



**ATTACHMENT SECURITY AS A PREDICTOR OF RECEPTIVE LANGUAGE
VOCABULARY AMONG CHILDREN WHO EXPERIENCED ADVERSITY**

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Introduction

During the first year of life, infants form a special type of relationship with their primary caregivers (typically parents), which are referred to as attachments. Attachment theory suggests that forming secure attachment relationships during infancy provides the foundation for healthy social and emotional development (Bowlby, 1982). A substantial body of research has documented that early attachment security is in fact associated with children's later social skills with peers, fewer externalizing behavior problems (e.g., aggression), and fewer internalizing problems (e.g., depression and anxiety; Groh et al., 2016).

In an influential chapter, Sroufe (1988) argued that testing for possible associations between infant attachment security and developmental outcomes that are outside of what Bowlby (1982) originally anticipated is an inappropriate extension of attachment theory (such as markers of children's cognitive and language development) and researchers should instead focus on outcomes about which attachment theory makes explicit theoretical claims. Additionally, Sroufe (1988) hypothesized that attachment security would not be robustly associated with children's later cognitive and language competence. Indeed, if many seemingly unrelated developmental outcomes were found to be predicted by attachment security, this could be seen as a threat to the discriminative validity of attachment theory.

Van IJzendoorn et al. (1995) recognized that Bowlby's (1982) ideas regarding the legacy of early attachment relationships did not include predictions regarding language development. Nonetheless, Van IJzendoorn et al. (1995) offered several explanations for why attachment security may promote the development of language skills. These include the possibility that (1) parents of securely attached children are more skilled teachers and their children more motivated learners than dyads with an insecure attachment, (2) securely attached children are able to explore and learn from novel environments more confidently than insecurely attached children and without being distracted by attachment-related aspects of the situation, and (3) securely attached children form deeper relationships than insecurely attached children with peers and teachers and these other relationships facilitate learning.

Van IJzendoorn et al. (1995) also provided meta-analytic evidence of a relatively strong association between early attachment security and language outcomes ($r = .28$). In addition, a large sample study and another recent meta-analysis also reported significant associations between early attachment security and measures of children's language development (Belsky & Fearon, 2002; Zeegers et al., 2019). That said, the estimates of the association between attachment security and various markers of language development in those studies were between .03 and .15, which are markedly weaker than the estimate reported by Van IJzendoorn et al. (1995). Other studies have reported mixed results, with several finding an association in some conditions but not in others (Constantini et al., 2012; Murray & Yingling, 2000; Spieker et al., 2003), and at least one study reporting a non-significant association between attachment security and language development (Anan & Barnett, 1999). However, these studies

have all had relatively small sample sizes, which may account for the inconsistent results. Additionally, it has been demonstrated that the presence or absence of risk factors may moderate the effect of attachment on some aspects of language development (Belsky & Fearon, 2002), which also may contribute to the varied results.

Given the current evidence, the discussion of whether or not language development falls within the boundaries of attachment theory is far from settled. The evidence in favor of the possibility that early attachment security can predict later language skills is encouraging, but still limited in quantity and scope. A particularly notable limitation is the scarcity of large sample studies on the topic. A second gap is the lack of focus on participants who have experienced early childhood adversity. This is particularly critical since these children are at greater risk for poorer language development outcomes than the normative-risk children (Lum et al., 2015). Although Belsky and Fearon (2002) incorporated measures of several risk factors, they used sociodemographic markers of risk, such as income, education level, and minority status, rather than including individuals known to have experienced specific forms of adversity. The latter point is also true of Spieker et al. (2003) as well as Anan and Barnett (1999).

In order to address these two gaps in the research literature and provide evidence either one way or the other concerning the appropriateness of using attachment theory for predicting language development outcomes, the current study examined the association between attachment security in infancy and language development in early childhood in a relatively large sample comprised of children who experienced specific forms of adversity. This includes children who were removed from their biological parents due to maltreatment and placed in foster care, children whose families were referred to Child Protective Services (CPS) due to allegations of maltreatment, and children who had been adopted internationally after living in foster care or group-based institutional care. Attachment security was assessed using the Strange Situation Procedure (Ainsworth et al., 1978), and children's receptive vocabulary skills were assessed using the *Peabody Picture Vocabulary Test-Revised* (PPVT-R; Dunn & Dunn, 1981). These represent gold-standard measures of attachment and language development.

