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Novel Methods for Screening: Contributions from Attachment and Biobehavioral Catch-up

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Abstract

Preventative interventions are needed across the lifespan, including for children who have experienced maltreatment. However, interventions' effect sizes are typically smaller in real-world settings than in clinical trials. Identifying providers who are likely to implement interventions with fidelity could promote implementation outcomes through targeted allocation of training resources. This study tested two pre-training screening measures as predictors of provider fidelity to Attachment and Biobehavioral Catch-up (ABC), a preventative intervention for maltreated infants. One measure assessed valuing of attachment/openness, and the other used vignettes to assess initial skill in a key intervention component. In a sample of 42 providers across 197 sessions, both screening measures predicted future ABC fidelity, even when controlling for experience and education. These results support the development of screening measures for other interventions, suggesting approaches that target specific qualities and behaviors are likely to predict implementation fidelity.

Keywords

provider characteristics; screening interviews; fidelity; training; implementation science

Child maltreatment places children at risk for a number of long-term problematic outcomes, highlighting the need for preventative interventions to alter these developmental pathways. However, disseminating and implementing evidence-based interventions while maintaining intervention effectiveness remains a challenge for the field of prevention science. Researchers have searched for characteristics of implementation sites, processes, and

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Compliance with Ethical Standards

Disclosure of potential conflicts of interest. We have no potential conflicts of interest to disclose.

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Informed consent. For this type of study formal consent is not required.

providers that predict successful implementation outcomes (Durlak & DuPre, 2008). Research on characteristics of providers that can be measured prior to training could inform hiring and training decisions. Provider characteristics can be divided into two subtypes: attribute measures (i.e., stable characteristics of the provider, such as education or personality traits) and process measures (i.e., variables that characterize how the provider interacts with clients and implements an intervention, such as fidelity; Project MATCH Research Group, 1998). Associations between provider attributes and implementation outcomes have been inconsistent, possibly due to the way that attributes are typically measured (i.e., overly general and not specific to a particular intervention). Thus, identifying specific attribute measures that are critical to implementation of a particular intervention may be more successful than assessing more general attributes. Alternatively, process measures may yield more robust prediction of implementation outcomes than attribute measures. Though process measures have been used rarely in pre-training contexts, video-based vignettes could measure aptitude prior to training.

Public Health Impact of Child Abuse and Neglect

In 2016, over 670,000 American children were reported victims of child maltreatment (USDHHS, 2018). Maltreatment places children at increased risk for disorganized attachment (van IJzendoorn, Schuengel, & Bakermans-Kranenburg, 1999), disruptions in hypothalamic-pituitary-adrenal (HPA) axis functioning (Bernard, Butzin-Dozier, Rittenhouse & Dozier, 2010) and behavioral dysregulation (Frost, Jelinek, Bernard, Lind, & Dozier, 2017), as well as mental health disorders (e.g., LeTendre & Reed, 2017) and death due to chronic disease (Miller, Chen, & Parker, 2011) in adulthood. The psychological and physical burden of exposure to maltreatment highlights the need for early interventions to prevent maltreatment and alter developmental pathways to poor outcomes. However, the interventions used in child welfare settings often lack research support and documented effectiveness (Barth et al., 2005).

Attachment and Biobehavioral Catch-Up

Attachment and Biobehavioral Catch-up (ABC) is a 10-session, home-based, preventative intervention for child protective services-involved infants and their biological or foster parents. ABC has been found to increase rates of secure and organized child attachment (Bernard et al., 2012), normalize levels of the stress hormone cortisol (Bernard, Hostinar, & Dozier, 2015), and promote executive functioning (Lewis-Morrarty, Dozier, Bernard, Terracciano & Moore, 2012). ABC focuses on the parenting targets of nurturance (i.e., providing nurturing care to distressed infants), following the lead (i.e., contingent responding), and non-frightening behavior (i.e., avoiding behavior that may frighten or over-stimulate children). Providers called “parent coaches” implement ABC primarily through “in the moment” comments, providing live coaching to parents as they interact with children. For example, after a parent comforts a crying child, a parent coach might say, “What a nice example of nurturance. He bumped his head and you asked him if he was okay.” Coaches’ comment frequency and quality predict parent behavior change, suggesting that in the moment commenting is an active ingredient of ABC (Caron, Bernard & Dozier, 2016).

