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Preschoolers' secure base script representations predict teachers' ratings of social competence in two independent samples

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ABSTRACT

Associations between attachment security, assessed as a secure base script (SBS), and teachers' social competence ratings were examined in two samples (one from the Midwest region and the other from the Southern region of the United States). Consistent with previous reports, significant associations between domains were obtained in both samples and after combining the two samples, $r = .33$, $p < .001$. The associations remained significant when child sex, age, and verbal intelligence were controlled. Findings are discussed with reference to relations between SBS scores and the covariates. Regarding sex differences, an existing literature suggests that girls, compared with boys, may be advantaged with respect to skills that could support higher scores on the task used to assess secure base scripts. In both samples, teachers rated girls as somewhat higher on scales of social competence and controlling for sex reduced the magnitude of associations between SBS and social competence, but the results remained significant in all tests.

KEYWORDS

Secure base script;
Attachment representations;
Internal working models;
Attachment security; Social
competence

From the attachment theory perspective (e.g. Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1973, 1982; Waters & Sroufe, 1983), the organization of secure base behavior during the infancy and toddler years is co-constructed by the child and the attachment figure and guides the formation of the child's mental model of their attachment relationship. This internal working model of attachment also influences the child's construction of internal working models of self, of the self in relation to others in her/his social world (including peers), who are not necessarily attachment figures, and of models of a wider social world that may, or may not, be benign with respect to the child's well-being. As a consequence of this cascade of internal representations emergent from the attachment relationship, attachment theory assumes that there should be coherence of adaptive functioning across salient social contexts, reflecting the history of

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security (vs. insecurity) of parent-child attachments (Waters & Sroufe, 1983). During early childhood, children who have co-constructed more secure internal working models of attachment should be characterized as more "successful" in peer group contexts (e.g. better integrated into the group social structure and better able to achieve their goals within these contexts) than children whose internal models do not reflect experiences in a secure attachment relationship.

Over the past two decades, a sufficient number of studies have tested this prediction to support three major meta-analyses (i.e., Groh et al., 2014; Pallini, Baiocco, Schneider, & Atkinson, 2014; Schneider, Atkinson, & Tardif, 2001). In each meta-analysis, authors concluded that attachment security, inferred from infant/toddler behavior, had a modest, but significant effect on indicators of peer social competence (SC; effect sizes $r = .20$, $d = .39$ across the three meta-analyses), suggesting that the experience of a secure attachment relationship in the early years helps the child to assemble suites of behavioral, cognitive and affective skills that promote successful navigation of the social world of peers. Indeed, Bowlby (1973) and others (Sroufe, Egeland, Carlson, & Collins, 2005), have suggested that the organization of attachment behavior reflects internal working models of attachment relationships, the self, and the self with others that guide when and how much these skills might be employed within social world of peers. In other words, attachment *representations* are hypothesized to be a key mechanism that helps account for the association reported between the organization of children's attachment behavior and later social competence in the peer group. If so, researchers need to provide evidence in support of the links between children's attachment representations and the quality of their exchanges with peers (e.g., social competence).

Initial empirical support was provided by Verissimo, Santos, Fernandes, Shin, and Vaughn (2014). They reported significant associations between narrative representations of attachment security using the *Attachment Story Completion Task* (ASCT; Bretherton, Ridgeway, & Cassidy, 1990) and a composite of observation and child interview measures for the social competence construct. Verissimo and associates found positive, significant associations between children's attachment and their social competence composite and the effect size was comparable to the effect sizes reported in the meta-analyses mentioned above. In this report, we present on data from two studies that attempted to reproduce and extend the results reported by Verissimo et al. (2014) using teachers' reports of child SC rather than the observation/interview assessments they used and a modified scoring protocol for the ASCT, that evaluates children's narratives for the presence of a secure base script.

