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Effects of the ABC Intervention on Foster Children's Receptive Vocabulary: Follow-Up Results From a Randomized Clinical Trial

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Abstract

Children with histories of maltreatment and disruptions in care are at elevated risk for impairments in early language development, which contribute to difficulties in other developmental domains across childhood. Given research demonstrating associations between parent responsiveness and children's early language development, we examined whether a parenting intervention administered in infancy improved preschool receptive language skills in children involved with the child welfare system. Attachment and Biobehavioral Catch-up (ABC) is a 10-session intervention that aims to enhance parent–child interactions. The follow-up results of this randomized clinical trial demonstrated that infants who received the ABC intervention ($n = 24$) scored significantly higher on a test of receptive vocabulary at age 36 months than infants who received a control intervention ($n = 28$). These results provide evidence of the critical role of parental responsiveness in supporting optimal language development among young children with histories of child welfare involvement.

Keywords

foster care; intervention; parenting

The early caregiving environment has a profound effect on children's language development (Perkins, Finegood, & Swain, 2013; Stein, Malmberg, Sylva, Barnes, & Leach, 2008). Therefore, children who have experienced threats to the early caregiving environment (e.g., maltreatment, disruptions in care) are at elevated risk for impairments in language development (Eigsti & Cicchetti, 2004; Pears, Heywood, Kim, & Fisher, 2011; Stock & Fisher, 2006). Early language deficits contribute to later learning and self-regulation difficulties (Jacobsen, Moe, Ivarsson, Wentzel-Larsen, & Smith, 2013; Pears, Fisher, Bruce, Kim, & Yoerger, 2010), which in turn affect academic achievement, social competence, and behavioral adjustment at school age (McCabe & Meller, 2004; Pears, Kim, Healey, Yoerger,

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& Fisher, 2015). Thus, children with histories of child welfare involvement are especially in need of interventions that support early language development.

High maternal responsiveness, characterized by responding contingently to children's vocalizations and behaviors (i.e., following the child's lead), has been consistently associated with children's language abilities across early childhood (Baumwell, Tamis-LeMonda, & Bornstein, 1997; Garcia, Bagner, Pruden, & Nichols-Lopez, 2015; Pungello, Iruka, Dotterer, Mills-Koonce, & Reznick, 2009; Tamis-LeMonda, Bornstein, & Baumwell, 2001). Hirsh-Pasek et al. (2015) demonstrated that the *quality* of mother–child interactions at 24 months old, defined by joint engagement, fluency and connectedness, and routines and rituals (e.g., coordinated activity around a familiar play routine), predicted children's expressive vocabulary a year later, above and beyond the *quantity* of words expressed by mothers during interactions. These findings suggest that parent responsiveness may represent a potential target of interventions aimed at promoting optimal language development in young children at risk for delays, such as children with histories of child welfare involvement.

Attachment and Biobehavioral Catch-up (ABC; Dozier & Infant Caregiver Project Lab, 2013) aims to enhance sensitive caregiving (e.g., following the child's lead) among parents caring for children with histories of adversity, such as maltreatment, foster care, and/or other risks leading to child welfare involvement. The efficacy of the ABC intervention has been evaluated in multiple randomized clinical trials, which showed improved child outcomes across developmental domains. Specifically, children who received the ABC intervention had higher rates of secure and organized attachments (Bernard et al., 2012) and better executive functioning (Lewis-Morrarty, Dozier, Bernard, Terracciano, & Moore, 2012) than children who received a control intervention. The association between ABC and children's language outcomes has not yet been reported.

The current study is a preschool-age follow-up of a randomized clinical trial of the ABC intervention, which targeted infants involved with foster care agencies through the child welfare system. Receptive vocabulary at preschool age is an important indicator of school readiness (Lonigan, Burgess & Anthony, 2000), which in turn predicts later achievement outcomes (Duncan et al., 2007). Given that ABC specifically aims to enhance parent responsiveness in infancy, which has been linked to early language development (Landry, Smith, & Swank, 2006), we expected that children who received ABC would show better language outcomes (i.e., receptive vocabulary) at preschool age than children who received a control intervention.