Hypotheses

Because there are two competing theoretical views concerning the possible association between infant attachment security and language development, the study evaluated two competing hypotheses:

1. If language development falls outside of the boundaries of what can be predicted by attachment security as assumed by Sroufe (1988), it is expected that a non-significant association between children's attachment security and their receptive language scores in early childhood would be observed.
2. If language development can be predicted by early attachment security as proposed by Van IJzendoorn et al. (1995), it is expected that children with histories of secure attachments would exhibit significantly higher receptive language scores than children with histories of insecure attachments.

Method

Participants

Data for this project were collected in the context of four longitudinal studies, one that focused on internationally adoptive parents, two that focused on foster parents, and one that focused on parents referred to CPS. Participants had been recruited to participate in clinical trials designed to test the efficacy of an attachment-based parenting intervention for high-risk children. The total sample size included in the analyses was $n = 493$. This includes children whose parents adopted internationally ($n = 117$), children in foster care ($n = 199$), and children of CPS-referred parents ($n = 177$).

Measures

Child-parent attachment security. The quality of children's attachments to their parents were assessed between 12 and 36 months ($m = 22.15$) using the Ainsworth Strange Situation Procedure (Ainsworth et al., 1978). The laboratory-based procedure is intended to allow for the assessment of the degree to which children rely on their parents when distressed and are effectively comforted by the parent. The procedure contains two periods of separation, each followed by a period of reunion. The procedure takes about 20 minutes. Children's attachment behaviors during the reunion were rated for proximity seeking, contact maintenance, proximity avoidance, contact resistance, and attachment disorganization/disorientation. Those ratings were used to classify each child as having one of four attachment patterns. Children classified as secure exhibited relatively high levels of proximity seeking and contact maintenance behaviors during the reunion episodes and were easily soothed by their parent. Children classified as having formed avoidant attachments exhibited low levels of proximity seeking and contact maintenance behavior and may have even turned away from their parent and/or refused to look to them during the reunion episodes. Children classified as forming resistant attachments exhibited high levels of proximity seeking behaviors but did not calm down when soothed and instead exhibited angry and/or passive behavior. Finally, children are classified as having formed disorganized attachment if they meet the criteria specified by Main and Solomon (1990), such as by displaying simultaneous or sequential contradictory behaviors, freezing, having misdirected attachment cues, or by displaying direct indices of apprehension regarding the parent. A four-way attachment distribution considers each of these categories separately. A two-way attachment distribution groups children with avoidant, resistant, and disorganized attachment patterns into a single insecure category. The level of interrater agreement was 78% for the four-way distribution ($K = 0.635, p < 0.001$). The level of interrater agreement was 86% for the two-way distribution ($K = 0.723, p < 0.001$).

Language development. Receptive language skills were measured using the *Peabody Picture Vocabulary Test-Revised* (PPVT-R; Dunn & Dunn, 1981) when children were approximately 36 and 48 months old. The PPVT-R is appropriate for use on people from 36 months to 40 years of age. It measures an individual's receptive knowledge of vocabulary through a non-verbal multiple-choice test. The test consists of 175 cards of four items each, arranged in ascending order of difficulty. Participants are asked to identify which of the pictures on each card matches a word given by the researcher. Testing is not timed and proceeds until participants respond incorrectly six times out of a series of eight, which is referred to as the ceiling. The raw score is equal to the number of correct responses before the participant reaches their ceiling. Each child's raw score was converted into a standardized score based on age-related norms. In the general population, the standardized scores have a mean of 100 and a standard deviation of 15.

Covariates. Following the standard set by the benchmark studies in this area (Belsky & Fearon, 2002; Van IJzendoorn et al., 1995), no covariates were considered in the analysis.

Results

Preliminary Analyses

In order to maintain statistical power, the multiple imputation procedure available in SPSS 27 was used to estimate missing attachment and language scores. Ten imputations were used, with missing data estimated from sample type, the presence or absence of an experimental condition employed for the purposes of the original study, and all available attachment and language data. All analyses were run using both the original data and the pooled imputed data. As there were no substantial differences in the results obtained using these two methods, only the results of analyses using the pooled imputed data will be reported.

Table 1

Descriptive Statistics for the Peabody Picture Vocabulary Test Revised

	Minimum	Maximum	Mean	SD
36-Month PPVT-R	42.88	134.16	81.10	16.47
48-Month PPVT-R	50.01	142.54	95.13	17.10
Average PPVT-R	48.64	133.06	91.97	15.47

Table 1 presents the descriptive statistics for the PPVT-R. The data were screened for extreme scores. No outliers were found, and no data were excluded. Tables 2 and 3 present the percentage of children categorized in each attachment pattern for the 2-way and 4-way distributions, respectively.