Secure base scripts are a core element of attachment security representations

For over a decade, H.S. Waters and associates have argued that internal working models of attachment security are, in part, mental representations reflecting the availability and use of a cognitive script summarizing a temporal-causal sequence of interactive events characteristic of experiences in a secure base relationship, that can be assessed from attachment-relevant stories prompted by the experimental context (e.g., Waters, Rodrigues, & Ridgeway, 1998; Waters & Waters, 2006). Empirical support for this hypothesis has been robust for adults (e.g., Bost et al., 2006; Coppola, Vaughn, Cassibba, &

Costantini, 2006; Hawkins, Madigan, Moran, & Pederson, 2015; Schoenmaker et al., 2015; Vaughn, Waters et al., 2006; Wong et al., 2011), adolescents (e.g. Dykas, Woodhouse, Cassidy, & Waters, 2006; Steele et al., 2014; Vaughn et al., 2016; Waters et al., 2015), and both younger and older school-age children (e.g. Bosmans, Van den Walle, Goossens, & Ceulemans, 2014; Psouni & Apetroaia, 2014; Waters et al., 1998; Waters, Bosmans, Vandevivere, Dujardin, & Waters, 2015). In these studies, evidence for use of the SBS (i.e., the dyad is engaged in some mutually satisfying activity, a challenge or threat to the continuation of the activity is encountered, the attached individual signals to the attachment figure that assistance is required, the signal is received and interpreted accurately, the attachment figure acts to resolve the challenge or threat, the attached individual accepts the resolution, and finally the interrupted activity resumes, or a new and mutually satisfying activity is initiated) has been reported.

In most studies, investigators used the word-prompt technique and 7-point scoring protocol, developed by Waters and Rodrigues-Doolabh (2004) (Waters & Waters, 2006) to elicit and quantify attachment relevant stories, but the initial description of secure base scripts (Waters et al., 1998) was based on narratives elicited using the ASCT (Bretherton et al., 1990). Waters et al. (1998) found that ASCT stories could be scored for secure base scriptedness by ranking them from most scripted to least scripted (see Vaughn, Posada, & Verissimo, this issue for a detailed discussion of the procedures used by Waters et al., 1998). These script scores were positively associated with child attachment security, $r = .39$ and $.41$, at 37 and 54 months respectively), assessed using the Attachment Q-sort (AQS, Waters, 1995) that had been completed when the participants were 25 months of age (Bretherton et al., 1990).

Although the script approach to studying internal working models of attachment had its beginnings in a study of young children's attachment-relevant stories, this approach has not been used widely in subsequent studies of attachment representations during early childhood. In the present study, we return attention to mental representations of attachment in early childhood generated in the context of a story completion task (i.e., the ASCT). We examine relations between the use of secure base scripts in their stories and children's social competence, assessed using teacher reports, in two independent samples of preschool age children (both from the USA). Because each study was planned and executed independently, there were differences in the ASCT story sets used. Two stories scored by Waters et al. (1998) were not included in one sample. Consequently, there were cross-sample differences with regard to the stories used to assess SBS use. The stories included in each study were also scored according to different scoring protocols. Although these differences in methods and measures might make interpretations of sample differences difficult, Vaughn et al. (this issue) showed that the different approaches to scoring the ASCT data overlap significantly and are also significantly associated with established attachment security measures (i.e., AQS). An assessment of verbal intelligence¹ (i.e. Peabody Picture Vocabulary Test) was included in both study protocols.

The goal of this study was to determine whether children's use of the SBS when forming attachment-relevant stories was positively associated with their classroom SC as characterized by their teachers. Because attachment theory posits, and many empirical studies support, the idea that attachment working models reflect a history of interaction experiences supporting the co-construction of a secure base relationship (or fail to do so

in the case of insecurely attached individuals), it is reasonable to consider the relation between attachment representations and SC as a "prediction" rather than a simple "association." Nevertheless, the quality of cognitive functioning (e.g., verbal intelligence) may influence the quality of narratives that are produced by a given child and may also influence teachers' characterizations of child SC. To control for such influences, we also tested relations between verbal ability and both the SBS scores and the SC scores. If significant for either construct domain, verbal ability was controlled statistically in analyses of their association. We also included child sex and child age as potential covariates that might influence either of the two primary construct domains.

