

# Attachment and Biobehavioral Catch-up: addressing the needs of infants and toddlers exposed to inadequate or problematic caregiving

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Parental sensitivity is key to the development of brain architecture, self-regulatory capabilities, and secure, organized attachments for infants and young children. For a variety of reasons, many parents struggle providing sensitive, responsive care. Attachment and Biobehavioral Catch-up (ABC) is a 10-session home visiting program developed to enhance parental sensitivity. ABC has been shown effective in enhancing parental sensitivity, and enhancing children's attachment security and regulatory capabilities. A key feature of the intervention is providing parents practice and feedback in interacting sensitively with their children. Effectiveness in dissemination sites has been impressive, likely because treatment fidelity is defined well and monitored carefully.

## Addresses

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## Introduction

Sensitive parental care during infancy is critical for optimal development. Thus, caregiving that is inadequate (as in neglect) or problematic (as in abuse or frightening behavior) undermines children's development of behavioral and biological regulation. Attachment and Biobehavioral Catch-up (ABC [1]) is a 10-session home visiting program that was designed to target the issues that are especially challenging for infants who experience inadequate or problematic parenting. This brief review aims to (a) establish the empirical and theoretical basis for ABC, (b) provide an overview of the ABC model for infants, (c) present research evidence that supports the efficacy of ABC in improving parental sensitivity, and child

attachment and other behavioral and biological outcomes, (d) introduce a novel adaptation of ABC for toddlers exposed to early adversity, an underserved population with unique needs, and (e) describe efforts to disseminate ABC with fidelity.

## The importance of caregiving in infancy

Infancy represents an important period for developing brain architecture [2], for developing the seeds of self-regulation [3], and for forming attachments with primary caregivers [4,5]. The evolutionary history of humans has resulted in a protracted period of immaturity; infants are almost fully dependent on parents or primary caregivers as co-regulators of physiology and behavior [3]. The attachment system evolved as a mechanism that promoted infants' chances of proximity to caregivers under conditions of threat [4].

Sensitive, responsive parenting has been posited as key to optimal development in infancy [5,6,7\*\*]. At least partially on the basis of early experience, the developing brain makes connections between neurons in simple circuits and eventually between brain regions in complex circuits [9,10]. The developing brain architecture is therefore differentially affected when young children have responsive parents than when they do not [9,10]. Further, self-regulatory capabilities develop most optimally when the caregiver can serve as a co-regulator for the child; over time and as the result of many experiences of having challenging experiences scaffolded by the sensitive caregiver, the child gradually takes over regulatory functions effectively him or herself [3,11,12]. Secure, organized attachments develop when the caregiver is emotionally available and responsive to the infant's distress [5,13].

## Effects of inadequate caregiving

On the other hand, when caregivers do not provide sensitive, nurturing care, or are insensitive or frightening, it becomes more likely that brain development does not proceed optimally [9,10,14], more likely that children fail to develop adequate self-regulatory functions [15], and more likely that they develop disorganized rather than organized attachments [16,17]. Taken together, these resulting changes in brain structure and function, physiological and behavioral regulation, and attachment exacerbate risk for mental and physical problems across the lifespan [18\*,19,20].

For these children who have experienced adversity, responsive care is especially important so as to remediate effects of adversity. Indeed, longitudinal, correlational studies suggest that responsive parenting can buffer children in the face of adversity (*e.g.*, Refs. [21,22]). Although responsive care is essential for children who have experienced early adversity, many parents are unable to provide this kind of buffering care. Mothers' own histories of childhood maltreatment interfere with their executive functioning and physiological regulation, which in turn leads to insensitive parenting [23]. Additionally, high levels of current parenting stress have been shown to explain the link between mothers' histories of adversity and insensitive parenting [24]. Parents providing foster or adoptive care may also struggle to respond in sensitive ways because children previously exposed to adverse caregiving may fail to signal their needs for nurturance clearly [17,25]. Thus, both biological and non-biological parents face challenges that may interfere with providing vulnerable children with the enhanced parental care that they may need.

### Attachment and Biobehavioral Catch-up

Attachment and Biobehavioral Catch-up (ABC) was designed to target three parenting behaviors that are key to child regulation of behavior and physiology. First, because non-nurturing care is associated with disorganized attachment for vulnerable children [17], ABC intervenes to help parents behave in nurturing ways when their children are distressed. Second, to target children's self-regulatory issues, including difficulty regulating physiology, emotions, and behavior, ABC helps parents follow their children's lead. This has been referred to as 'serve and return interactions' [26], and as contingent responsiveness [11,27]. The third target of ABC is reducing frightening behavior, such as yelling, grabbing roughly, and intruding in the child's space, because such behavior undermines children's ability to develop organized attachments [28], and develop adequate regulatory capabilities [29].