Method

Participants

Participants included 52 children (44% male), ranging in age from 34.2 to 46.4 months (M = 39.52, SD = 2.98) at the time of the follow-up assessment of interest for the current study (see Table 1 for other child demographics). All children were referred by caseworkers at foster care agencies to the ongoing longitudinal study during infancy and were involved in the child welfare system at the time of enrollment. The follow-up assessment of interest

occurred approximately 2 years (M = 1.98, SD = 0.84) post intervention, when children were approximately 3 years of age. At the time of the 3-year-old follow-up, the majority of the children had been adopted (n = 25, 48%), with others still in foster care or returned home to their birth parents. On average, children were first placed into foster care at 5.8 months old (SD = 7.48), and the majority (n = 33, 63%) experienced one, stable out-of-home placement (see Table 2 for a more detailed breakdown of child placement characteristics).

At the time of enrollment, primary caregivers (94% female) ranged in age from 19.0 to 58.6 years (M = 43.2, SD = 9.76), with nine caregivers not reporting their age (see Table 1 for caregiver age and ethnicity by intervention group). Of the 44 caregivers who reported their education level, 5 (11%) did not finish high school, 11 completed high school (25%), 21 completed some college (48%), and 7 completed college (16%). Of the 40 caregivers who reported their family income level, 6 (15%) reported earning less than US$10,000, 3 (7.5%) between US$10,000 and US$19,999, 6 (15%) between US$20,000 and US$29,999, 5 (12.5%) between US$30,000 and US$39,999, 3 (7.5%) between US$40,000 and US$59,999, 9 (22.5%) between US$60,000 and US$99,999, and 8 (20%) more than US$100,000.

Procedure

Children were referred to the study by caseworkers at foster care agencies. Research staff obtained consent from the child's primary caregiver and the child's birth parent (or foster care agency staff when birth parent could not consent). After consent was obtained, the project coordinator randomly assigned children to intervention groups using a randomly generated sequence of numbers (with intervention assignment based on even vs. odd digit). Both interventions included ten 1-hr visits delivered in the home by a parent coach. Children were assessed approximately 1 month after the intervention and annually thereafter. The current study examines post-intervention data collected at the 3-year-old assessment visit using an intent-to-treat approach (Gupta, 2011), which may result in a conservative estimate of intervention effectiveness due to some variation in intervention exposure after random assignment. Of the 52 children included in analyses, 46 (22 ABC, 24 control) received the intervention with the same caregiver who was caring for them at the time of the 3-year-old assessment, 3 children (1 ABC, 2 control) received the intervention in a previous placement but not the current placement, and 3 children (1 ABC, 2 control) were placed with caregivers who had participated in the intervention with a previous child but not them. The children included in the current study represented only a subset of children from the larger study (22.5%) for whom 3-year-old receptive vocabulary data were available.

Experimental Intervention: ABC

The ABC intervention was designed to enhance sensitive caregiving by helping parents: (1) follow the child's lead, (2) provide nurturance in response to the child's distress, and (3) avoid behaving in intrusive or frightening ways. In sessions, parent coaches presented a rationale for the parenting behavior target based on research evidence, guided discussions with caregivers about each parenting target, supported parents in practicing following the lead during structured activities (e.g., playing with blocks, making pudding), and provided video feedback to highlight parents' strengths and progress. In a previous study of the same

sample, caregivers in the ABC intervention group showed greater improvements in parental sensitivity from pre- to post-intervention assessments than caregivers in the control intervention group (Bick & Dozier, 2013).

Control Intervention: Developmental Education for Families (DEF)

The DEF intervention was a development-focused program administered to families for the same frequency and duration as the ABC intervention. DEF was modeled on a program previously shown to enhance intellectual, motor, and cognitive development in children at risk for developmental delays (Ramey, McGinness, Cross, Collier, & Barrie-Blackley, 1982; Ramey, Yeates, & Short, 1984) but did not target parent sensitivity.