Method

Participants

USA sample 1

For Sample 1, 86 children were recruited through daycare centers, preschools, and internet ads from a college town in the U.S. Midwest (41 boys, 45 girls). Participating children were part of a larger study on secure base relationships during the preschool years. The mean age for the sample was 44.37 months ($SD = 2.47$, range = 40–50 months). Most of the participating children were Caucasian (83.7%), 4.7% were Hispanic, 12% were African American, 2.3% were Asian American, and the remaining children were biracial. All mothers declared themselves the children's principal caregiver; their average age was 34 years ($SD = 6.03$, range = 22–55 years). About half of the mothers worked fulltime (52.3%), 18.6% worked part time, and the remaining were full-time homemakers. All mothers had completed high school, with 42% having a college degree, and 38.8% having some years of postgraduate training. The average family income was about \$71960 ($SD = 45,000$, range from \$5000–250000). Nine (9) children did not attend preschool. Seventy of the 77 remaining children had teachers who completed reports about their behavior relevant to their SC at the daycare or preschool setting. Group comparison analyses indicated that the 16 children without teacher reported questionnaires did not differ significantly from children whose teachers completed the questionnaires with respect to child age, gender, ethnicity, general health, maternal age, maternal education, paternal age, and paternal education. However, family income did distinguish those without questionnaire data. The 16 children without teacher ratings came from families whose income was significantly lower than that of children whose teachers filled the questionnaires. Importantly, there were no significant differences between the two groups in scores for scripted representations of secure base use or verbal skills. Our primary analyses were conducted using the 70 children having teachers' reports.

USA sample 2

A total of 139 children (72 boys) were recruited for this sample from 14 preschool classrooms located in a National Association for the Education of Young Children accredited, University managed early education program serving a predominantly middle class (based on education levels and job titles) population in a Southern USA region metropolitan area. Eight classrooms were composed of younger children (i.e., children < 48 months of age at the beginning of the academic year) ($n = 67$, mean age = 45.4 months), and six classrooms were composed of older children (i.e., children > 48 months of age) ($n = 72$, mean

age = 60.1 months). Participating children were from two annual cohorts of a larger study examining relations among sleep parameters and social, emotional, and cognitive functioning in preschool children. Because the study took place in a single site, many of the children in cohort 2 had been assessed as members of cohort 1 in the previous year. We randomly assigned cases with longitudinal data to the "younger" or "older" partitions of the current sample, so no child contributed data at both age levels in these analyses. Eighty-eight participants were from European-American ethnic background families, 42 were from African-American ethnic background families, and nine children were from families that identified as Asian, Hispanic, or mixed ethnicity. Classrooms for older children also served as a model site for the State sponsored pre-K initiative and approximately 28% of children in these classrooms (5 of 18 in each classroom) are from lower income families meeting eligibility for the State pre-K program.

Procedures

USA sample 1

The data reported here are from a larger study that included a home visit and two playground visits. Measures used in these analyses were obtained during the home visit and from teachers' reports about children's behavior at daycare centers and preschools. A research assistant contacted mothers who responded to a study flyer. The assistant explained the study in detail and scheduled the first visit. The home visit took about 2–2.5 hours. The first hour was semi-structured with the mother and child completing an assigned task, after which, they resumed "typical" daily activities. During the second hour, children participated in a storytelling task using an attachment story completion task, lasting about 15–20 minutes (ASCT, Bretherton et al., 1990). The ASCT was videotaped for later transcription. The child's language skills were assessed using the Peabody Picture Vocabulary Test III (PPVT-111, Dunn et al. 1997), on the day that the first playground visit was scheduled.

Children's teachers or professional caregivers were contacted and asked to participate in the study by filling out questionnaires regarding children's behavior in the preschool, including the Social Competence and Behavior Evaluation scale (SCBE-30; LaFreniere & Dumas, 1996) and the Behavior Assessment System for Children second edition (BASC-2; Reynolds & Kamphaus, 2004). Scales from these two instruments were used as the assessment of child social competence.

USA sample 2

All assessments for this sample were obtained at the child-care facility during the period from April to July in each project year. The ASCT (Bretherton et al., 1990) was administered individually in a laboratory room in the child-care facility and was video-recorded for later transcription (approximately 15–20 minutes per child). The teachers (2 per classroom) completed questionnaires containing the SC scales (i.e., SBCE-30, LaFreniere & Dumas, 1996, and the Penn Interactive Peer Play Scale, PIPPS; Fantuzzo et al., 1995) between April and June in each academic year. The verbal ability assessment (PPVT-M) was administered individually in a quiet area adjacent to the child's classroom (approximately 20–30 minutes per child), also between April and June in each academic year.