Effectiveness is often far lower in community implementation than in laboratories (e.g., Hulleman & Cordray, 2009). However, community-based ABC parenting outcomes have been comparable to those in the laboratory (Roben, Dozier, Caron, & Bernard, 2017). In order to promote ABC's implementation efforts and translate success to other interventions, it is critical to understand the factors involved in bringing an intervention to the community.

Provider Screening in the Context of Implementation

Frameworks facilitate the understanding of factors that can challenge implementation (Tabak, Khoong, Chambers & Brownson, 2012). Similar to implementation frameworks in other fields (Damschroder & Hagedorn, 2011; Tabak et al., 2012), the conceptual model of implementation in the public service sector includes different levels and phases (Aarons, Hurlburt & Horwitz, 2011). The multi-level aspect of the model locates factors along a continuum of scale, including sociopolitical and funding climates, organizational characteristics, and individual provider characteristics (Aarons et al., 2011). The model also identifies four phases of implementation: exploration, adoption/preparation, implementation, and sustainment, and proposes that factors may differentially impact implementation during different phases.

The current paper focuses on factors at the level of the individual provider that can be measured during the adoption/preparation stage, and which may then impact implementation during later stages. Currently, there is little consensus on which provider characteristics matter, and systematic evaluation of provider variables during staff selection has been rare (Aarons et al., 2011; Fixsen, Naoom, Blase, Friedman & Wallace, 2005). Understanding which providers will implement an intervention well is critical for positive intervention outcomes, effective allocation of resources, and long-term sustainability of implementation efforts.

Attribute Measures as Predictors of Provider Success

Various attributes, including experience and education, have been examined as predictors of providers' success at intervention implementation, but results have been inconsistent (Beidas & Kendall, 2010). For example, associations between education and implementation outcomes have varied from positive (e.g., Campbell et al., 2013) to negative (e.g., Project MATCH Research Group, 1998), with most small and non-significant (e.g., Kallestad & Olweus, 2003; Klimes-Dougan et al., 2009). Similarly, experience has been associated positively with outcomes in several studies (e.g., Taylor, Asgary-Eden, Lee & LaRoche, 2015), negatively in others (e.g., Campbell et al., 2013; Project MATCH Research Group, 1998), and has failed to predict outcomes in others (e.g., Klimes-Dougan et al., 2009; Project MATCH Research Group, 1998).

Providers' personality characteristics have also been explored as predictors of implementation outcomes. For example, the Project MATCH Research Group (1998) found that providers' needs for nurturance (i.e., to assist others) and aggression (i.e., to be critical of others) predicted client outcomes, but associations depended on treatment type. Specifically, providers with lower nurturance and higher aggression needs produced the best

client outcomes in Twelve Step Facilitation, but providers with higher nurturance and lower aggression needs generated the best outcomes in Motivational Enhancement Therapy. These findings suggest that specific characteristics related to an intervention might predict outcomes better than broad traits. In support of this idea, Kallestad and Olweus (2003) found that teachers' implementation of the Olweus Bullying Prevention Program was predicted by the intensity of negative emotion teachers felt about students being bullied.

Provider Attachment Representations as a Predictor of Provider Success

One attribute potentially predictive of implementation outcomes is providers' state of mind with regard to attachment. Previous attachment experiences and relationships influence behavior in future relationships, making clients' and providers' internal working models of relationships (i.e., state of mind) important for intervention outcomes (Bowlby, 1988; Tyrrell, Dozier, Teague, & Fallott, 1999). These internal working models have been labeled as "autonomous" versus "non-autonomous" (i.e., dismissing and preoccupied) (Main & Goldwyn, 1998). People with an autonomous state of mind with regard to attachment value attachment relationships and experiences, and exhibit attentional flexibility during conversations about attachment experiences (Hesse, 2008). Autonomous providers have been found to better regulate their own emotions, develop stronger therapeutic alliances with clients, and demonstrate greater treatment fidelity, than providers with non-autonomous states of mind (Wittenborn, 2012).