Measures

Receptive language—The Peabody Picture Vocabulary Test, third edition (PPVT-III; Dunn & Dunn, 1997), is a standardized assessment used to assess children's receptive language abilities. Children were shown a set of four pictures and were asked to point to the picture of a stated word and earned a point for every correct response. PPVT raw scores ranged from 10 to 76 ($M = 33.73$, $SD = 16.96$), and standard scores ranged from 65 to 128 ($M = 92.71$, $SD = 15.92$). Standard scores were used in analyses, as these adjust for differences in child age and can be readily interpreted in comparison to age-based benchmarks ($M = 100$, $SD = 15$).

Results

We first compared the intervention groups on demographic and placement variables. χ^2 tests showed no differences between ABC and DEF groups in terms of child sex, child ethnicity, caregiver sex, caregiver ethnicity, current caregiver type (i.e., biological parent vs. foster/kin/adoptive parent), or caregiver education status (all p values > .05). The t-tests showed no group differences in current child age, child age at first placement, number of placement changes, duration of current placement, caregiver age, or caregiver income level (all p values > .05). Next, we examined whether receptive vocabulary (standard score on the PPVT) was associated with demographic or placement variables. Children's PPVT standard scores were not associated with child sex or ethnicity, caregiver education or income level, current caregiver type, child age at first placement, number of placement changes, or duration of current placement. Taken together, these preliminary analyses suggested that randomization resulted in intervention groups that were comparable in terms of demographic and placement characteristics and that PPVT scores were not associated with these variables.

PPVT standard scores were then compared between ABC and DEF groups using an independent samples t-test. ABC children had higher standard scores on the PPVT ($M = 98.08$, $SD = 16.08$) than DEF children ($M = 88.11$, $SD = 14.52$), $t(50) = 2.35$, $p = .023$ (see Figure 1). This group difference reflected a medium-to-large effect size, Cohen's $d = .65$. Comparison to age-based norms showed that, on average, children in the ABC group performed at the 45th percentile, whereas children at the DEF group performed at the 28th percentile. When excluding children whose current caregivers did not participate in either the ABC or DEF intervention (i.e., children received one of the two interventions in a

previous placement, $n = 3$), there was still a significant effect of the ABC intervention on receptive vocabulary, $t(47) = 2.05$, $p = .046$. Similarly, when excluding children whose caregivers participated in the ABC or DEF intervention with a previously placed child (i.e., children in the current sample did not directly receive the intervention, $n = 3$), the effect of the ABC intervention also remained significant, $t(47) = 2.46$, $p = .018$.

In order to examine whether the intervention effect held when accounting for a number of important covariates, we conducted a stepwise regression. Based on the previous literature suggesting links to child language development, we controlled for child gender (Kaiser, Cai, Hancock, & Foster, 2002), number of placement changes since birth (Lewis, Dozier, Ackerman, & Sepulveda-Kozakowski, 2007), caregiver education (Magnuson, Sexton, Davis-Kean, & Huston, 2009), and caregiver income (Qi, Kaiser, Milan, & Hancock, 2006). Given that a number of caregivers did not report their education or income, we imputed means for missing data, so as not to significantly reduce the sample size for this follow-up analysis. Using multiple linear regression, covariates were entered into Step 1, and intervention group was entered into Step 2, with standardized PPVT score as the dependent variable (see Table 3). The full model accounted for 17.6% of the variance, with intervention group leading to a significant increase in variance, $\Delta R^2 = .08$, $F(1, 46) = 4.62$, $p = .037$. Thus, accounting for several key covariates, the effect of the ABC intervention on children's receptive vocabulary remained significant.

Discussion

Our findings demonstrated that children with histories of child welfare involvement who received the ABC intervention in infancy showed higher receptive vocabulary at preschool age than children who received a control intervention. In addition to providing support for the efficacy of the ABC intervention in improving language outcomes for young children with histories of disrupted care, these findings extend previous research linking responsive caregiving and language development. Specifically, by using an experimental design, the current study provides causal evidence of the association between parent participation in the ABC intervention (manipulated via random assignment) and children's receptive vocabulary.

Other, more intensive, early intervention programs (e.g., "My Baby and Me" and Early Head Start) have also demonstrated effects on children's language development (Ayoub, Vallotton, & Mastergeorge, 2011; Guttentag et al., 2014). However, these interventions did not specifically target children who had experienced maltreatment, disruptions in care, or other risks that lead to child welfare involvement. The ABC intervention is unique in that it is short-term, targeted, and specifically designed for infants who have experienced threats to the early caregiving environment.