The focus of the ABC intervention is squarely on changing parental behaviors. This focus is apparent in a variety of ways, including the choice of where the intervention is implemented, who is included in sessions, and how it is implemented. First, the intervention is implemented in parents' homes, with office or clinic intervention sessions not recommended. Second, other family members (*e.g.*, boyfriends, grandparents, other children) are invited to join sessions. Parents therefore are practicing new parenting behaviors in the environments in which they live (*e.g.*, grandmother disagreeing with session content, three children vying for attention, *etc.*).

Third, and key to successful implementation of the intervention is frequent 'in the moment' comments about relevant parent behaviors made by the parent coach.

Every time that parents follow their child's lead (or fail to do so), or are nurturing when their child is distressed (or fail to be nurturing), is an opportunity for the parent coach to make a comment. An in the moment comment may contain up to three components; the parent coach may (1) describe the child's behavior and parent's response (*e.g.*, "He cried and you picked him up"), (2) label the intervention target (*e.g.*, "That was a great example of being nurturing when he was distressed"), and/or (3) indicate a potential outcome of the parent's response (*e.g.*, "He will learn trust because he gets a response from you so quickly"). Parent coaches are expected to make comments in at least 50% of the opportunities they have, and at a pace of at least one per minute. Therefore, across a one-hour intervention session, parents should be hearing feedback (most of it positive) about 60 times regarding their following their child's lead and nurturing their child. The frequency of in the moment comments, as well as their quality (*e.g.*, percentage that correctly label the intervention target, average number of components included in comments), has been found to predict the magnitude of change in parent sensitivity [30]. Parent coaches make in the moment comments throughout each session while also covering content related to one of the three intervention targets: providing nurturance (Sessions 1 and 2), following the child's lead (Sessions 3–5), or avoiding frightening behavior (Session 6). In each session, the parent coach defines the intervention target, presents a research-based rationale for its importance, guides a discussion with the parent regarding the target, presents video examples (both standard videos and video clips from the target dyad), and/or provides feedback during structured parent–child interaction activities. In Sessions 7 and 8, the parent coach further encourages the intervention targets by helping the parent identify 'voices from the past' that interfere with sensitive parenting. Finally, the parent coach consolidates gains and celebrates changes in Sessions 9 and 10. Importantly, throughout all 10 sessions, the parent coach prioritizes in the moment commenting above manual content—interrupting themselves frequently to comment on nurturance and following the lead. These frequent interruptions serve to constantly bring the attention back to the parent's responses toward the child, sending the message to the parent that her interactions with the child are always most important.

Several properties of ABC are consistent with qualities that have distinguished effective interventions in the literature. First, ABC is short-term (*i.e.*, 10 one-hour sessions, delivered once per week), consistent with findings from a meta-analysis of 70 attachment-based interventions showing that programs with shorter durations were *more effective* than those with longer durations (>16 sessions) [31]. Even for multi-risk families, interventions that had fewer than 16 sessions were most effective for changing sensitive parenting and child

attachment. Second, also consistent with meta-analytic findings [31], ABC's focus is solely on changing parenting behaviors. The meta-analysis found that interventions that focused specifically on changing parents' behaviors were more effective than interventions that focused on changing parents' internal representations (*i.e.*, parents' cognitive models about attachment) or providing social support. Actually, interventions with an exclusively behavioral focus were even more effective than those that tried to change behavior *and* provide social support or change internal representations, suggesting that a very targeted approach is ideal. Third, the ABC intervention is conducted with parents and children together after infants are at least 6 months of age, allowing parents to practice and receive feedback on the target skills; meta-analytic findings [31] demonstrated that parenting interventions conducted prenatally were less effective than those conducted after the birth of children, perhaps because a didactic approach (without the opportunity to practice and receive feedback) is not sufficient for changing behavior.