Attachment state of mind may be especially important for providers who are implementing early childhood parenting interventions, particularly those that involve in the moment coaching of parent-child interaction. State of mind is hypothesized to relate to the ability to identify and respond to an infant's needs (Main & Goldwyn, 1998), and therefore may predict providers' ability to help parents recognize and respond to infants' needs. Autonomous adults are more sensitive parents than non-autonomous adults (e.g., van IJzendoorn, 1995), suggesting that autonomous providers may find interventions targeting parental sensitivity concordant with their personal beliefs, which may lead them to value and put effort into implementing an intervention. Conversely, the tendency of dismissing individuals to minimize infants' needs (Crowell & Feldman, 1991) may lead dismissing providers to struggle to recognize infant signals. Additionally, dismissing individuals tend to lack attentional flexibility in attachment-related conversations (Hesse, 2008), which may make it difficult to interrupt conversations with parents in order to coach parent-child interaction. Non-autonomous providers may also experience physiological and emotional reactions to infants that interfere with their ability to coach parental responding (e.g., Riem, Bakermans-Kranenburg, van IJzendoorn, Out, & Rombouts, 2012). In sum, providers' attachment state of mind may either make their task of implementing parent coaching interventions easier or more difficult.

Process Measures as Predictors of Provider Success

Providers' skill is theorized to influence implementation (Durlak & DuPre, 2008); however, little research has measured this construct prior to training. Process measures coded from sessions taped prior to training can predict post-training skill (e.g., Carpenter et al., 2012).

However, recorded sessions may not be practical to obtain and code, and providers may select sessions that positively represent themselves (Rosengren, Baer, Hartzler, Dunn & Wells, 2005).

These concerns have led to the development of standardized process measures that present vignettes about clients and ask providers how they would respond to the clients, using multiple choice or open response format. In the motivational interviewing domain, vignette measures have been particularly well developed (e.g., Baer et al., 2012; Miller, Hedrick, & Orlofsky, 1991; Rosengren et al., 2005), have distinguished providers who become proficient from those that do not (Baer, Rosengren, Dunn, Wells, Ogle & Hartzler, 2004), and as a result, have been used in hiring decisions (Stein, Clair, Soenksen-Bassett, Martin & Clarke, 2015).

The developmental history of motivational interviewing skill assessments can provide guidance for construction of pre-training skill assessments for other interventions. Over time, the realism of vignette stimuli and response formats has increased. Text-based vignettes and written responses (Miller et al., 1991) have been replaced by video-based vignettes and voice-recorded responses (Baer et al., 2012). These adaptations are thought to yield stronger predictive validity than written versions (Lievens & Sackett, 2006). Video-based stimuli reduce demands on reading proficiency, and may better approximate real life therapeutic situations, in which providers must process multiple cues in the environment, including verbal statements, body language, facial expression, and vocal tone (Lievens & Sackett, 2006). Recording verbal responses not only eliminates demands on writing proficiency, but can also capture nuances not present in written responses, such as the provider's tone of voice (Baer et al., 2012) and automaticity of responding.

Developing a Screening Interview for Attachment and Biobehavioral Catch-up

In summary, domain-general attributes have not yielded robust prediction of providers' implementation outcomes, but more specific attribute measures may better predict future implementation. Process measures, in contrast, are thought to be likely to predict outcomes (Fixsen et al., 2005; Project MATCH Research Group, 1998), but are rarely measured prior to training. In designing a screening interview for ABC, we sought to ask three questions: First, could either an attribute measure or a process measure successfully predict future implementation; second, how would these measures compare to education and experience in predicting outcomes; and third, if both measures predicted outcomes, which would be more important? In asking this last question, we sought to explore the impact of stable aptitude versus malleable skill. That is, since attributes are unlikely to change, if attributes were stronger predictors of implementation than process measures, which measure a theoretically teachable skill, this would suggest that training and consultation would have limited impact on providers' ability to implement ABC with fidelity. Alternatively, if process measures predicted future implementation better than attributes, this would suggest that skills were more important than internal personality characteristics, and that process measures could be used to identify the level of training providers need to reach fidelity.

Thus, in the ABC screening interview, we included an attribute measure and a process measure. We hypothesized that the attribute of providers' valuing of attachment and openness would affect their ability to recognize infants' signals, assess the quality of parents' responses, and provide accurate, helpful feedback about parents' behavior. We also hypothesized that the process of making in the moment comments about parent behavior, the critical active ingredient of ABC, could be assessed through video-based vignettes. In addition to examining the measures' ability to predict implementation outcomes in separate regression models, we compared their relative contributions to outcomes using relative weight analyses.