Measures

USA: sample 1

Attachment story completion task (ASCT). Children's secure base scriptedness was assessed with the ASCT (Bretherton et al., 1990). The ASCT is used to elicit narratives relevant to the use of caregivers as a secure base. In Sample 1, four stories relevant to secure base relationship content (Spilled Juice, Hurt Knee, Monster in the Bedroom, and Separation-Reunion, scored as a single story) were scored using the guidelines described by Waters et al. (1998). The vignettes were presented to children one at a time, along with a doll set containing the characters in the vignettes; the dolls were matched with the child's gender such that boys received boy dolls and girls received girl dolls. Children were told that they were going to tell stories about the "doll family" and that the researcher would begin the story but the child would finish it. Following the procedures described by Bretherton et al. (1990), a warm-up story about a birthday party was presented first to ensure that children understood the structure of the task. Next, children were presented with four attachment-relevant story stems. Videotapes were transcribed for children's narratives and behavior.

The resulting narratives were coded regarding the extent to which the issue in the story was addressed and the child successfully used the caregivers in the story as a secure base to reduce distress or threats and to recover a previously comfortable state. Based in the three anchoring points used by Waters et al. (1998), children's narratives for this sample were scored on a five-point scale (i.e., 1, 1.5, 2, 2.5, 3). A score of '1' indicates a narrative inconsistent with the SBS script (e.g. child does not address the issue or there is significant odd content), '2' indicates the narrative has basic elements of the SBS (e.g. the problem is addressed but there is not an explicit return to active engagement in the environment/normalcy), and a score of '3' was assigned to narratives most consistent with the SBS (e.g. the problem is addressed and there is a return to emotional equilibrium). Posada and Lu (2011) have presented empirical support for this coding system. Two assistants independently coded each story; further, the coding was completed separately for each story and coders were also blind to each participant's scores on the other stories (i.e., 8 coders for each transcript). Percent agreement between coders for the Spilled Juice, Hurt Knee, Monster in the Bedroom, and Separation-Reunion stories averaged 88.75%, 81.48%, 94.73%, and 96.38%, respectively (ICCs: Spilled Juice = .87, Hurt Knee = .72, Monster in Bedroom = .94, Separation-Reunion, = .66). A mean scriptedness score for each narrative was computed by averaging the coders' scores. Subsequently, scores were averaged across individual stories to create a total scriptedness score. This composite score was used for analyses (Cronbach's alpha = .74).

Social competence. Teachers or professional caregivers rated child SC using the SCBE-30 and the BASC-2. The SCBE-30 is a 30-item instrument which has a 6-point Likert-type response format: *never*, *rarely*, *sometimes*, *often*, *frequently*, and *always*, and yields of three summary scales: (1) anger-aggression (sample item – "easily frustrated"); (2) anxiety-withdrawal (sample item – "avoids new situations"); and (3) social competence (sample item – "negotiates solutions to conflicts with other children"). For this report, only the *Social Competence* scale (10 items) was used. Cronbach's alpha for this scale was .88.

The BASC-2 teacher rating scales for preschool children (ages 2-5; Reynolds & Kamphaus, 2004) is a well-known, reliable, and valid instrument that assesses multiple aspects of children's behavior including dimensions relevant to social competence. The items (100) are rated on a 4-point scale ranging from "never" to "almost always". Three scales assess positive aspects of behavior, adaptability (7 items; sample item – "Shares toys or possessions with other children"), social skills (6 items; sample item – "Offers help to other children"), and functional communication (9 items; sample item – "Communicates clearly"). Chronbach's alphas were .82, .91, and .81 for adaptability, social skills, and functional communication, respectively. Correlations among these scales ranged from .49 to .63, all p -values < .001. Scores for the three scales were summed and averaged to create a single BASC-2 score for SC.

