behavior Research Methods*, *45*, 880–895.

Weinfield, N. S., Sroufe, L. A., & Egeland, B. (2000). Attachment from infancy to early adulthood in a high-risk sample: Continuity, discontinuity and their correlates. *Child Development*, *71*, 695–702.

Woodcock, R. W. (1990). Theoretical foundations of the WJ-R measures of cognitive ability. *Journal of Psychoeducational Assessment*, *8*, 231–258.

Woodcock, R. W., & Johnson, M. B. (1989). *Woodcock-Johnson psycho-educational battery – Revised*. DLM.

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Nivison, M. D., Dagan, O., Booth-LaForce, C., Roisman, G. I., & Waters, T. E. A. (2024). Caregiving antecedents of secure base script knowledge inferred from the Adult Attachment Interview: A comparative, pre-registered analysis. *Infant and Child Development*, *33*(2), e2410. https://doi.org/10.1002/icd.2410