Method

Participants

This study used archived program effectiveness data from 42 ABC parent coaches from around 20 agencies in 5 US states. Nearly all ($n = 41$, 98%) of the parent coaches were female. Demographic data were available for 83% of the sample. Coaches were 60% European American; 17% African American; 11% Asian American, Native Hawaiian or Pacific Islander; 6% Hispanic; and 6% more than one race. The average age of coaches was 38 ($SD = 9$) with 11 ($SD = 6$) years of experience in the field. The majority (74%) had masters' degrees, with 23% with a BA or less, and 3% with a Ph.D.

Procedure

Potential parent coaches were identified by organizations interested in implementing ABC. If providers were interested in pursuing ABC training, they were asked to participate in the screening interview. As shown in Figure 1, the 42 participants were selected from a larger pool of 47 providers. Two sites selected all screened providers, whereas three sites screened more providers than they were able to train, and selected the best providers using screening scores. The screening interview was conducted remotely using video conferencing software for 12 participants and in person by organization staff for 30 participants. The interview was audio recorded, and sent to the University of Delaware to be coded. Providers were then trained in six cohorts. Parent coaches participated in a two- or three-day training workshop led by the second and fourth authors, and received weekly consultation for one year. Consultation included general/clinical group consultation, using session video and focusing on issues such as case conceptualization and integration of in the moment comments with manual content. Consultation also included individual fidelity-focused sessions, in which parent coaches coded fidelity from their own session videos, and then met with fidelity coders who had independently coded the coaches' fidelity to receive feedback focused on improving fidelity.

In this study, we examined parent coaches' fidelity over their first 5 ABC sessions. Archived fidelity data coded by fidelity consultants were used; 197 sessions were available, and 13 were missing. The University's IRB considered the research exempt because it used archived data that were collected for clinical consultation, and which were subsequently de-identified.

Measures

Demographics—Parent coaches' gender, race, ethnicity, highest level of education, and years of experience were collected via a Qualtrics questionnaire emailed to coaches.

ABC screening interview

Attribute measure: The attribute measure used 4 questions from the Adult Attachment Interview (AAI; George, Kaplan & Main, 1985) about early life experiences with the provider's primary caregiver, which led us to call it the "mini-AAI." The mini-AAI was not designed to be a shorter, but equivalent, version of the original AAI, which has an extensive scoring system. Instead, the mini-AAI questions were selected to briefly estimate the provider's valuing of attachment and openness. The mini-AAI used a 5-point Likert scale reflecting responses similar to those with an autonomous state of mind versus those with a dismissing state of mind. A score of 5 would reflect a provider who valued attachment, was open about his or her attachment influences, and was able to provide believable, internally consistent episodic memories about the caregiver's responsiveness to distress. A score of 1 would reflect a provider who was closed about his or her attachment influences, was unable to identify memories of the caregiver's responsiveness, and may have insisted on an ideal presentation of the caregiver.

Process measure: The process measure introduced a core component of ABC, in the moment comments, and measured the degree to which the provider could identify the ABC targets (nurturance and following the lead) and make comments naturally. First, the interviewer provided a definition of what in the moment comments were and how they were used. Next, two sample video vignettes were played, one showing a parent nurturing her child and the second showing a parent following her child's lead, both followed by an ABC parent coach making an in the moment comment. These initial vignettes served to model the process of commenting and introduce the provider to the ABC targets. Next, four videos of targeted parent behaviors were presented. Each video was played twice before the provider was asked to make an in the moment comment. A 5-point scale captured the degree to which a provider correctly identified the targeted parent behaviors and commented on them clearly and naturally. A provider with a score of 5 would describe the target behaviors clearly and accurately in parent-directed comments (e.g., "Beautiful job nurturing your child. She cried and you picked her up!"), whereas a provider with a score of 1 would not identify the intervention targets and would make vague, uncomfortable comments (e.g., "I think this child is just tired. I'd tell the mother that he might need a nap.").

The attribute and process measures were scored by ABC trainers (second and fourth authors) prior to training. The fourth author, a trained and reliable AAI coder, created the coding system and trained the second author. Half-point score designations (e.g., 3.5) were allowed. To assess interrater reliability, 15% of interviews were double-coded by two impartial raters who were not involved with training or consultation in the current sample. Two-way mixed effects single measures intraclass correlation coefficients (ICCs) were .80 for the mini-AAI scores and .81 for the vignette scores, reflecting excellent concordance.