The SCBE *Social Competence* and the BASC composite were themselves positively and significantly associated, $r = .86$, thus, a composite score for the two scales was created. We first standardized the SCBE and BASC scales and then computed the average of the two Z scores. The resulting composite was used in subsequent analyses.

Verbal intelligence. The PPVT-111 (Dunn & Dunn, 1997) is a widely used, reliable, and valid instrument. Following the scoring protocol for the PPVT-111, raw scores were calculated by subtracting the total number of incorrect responses from the highest item completed. These were converted to mental age scores, according to the PPVT-111 manual. To adjust for the range of child ages in the sample, standard scores (i.e. $MA/CA \times 100$) were used. Because children's language skills may influence a child's ability to organize a story, and might affect the scriptedness of their secure base stories, we examined the distribution for low scores. Children whose scores fell below the 10th percentile of the normal range for the test (i.e., a score of 80, as reported in the scoring manual, Dunn & Dunn, 1997) were not included in the analyses. Of the 67 children with both secure base scriptedness scores and teacher rated social competence, 12 had scores below 80 on the PPVT-111. A review of these cases indicated that the administration protocol for the PPVT-111 had not been strictly followed for at least 10 of these children. All 12 cases were removed from the final analysis for this sample.

USA: sample 2

Attachment story completion task (ASCT). Children were invited individually to accompany a familiar research staff member to a laboratory playroom located in the child care center. The child was seated at a child-size table and the researcher explained that they would be playing a game that involved telling stories and that the child could use toy props (doll figures representing characters in the story, doll house props such as furniture, a pet dog, a car, etc.) to tell the story. The researcher explained that she would start the story and then ask the child to complete it. As described above, the first story involved a child's birthday party. After the research staff member had set the scene, she asked, "tell me and show me what happens next." No child had difficulty responding to this practice story. The remaining story stems were presented in the same manner. The researcher repeated each of the child's utterances to ascertain that the child's statement had been heard (several children talked in quite low tones and would have been difficult or impossible to transcribe without the researcher's comment) and understood correctly. If a child corrected the researcher's statement, the corrected statement was used for

scoring purposes. For this study, only three (of six) stories were coded for secure base scriptedness (Separation, Reunion, and Monster in the Bedroom).

All stories were transcribed verbatim and included all statements relevant to the story by both the child and the researcher. These transcripts were scored for secure base scriptedness using the Vaughn/Coppola coding protocol described in the previous chapter. A single score (scale range 1-7) secure base scriptedness score was assigned. The Intra-class Correlation coefficients ranged from .70 to .85 across all coder pairs.

Social competence. Teachers rated child SC (2 teachers in each classroom) using the SCBE-30 (described above; Cronbach's alpha for the SCBE-30 *Social Competence* subscale = .90) and the Penn Interactive Peer Play Scale (PIPPS; Fantuzzo et al., 1995). The PIPPS is a 32-item questionnaire designed to measure three factors/dimensions of children's social behavior in preschool classrooms: *Play interaction* (sample item – "encourages others to join play"), *Play disruption* (sample item – "grabs others' things"), and *Play disconnection* (sample item – "hovers outside play group"). Each item is rated on a four-point response scale (1 = "never" – 4 = "always"). Of these, the *Play Interaction* scale most closely corresponds to our definition of SC and this was the score used for this study. Cronbach's alpha for this scale = .88. Teachers' ratings within classrooms were significantly correlated and so composite scores were formed by taking the average of the two teachers for each child. The two teacher composite scores were themselves significantly correlated ($r = .83$) and so the final score was a composite (i.e., average) of the scores for the two scales (i.e., SCBE, PIPPS). Because scale scores had different rating ranges, they were standardized prior to creating the final SC composite score.

Receptive vocabulary. The PPVT-IV (Dunn & Dunn, 2007) was used to assess the child's receptive vocabulary. The age standard scores were used in our analyses ($M = 115.7$, $SD = 12.4$ for the sample). The PPVT-IV was administered individually to children in a quiet area adjacent to the child's classroom, to avoid disruption from classmates and/or adults in the classroom. Only 1 child in this sample had a score lower than 80 and this child was excluded from our analyses.