Table 2

Descriptive Statistics for the Strange Situation Paradigm (2-way Distribution)

Insecure	53.53%
Secure	46.47%

Table 3

Descriptive Statistics for the Strange Situation Paradigm (4-way Distribution)

Avoidant (A)	10.75%
Secure (B)	46.17%
Resistant (C)	7.34%
Disorganized (D)	35.76%

Main Analysis

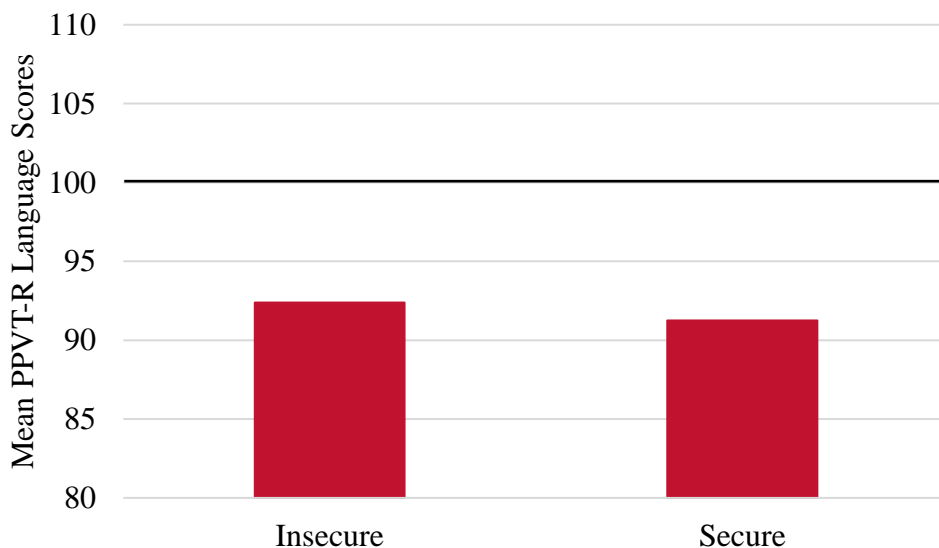


Figure 1. Mean language scores as a function of 2-way attachment security.

A one-way analysis of variance (ANOVA) was performed to compare the effect of 2-way attachment security on mean PPVT-R receptive language vocabulary scores. There was not a statistically significant difference in mean language scores between the two groups ($F(1, 491) = 9.449, p = .81$). Figure 1 demonstrates the difference in mean language scores between the two groups.

Supplemental Analysis

A one-way ANOVA was performed to compare the effect of the population from which each sample was drawn on mean PPVT-R receptive language vocabulary scores. This analysis included a normative-risk sample of $n = 46$. There was a statistically significant difference in mean language scores between the four groups ($F(3,535), p < .001$). Post-hoc comparisons revealed a significant difference in mean language scores between the CPS and foster samples and between the foster and international adoption samples, but not between the international adoption and normative-risk samples. Figure 2 presents a comparison of the mean language scores for each sample type.

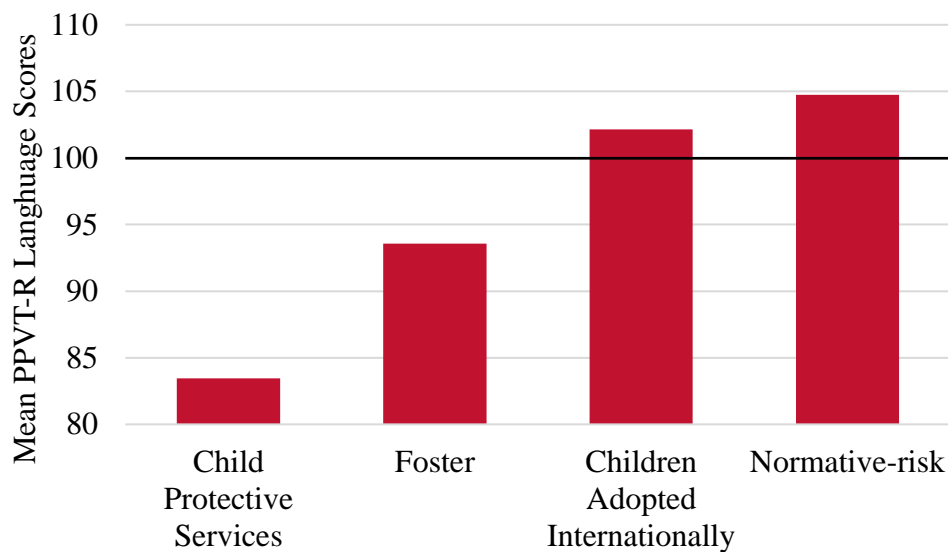


Figure 2. Mean language scores as a function of population.