Several limitations in the current study should be noted. First, the sample size was small and only reflected a minority of the larger study. One of the primary reasons for the reduced sample was attrition due to children changing placements; given that the majority of the children in the current sample had one stable placement, it is possible that effects would not generalize to a more representative sample of children in foster care who experience multiple placements, like those lost to follow-up. Second, children's placement

characteristics at the time of the outcome of interest varied, with some children no longer living with the caregiver who had participated in ABC. Although we used a conservative intent-to-treat approach for analyses, it is important to interpret effects with caution, given the variability in children's intervention exposure/dose after random assignment. Our sample size did not allow for more nuanced examination of dosage, although this would be an important direction for future research that aims to replicate and/or extend findings of the current study. Third, although the PPVT is a valid and reliable measure of receptive vocabulary skills, we did not utilize a more comprehensive language assessment that includes measures of expressive language ability. Finally, assessments of ABC intervention fidelity were not included in our analyses. A previous study demonstrated that caregivers in the ABC group showed greater improvements in sensitivity from pre- to post-intervention than caregivers in the DEF group (Bick & Dozier, 2013). In future studies, it will be important to directly test whether changes in maternal sensitivity mediate intervention-related changes in language development.

Despite these limitations, our findings have important clinical implications, demonstrating that enhancing caregiver responsiveness may be a potential target of programs aimed at early language development. Future work should focus on delineating specific mechanisms by which responsive parenting promotes language development in children with histories of maltreatment, as well as examine related outcomes beyond preschool age.

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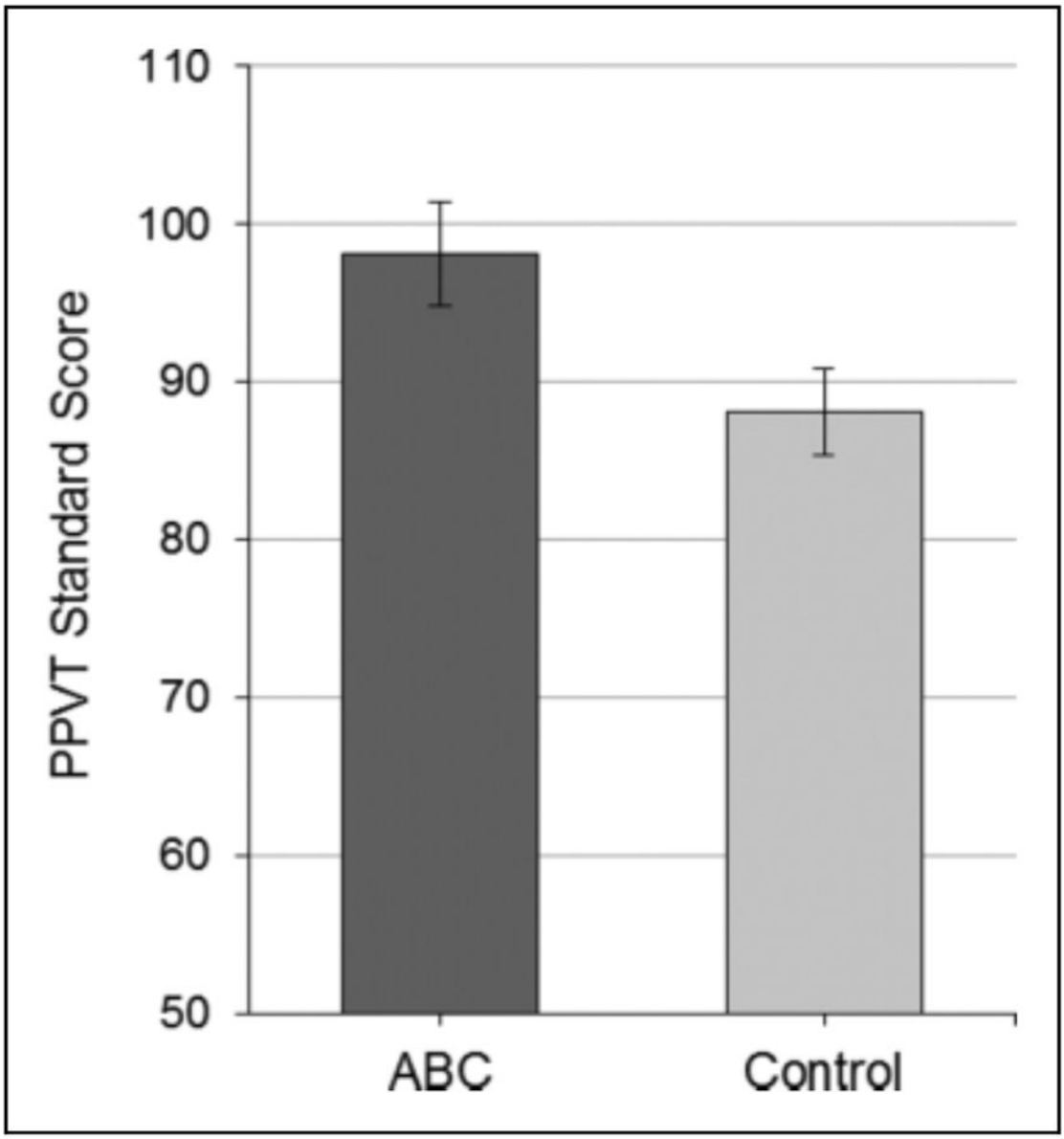