Results

Results are presented in two sections. First, we analyze the data by sample to determine whether the patterns of association among the study variables are similar, especially with regard to the relation between SBS scores and the teachers' ratings of child social competence. We also include child sex, child age, and the study specific measure of verbal intelligence in these analyses and follow up initial analyses with additional partial correlation analyses controlling for significant correlates of the SBS scores. Because missing data were present for some participants in each of the two samples for some study variables, we computed Little's MCAR statistic and estimated the correlations using the EM (estimation maximization) algorithm, when the MCAR Statistic was not significant. Second, we combine the samples, after adjusting the SBS scores (i.e., standardizing within sample) to control for the differences in scaling across studies, and calculate the zero-order correlations for the full set of cases.

USA sample 1

Zero-order correlations among study variables for the first sample are presented in Table 1 (first panel). Little's MCAR test statistic = 12.76, $p = .752$ in this sample, consequently correlations were estimated using the EM algorithm. Consistent with our prediction, child secure base script scores were positively and significantly associated with teachers' ratings of social competence, $r = .28, p < .05$. No control variable (i.e. sex of child, age, PPVT receptive vocabulary) was significantly associated with the child's secure base script score, however child sex was related significantly with the teachers' ratings of social competence. Girls received higher scores. Partial correlation analyses controlling for child sex reduced the size of the association between the SBS score and the teachers' social competence rating ($pr = .21, p < .05$, 1-tail test).

USA sample 2

Correlations among the study variables for the second USA sample are presented in the second panel of Table 1. Little's MCAR test statistic = 24.77, $p = .36$, for this sample. The EM algorithm was used to estimate the correlation matrix. Consistent with our hypothesis, the secure base script score was positively and significantly associated with the teachers' ratings of social competence, $r = .38, p < .000$. In addition, both the teachers' ratings of SC and the SBS score were significantly associated with sex of child (girls had higher scores) and the PPVT receptive vocabulary score. The partial correlation between the SC and SBS score, controlling for sex of child and the PPVT score, was $pr = .24, p < .001$, 1-tail test.

Combined samples

Pairwise tests on the zero-order correlation coefficients (without covariates) for the SBS and SC variable pairs indicated that the two sample correlations did not differ significantly in magnitude. Consequently, we combined the samples for our final analyses. Correlations for the combined sample are presented in Table 2. The Little MCAR test

Table 1. Correlations among study variables.

| | Secure base | SCT | C-sex | C-age | Verbal Int. |
|---------------------------------|-------------|----------|-------|-------------|-------------|
| USA Sample 1 | | | | | |
| Secure Base Script | | | | | |
| Teacher Rated Social Competence | .28* | | | | |
| Child sex | .14 | .29* | | | |
| Child age | .06 | -.06 | .06 | | |
| Verbal intelligence | -.05 | .20 | -.02 | -.16 | |
| Mean, SD | 207, .37 | 03, 86 | | 44.36, 2.48 | 111.5, 11.9 |
| USA Sample 2 | | | | | |
| Secure Base Script | | | | | |
| Teacher Rated Social Competence | .38*** | | | | |
| Child sex | .32*** | .25** | | | |
| Child age | .08 | .02 | .14 | | |
| Verbal intelligence | .24** | .19* | -.05 | -.16 | |
| Mean, SD | 3.85, .95 | .00, .47 | | 53.32, 7.70 | 115.6, 12.4 |

* $p < .05$

** $p < .01$

*** $p < .001$

SCT = teacher rated social competence, C-sex = Child sex, C-age = Child age, Verbal Int. = Verbal Intelligence

Table 2. Correlations among study variables for the combined sample.

| | Secure base | SCT | C-sex | C-age |
|---------------------------------|-------------|-------|-------|---------|
| Secure Base Script | | | | |
| Teacher Rated Social Competence | .33*** | | | |
| Child sex | .26*** | .23** | | |
| Child age | .04 | -.00 | .11 | |
| Verbal intelligence | .13+ | -.09 | .00 | -.21*** |

+ $p < .10$ ** $p < .01$ *** $p < .001$

Secure Base = Secure base script score, SCT = teacher rated social competence composite, C-sex = Child sex, C-age = Child age, Verbal Int. = Verbal intelligence

statistic = 37.32, $p = .001$ and the EM algorithm was used to estimate the correlation matrix. Consistent with our primary hypothesis, for the full sample the SBS score was positively and significantly associated with the teachers' rated SC composite score, $r = .33$, $p < .001$. Among the control variables, only sex of child was significantly correlated with both the SBS and SC scores. Controlling for sex of child in the partial correlation analysis reduced the correlation between SBS and SC scores, with the resulting value remaining significant, $r = .23$, $p < .001$, 1-tail test.