### Efficacy of ABC

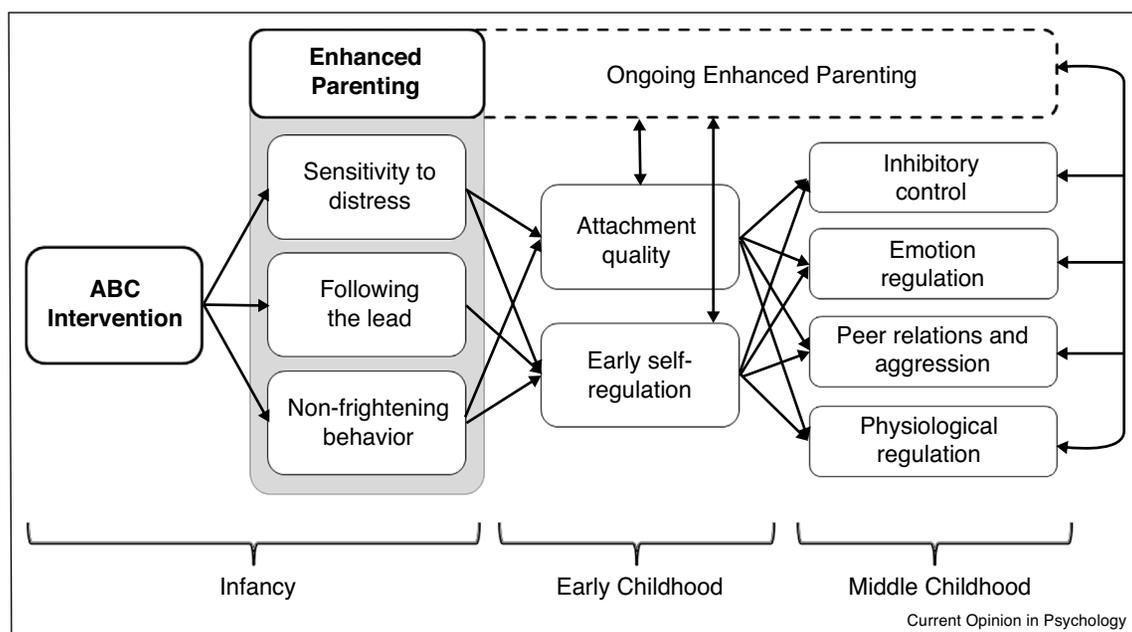
By increasing nurturance in response to distress, increasing following the lead, and reducing frightening behavior, ABC is expected to improve children's attachment quality and self-regulation; in turn, these early competencies, along with ongoing enhanced parenting, are expected to support long-term outcomes of improved inhibitory control, peer relations, emotion regulation, and physiological regulation (See Figure 1).

In randomized clinical trials, children and parents who receive ABC were compared to children and parents in a control group, who received a comparison intervention. The comparison intervention, referred to as DEF (*i.e.*, Developmental Education for Families), was also 10 sessions, delivered in the home, and involved video feedback. However, the comparison intervention focused specifically on language and motor development, and avoided topics related to parent sensitivity. With some exceptions [31,32], ABC has primarily been tested in our lab.

Parents assigned to the ABC intervention showed greater sensitivity and lower levels of intrusiveness at post-intervention than parents assigned to the control intervention [34<sup>\*\*</sup>,35,36<sup>\*</sup>]. In a study of parents' brain activity, assessed using event-related potentials (ERP), parents who received ABC showed a larger enhancement of ERP responses for emotional faces relative to neutral faces than parents who received a control intervention [34<sup>\*\*</sup>]. Whereas ABC parents' brain activity to children's emotional faces was similar to low-risk comparison parents, the attenuated responses to emotional faces seen among parents in the control intervention mirrored brain responses of neglectful parents in a previous study [37].

Children who received ABC showed enhanced functioning across key developmental domains. More of the children in the ABC intervention group had secure attachments as assessed in the strange situation, and fewer had disorganized attachments, than children in the control

Figure 1



Conceptual model for anticipated effects of ABC on key outcomes in early childhood and middle childhood.

group [38]. Children in the ABC group also had more normative patterns of cortisol production at post-intervention than children in the control group [39], with these effects persisting three years post-intervention [40\*\*]. As toddlers, children in the ABC intervention showed lower anger during a frustrating problem-solving task than children in the control group [41]. Finally, children in the ABC group also showed more optimal inhibitory control and cognitive flexibility several years after the intervention than children in the control group [42,43\*].