Discussion

The purpose of this study was to examine the association between attachment security and receptive language vocabulary among children who experienced early adversity. In response to a debate that has taken place over the last several decades concerning the boundaries of attachment theory, two hypotheses making opposite predictions were proposed. The former predicted that attachment security would not be significantly associated with language outcomes, following arguments proposed by Sroufe (1988). The latter predicted that attachment security would be significantly associated with language outcomes, following arguments proposed by Van IJzendoorn et al. (1995). The results of this study support the former hypothesis, with a non-statistically significant association found between attachment security and receptive language vocabulary. A supplemental analysis revealed that while language outcomes did not vary as a function of attachment security, they did vary as a function of population. Most notably, children adopted internationally were found to have significantly higher language scores than both children in foster care and children of parents referred to Child Protective Services. Additionally, the language scores of children adopted internationally did not differ significantly from those of normative-risk children.

Taken together, these results suggest that language skills are not entirely innate. They differ as a function of children's environments. At the same time, there are certain aspects of the caregiving environment that appear to be relatively unimportant for some facets of children's developing language skills. Specifically, the type of caregiving environment appears to make a significant impact on children's receptive vocabulary skills. The data also suggest that in the case of adoption, the post-adoptive environment appears to have a greater influence on children's developing language skills than pre-adoptive experiences. In contrast, attachment security appears to not be as important to the development of this particular language outcome. As suggested by Sroufe (1988), there are boundaries to what attachment security predicts, and these results suggest that at least some aspects of language development fall outside of these boundaries.

Limitations and Future Directions

The data analyzed in this study are too limited to make clear why no association was found between attachment security and language outcomes while similar studies in the past have found such an association. It is possible that this disparity in findings is due to measuring different aspects of language development. Receptive vocabulary is only one component of a broader set of receptive language skills. Language as a whole also encompasses a set of expressive language skills. Because the testing of expressive language skills in an experimental setting could conceivably vary more than receptive language skills as a function of comfort with the experimenter, it would be reasonable to expect the former to be influenced more by attachment security than the latter. Without a measure of expressive language skills, the present study is not in a position to test this hypothesis. Future studies could begin by examining the association between attachment security and expressive language skills. Were such an association found to be significant, a reasonable next step could be to measure children's level of comfort with the experimenter during the language measurement task to determine whether this factor mediates the association.

Similarly, the present study is not in a position to explain which specific aspects of the family environment account for the difference in language outcomes on the basis of differing populations. One theoretically relevant factor is parental responsiveness to children's cues. In high-risk environments such as foster homes or homes involved with CPS, it is possible that parental responsiveness would be low. This lowered parental responsiveness could in turn have a detrimental impact on children's developing language skills. These children would be less motivated to learn language in order to get their needs met and also have fewer of the interactions with their caregivers that would stimulate language learning. In contrast, parents who adopt children must consciously go through the lengthy and expensive adoption process. This increases the likelihood of these parents having a high degree of motivation and time to respond to their children's cues. This heightened parental responsiveness could account for how children adopted internationally catch up to their normative-risk peers. Future research is necessary to explore this hypothesis.

Putting the matter of language aside, there are other cognitive domains in which it would make sense to test the predictive boundaries of attachment security. One of the prime candidates for this is executive function. Executive function (EF) is a set of higher order cognitive skills that underlie goal-directed thoughts and behaviors (Bernier et al., 2015). Because EF is thought to rely on a similar set of self-regulatory skills as those developed in an attachment relationship (Bernier et al., 2015), EF is a particularly good starting place for continuing to test the predictive boundaries of attachment security as it pertains to cognitive domains. Similar to the body of research examining the association between attachment security and language, there are a lack of

studies in the research examining the association between attachment security and EF which include children who have experienced early adversity. Future research should explore this area.

Conclusion

The findings of the present study suggest that while attachment security may not be important for the development of receptive language vocabulary, other aspects of the home environment play a large role. Most notably, aspects of the home environment that characterize the post-adoptive situation seem to serve as protective factors against early experiences of adversity in the development of language. Additional research is necessary to explain which specific aspects of the home environment perform this function. Additional research is also necessary to clarify if some aspects of language can be predicted by attachment security and not others, and which aspects of language these are. The present findings are practically important in suggesting that there are actions which parents can take to promote their children's language growth and buffer against adverse early experiences. A child's success or failure in language is not biologically set in stone, and there appears to be much that parents can do to nurture their children's optimal development in this area.

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