Discussion

We initiated this study to address a current issue in attachment research. Namely, the link between attachment representations and social competence as reported by teachers. Attachment representations have been hypothesized to be an important mechanism for explaining the relation reported in the literature between attachment security, as inferred from children's behavioral organization, and teachers' ratings of SC. Further, we wanted to investigate that link by using a relatively new approach that assesses the organizational features of children's attachment representations (i.e., the SBS system developed by H.S. Waters and associates, Waters et al., 1998; Waters & Waters, 2006, and modified by the present authors). We also included three potentially informative control variables (i.e., child sex, child age, and verbal intelligence) that might be associated significantly with either or both of the primary study variables.

The results are clear, despite the fact that the studies were conducted in different settings (e.g., assessments made in the context of home visits in one study vs. at child care facilities in the other), and the differences in methods of scoring the children's stories (i.e., use of different numeric scale for scoring secure base content for each sample), and despite significant differences in age-level across the two samples our findings are consistent with the extant literature and with our hypothesis. The zero-order correlations between the SBS scores and teachers' ratings of SC were positive and significant in both samples. We suggest that these results demonstrate the robustness of the attachment – social competence association during early childhood. Moreover, all of the correlation values exceeded the mean effect size (i.e., $r = .20$) reported in the three previous meta-analyses of this association (Groh et al., 2014; Pallini et al., 2014; Schneider et al., 2001), although our sample values do fall within the overall range of scores reported in those meta-analyses. We acknowledge that our data collections for the SBS and social competence scores were more or less concurrent, and this may have served to increase the

association between the two scores. This should be explored further in future research testing relations between attachment and peer SC during early childhood.

Importantly and unlike most of the previous studies attempting to link attachment security and preschoolers' SC, our findings support the argument (eg., Verissimo et al., 2014) that secure base *representations* are a key mechanism accounting for this link. We noted at the outset that most research on the topic has assessed security in child-mother relationships (with a few including child-father relationships) on the basis of child behavior, often assessed during infancy or toddlerhood. Our approach directly assesses the mechanism presumed to be responsible for this association (i.e., mental models of attachment). Further, our attachment assessment uniquely addresses the structural features of attachment representations (Waters & Waters, 2006) in a developmentally appropriate manner (secure base scripts; Nelson, 1986) and links it to teachers' judgments concerning preschoolers' navigation of their social world with peers.

That being said, we recognize that both the SBS score and the teachers' ratings of child SC were also associated with the set of control variables, although this too differed across samples. Child sex was associated with SBS scores in the Sample 2 but not in Sample 1. Child sex was also associated with teacher rated social competence in both samples. Finally, verbal intelligence was associated with the SBS score and the teachers' ratings of social competence in Sample 2 but not in Sample 1. In part, these inconsistencies across samples may reflect differences in power to detect significant effects between the two samples. For example, the association between teachers' ratings of social competence and verbal intelligence in Sample 1 (i.e. $r = .20$, ns) is not significant whereas the analogous association is significant in Sample 2 (i.e. $r = .19$, $p < .05$). We also note that the correlation between verbal intelligence and the SBS score did not reach significance in the combined sample (i.e., $r = .13$, ns).

These potentially confounding associations notwithstanding, our partial correlation analyses controlling for all significant associations with these variables within each sample did not reduce the association between the SBS score and teachers' ratings of social competence to a value below the conventional level of significance in either sample. These analyses do not suggest a definitive interpretation of the effects of external parameters such as child sex, age, or level of verbal intelligence on the association between children's attachment security and teachers' ratings of social competence during early childhood. The results do, however, suggest that these (and possibly other) parameters may be important and should be included when examining associations between the attachment and SC domains.