Figure 1.
Attachment and biobehavioral catch-up intervention effects on receptive vocabulary.

Table 1

Child and Caregiver Demographic Characteristics of Attachment and Biobehavioral Catch-Up (ABC) and Control Groups.

	ABC (*n* = 24)		Control (*n* = 28)	
Variable	***n***	**Percentage**	***n***	**Percentage**
Child ethnicity				
African American	12	50.0	17	60.7
Asian American	1	4.2	0	0.0
Biracial	3	12.5	1	3.6
Caucasian	7	29.2	8	28.6
Hispanic	1	4.2	2	7.1
Child gender				
Male	9	37.5	14	50.0
Female	15	62.5	14	50.0
Caregiver ethnicity				
African American	11	45.8	13	46.4
Biracial	1	4.2	1	3.6
Caucasian	12	50.0	11	39.3
Hispanic	0	0.0	3	10.7
	Mean (*SD*)	Min–Max	Mean (*SD*)	Min–Max
Child age (in years)	3.34 (0.28)	2.85–3.87	3.25 (0.21)	2.99–3.76
Caregiver age (in years)	42.92 (7.47)	26.9–52.5	43.38 (10.03)	19.0–58.6

Table 2

Child Placement Characteristics.

Placement Variable	*n*	Percentage
Age at first placement		
Birth–3 months	28	53.8
3–6 months	9	17.3
6–12 months	5	9.6
12–18 months	6	11.5
18–30 months	4	7.7
Total number of placements		
1	33	63.5
2	16	31.1
3	1	1.9
Birth mom in foster care	2	3.8
Placement type at age 3		
Adopted	25	48.1
Living with birth parent	9	17.3
Nonrelative foster care	10	19.2
Relative caregiver	8	15.4

Table 3

Multiple Regression Analysis of Attachment and Biobeha-vioral Catch-Up (ABC) Intervention Effects on Children's Receptive Vocabulary.

Variable	Unstandardized *B*	*SE*	*t*	*p* Value
Step 1: Covariates				
Constant	91.81	3.87	23.74	.000
Gender (female)	5.53	4.44	1.25	.219
Number placements	−5.80	5.13	−1.13	.263
Low caregiver education	−8.88	7.93	−1.12	.269
Low caregiver income	1.93	5.79	0.33	.741
Step 2: Primary predictor				
Constant	87.51	4.23	20.67	.000
Intervention group (ABC)	9.39	4.37	2.15	.037

Note. Low caregiver education: 0 = at least some college; 1 = high school degree or less than high school degree; low caregiver income: 0 = >US $30,000, 1 = <US$30,000.