### Unique needs of toddlers exposed to adversity

Toddlerhood represents a developmental period of increasing autonomy, with children typically becoming more independent in regulating emotions and behavior [44]. Children with a history of early adversity, however, often struggle to develop self-regulatory competencies, showing poorer executive functioning [45] and higher externalizing behavior [18\*,46] than typically-developing peers. Difficult child behaviors such as aggression, defiance, and hyperactivity may directly interfere with receiving sensitive care, as these behaviors can challenge parents' own emotion regulation abilities. In response, parents may be harsh or threatening, setting limits in coercive ways. Thus, toddlers who experience early adversity are especially in need of intervention if they are to develop good self-regulation.

### ABC for toddlers

A number of attachment-based parenting programs, such as ABC, has been developed for infants [47,48], and a number of behavior-management parenting programs has been developed for preschoolers [49–52]. However, parenting interventions for toddlers that address attachment needs for nurturing and responsive relationships *and* behavioral needs for help regulating emerging dysregulation are lacking. A notable exception is the Video-feedback Intervention to promote Positive Parenting and Sensitive Discipline (VIPP-SD), which aims to enhance sensitive parenting especially in the context of limit-setting for young children with behavior problems [53].

ABC for Toddlers (ABC-T) also addresses this gap. In addition to helping parents respond in nurturing ways to children's distress and follow children's lead with delight, ABC-T helps parents serve as co-regulators of children's emerging behavioral dysregulation. Parents learn strategies to help toddlers settle in the context of a supportive relationship. ABC-T encourages parents to remain physically and psychologically available and sensitive when children are showing destructive or aggressive behaviors. Strategies include: staying calm and labeling the child's emotion, avoiding power struggles and lecturing, remaining close and providing nurturance, and resuming following the child's lead with delight when the child is calm. Similar to ABC for infants, ABC-T coaches provide

frequent in the moment comments to celebrate, reinforce, and scaffold parents' behaviors with regard to each of the targets. In a randomized clinical trial, ABC-T has been found to improve foster children's cognitive flexibility and reduce foster children's attention problems [43\*]. In ongoing research, it will be critical to examine whether ABC-T reduces externalizing behaviors, such as aggression and non-compliance, in addition to the related constructs of cognitive self-control.

### Success in disseminating ABC

Often when interventions with strong efficacy results are implemented in community settings, the effects are substantially smaller than in the lab [54–56]. Although ABC has not yet been tested in a randomized clinical trial in the community, pre-intervention and post-intervention sensitivity data aggregated for 108 dyads, seen by 38 coaches across 5 dissemination sites, show a large effect size ( $d = .83$  [57]), which is at least as large as effect sizes seen in efficacy studies. The successful dissemination of ABC is likely the result of first identifying the active ingredient for parent behavior change (*i.e.*, in the moment commenting) and then developing training, supervision, and fidelity monitoring that enhance this active ingredient. The fidelity-monitoring system that quantifies the frequency and quality of in the moment comments is used in weekly supervision. The parent coach and her fidelity supervisor code a randomly selected 5-min segment from one of the coach's sessions each week. In that 5-min clip, each coder identifies every opportunity to comment (*i.e.*, any time that the parent behaved in a way that was consistent or inconsistent with a target, such as being nurturing or not nurturing). For every opportunity, the coder then identifies whether the parent coach commented, and if she did, rates a number of indicators about the quality of the comment (*e.g.*, on-target vs. off-target, number of components included). Summary information for the video, including the frequency of comments, percent of comments that were on-target, and number of missed opportunities to comment, is used in weekly fidelity supervision to enhance the coach's skill in commenting. Although the self-coding has been shown to lead to improved commenting in a case study [58], ongoing work about ABC supervision aims to understand what approaches to supervision are most effective in improving and maintaining parent coach fidelity.

### Summary

Infants and toddlers with histories of inadequate or problematic parenting are especially in need of sensitive care to develop self-regulation. By helping parents nurture children in times of distress, follow children's lead, and avoid behaving in frightening ways, ABC enhances secure and organized attachments, cortisol regulation, and behavioral outcomes. Evidence of ABC's efficacy informs models of developmental psychopathology, highlighting the critical role of sensitive parenting for young children's

healthy development. Following models of differential susceptibility [59–61], future research should examine what factors in children and parents predict the magnitude of changes seen in outcomes as a result of ABC. Such evidence about moderators of treatment effectiveness can help in targeting interventions to those most likely to benefit, and tailoring interventions to those that may need a different or more intensive approach. These future directions, and others, are critical for ensuring that interventions, such as ABC, are meeting the needs of high risk parents and vulnerable infants.

## Conflict of Interest

The authors have no conflict of interest.

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