Secure base scripts and child sex

Although the majority of both girls and boys in each sample provided narratives that contained adequate secure base content to be considered "securely attached," we did find significant sex differences (favoring girls) with respect to SBS scores in one of our two samples. Attachment theory does not anticipate sex differences in children's attachment security, in part because the initial focus of research was on infants and toddlers and both female and male infants are equally incapable of defending themselves from dangers in the environment. Indeed, over the first 25 years or so of the current era of attachment research (i.e., 1965-1990) sex differences were rarely reported in studies

using the Strange Situation or the Attachment Q-sort to characterize the attachment security of infants and toddlers.

However, when measures of attachment evolved from characterizations of the sensory-motor attachment representations of pre-verbal children to the mental representations emergent from those sensory-motor representations during early childhood (eg., Bretherton et al., 1990), reports of sex differences in doll-play tasks assessing attachment (mostly favoring girls) began to appear (eg., Laible, Carlo, Torquati, & Ontai, 2004; Page & Bretherton, 2001; Pierrehumbert et al., 2009; Woolgar, Steele, Steele, Yabsley, & Fonagy, 2001). More recently, attachment researchers (eg., Tóth, Lakatos, & Gervai, 2013) have acknowledged that such differences are regularly, but not always (eg., USA Sample 1), observed in early and middle childhood when representations are elicited in the context of story-stem completion tasks supported by doll-like props. Boys, more frequently than girls, introduce aggressive themes into doll-play when the story stem involves a stressful event (eg., separation from attachment figures; physical or psychological injury; threat of harm) whereas, girls, more frequently than boys, introduce prosocial and empathic themes into narratives suggestive of stress (eg., Page & Bretherton, 2001).

Several studies of mother-child transactions from outside the attachment research tradition have suggested a potential transactional pathway that might lead to the kinds of sex differences reported. Dunn, Bretherton, and Munn (1987) studied naturally occurring conversations between mothers and their 18- to 24-month old children observed at home. They reported that mothers (and older siblings) used more feeling state words in conversations with daughters than with sons. Fivush, Haden, and Reese (2006) reviewed a large body of research on a specific aspect of parent/child reminiscences (i.e., elaboration) and reported that, in higher income western countries, when mothers (and fathers) were asked to initiate dialogues with their child about emotionally charged events experienced by the child they were significantly more elaborative and coherent with daughters than with sons. They also tended to integrate more emotion states into the discussion and to talk about their causality when with daughters than when with sons. They also reviewed research suggesting that mothers are more elaborative when they reminisce with children who are securely attached (eg., Fivush & Vasudeva, 2002; Laible et al., 2004). Taken together studies on mother child transactions involving feeling state words and the use of elaboration in mother/child during reminiscences about emotion laden events suggest that girls, to a greater extent than boys (at least in the cultures studied) would be prepared to respond to story completion tasks with attachment relevant themes in a more coherent and elaborative manner that may lead to more scripted narratives, using the scoring protocol described by Waters and associates (eg., Waters & Waters, 2006).

Conclusion

Our results demonstrating that scores based on secure base scriptedness of child narratives predict teachers' ratings of child SC is consistent with the notion that the SBS, assessed from story completions elicited using the ASCT, is a critical element of children's internal working model of attachment. Positive and significant associations were observed in two independent samples of preschool age children. The SBS score was also associated with demographic and verbal intelligence variables. Nevertheless,

the relation between secure base scriptedness and teachers' ratings of SC was only partially attenuated when external correlates were controlled. These results suggest that the SBS score is a useful assessment of attachment security during early childhood and support the model of social competence development suggested by Waters and Sroufe (1983) insofar as social competence during early childhood is predictable, to a significant degree, from indicators presumed to reflect earlier competence (i.e., secure base use and secure base provision) during infancy/toddlerhood.

Note

1. We understand that the PPVT is not a comprehensive measure of verbal intelligence and is better characterized as a measure of receptive vocabulary. However, the PPVT standard score is a positive, significant correlate of the full-scale *Stanford Binet* and the verbal scales from the *Wechsler Preschool and Primary Tests of Intelligence* and we are comfortable with referring to this score as an index of verbal intelligence.

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