ABC fidelity—In ABC, fidelity is defined as making frequent, high quality in the moment comments. The in the moment fidelity measure assessed each opportunity for a parent coach to comment (i.e., each relevant parent behavior), and the coach's response to each opportunity. Several aspects of parent coach responses were coded:

Missed opportunities: An occurrence of an ABC-targeted parent behavior was coded as a missed opportunity if the parent coach failed to respond with an in the moment comment.

On-/off-target: Each in the moment comment was coded as on-target or off-target. On-target comments were accurate and appropriate to the parent behavior. Off-target comments may have included inaccurate information or described parent behaviors not relevant to ABC.

Number of components: Comments could include 0 to 3 components of information: (1) specifically describing the parent behavior (e.g., "He started fussing, and you picked him up"), (2) labeling the target (e.g., "Beautiful nurturance"), and (3) describing long-term outcomes (e.g., "He's learning he can count on you").

Fidelity was coded on an Excel spreadsheet that calculated summary statistics, including frequency of on-target comments, percentage of missed opportunities, percentage of comments that were on-target, and average number of components included in comments. In the current study, fidelity consultants selected 5-minute clips for coding using random number generators. Video clips of 5 minutes have measured ABC fidelity effectively in previous work (Caron et al., 2016). Thirty-two clips (16% of the sample) were double-coded by additional fidelity consultants. Interrater reliability was excellent, as measured by one-way single-measures ICCs: .88 for frequency of on-target comments, .77 for percentage of missed opportunities, .75 for percentage of on-target comments and .77 for average number of components. Session-level data were averaged to create one data point per provider for each fidelity outcome.

Results

Preliminary Analyses: Correlations

The first set of analyses tested whether the mini-AAI and vignette assessments independently predicted providers' future fidelity to ABC. As shown in Table 1, higher scores on both measures were associated with stronger ABC fidelity in parent coaches' first 5 sessions, specifically, higher percentages of on-target comments and lower percentages of missed opportunities. Higher vignette scores also trended toward association with higher future on-target comment frequency ($p = .05$). Means, standard deviations, and correlations between variables are found in Table 1.

Primary Analyses: Regressions and Relative Weight Analyses

Next, we examined whether associations between screening scores and fidelity outcomes would hold after accounting for characteristics previously linked to future implementation, specifically, experience and education. We conducted a series of multiple regression analyses in which experience, education, and either the vignette score or mini-AAI score

were included. As shown in Table 2, after controlling for parent coaches' educational attainment and years of experience, mini-AAI scores continued to significantly predict coaches' future percentage of on-target comments ($\beta = .42, p < .05$) and percentage of missed opportunities ($\beta = -.37, p < .05$). Coaches' vignette scores also significantly predicted their future percentage of on-target comments ($\beta = .51, p < .01$), percentage of missed opportunities ($\beta = -.42, p < .05$), and on-target comment frequency ($\beta = .47, p < .01$), after accounting for experience and education.

In our final set of analyses, we explored the relative contributions of the mini-AAI and vignette assessments on future fidelity by supplementing each of our multiple regressions with a relative weight analysis (RWA; Johnson, 2000). RWA provides the proportionate contribution that each predictor makes to the overall R^2 , which allows for estimates of relative importance among highly interrelated predictor variables. We used an approach and SPSS syntax provided by Lundby and Johnson (2006) to account for intercorrelation among variables when estimating their relative importance. As shown in Table 3, we calculated the percentage of variance (R^2) accounted for by our predictor variables (mini-AAI and vignette screening scores) and covariates (education and experience) in predicting future percentage of missed opportunities, percentage of on-target comments, and on-target comment frequency. Both the mini-AAI and vignette screening scores accounted for a percentage of the variance in each of the predictor variables, but the mini-AAI was a stronger predictor of percentage of on-target comments than the vignette score, whereas vignette score was a stronger predictor of percentage of missed opportunities and frequency of commenting than the mini-AAI.

Discussion

Evidence-based interventions are needed across the field of prevention practice. However, transporting interventions from labs to community settings has proven challenging, and strategies to predict and improve implementation success are needed. A key step is measuring fidelity and precursors to it. In the current study, we found that two aspects of a screening interview, a mini-AAI assessing valuing of attachment and openness, and video-based vignettes assessing initial commenting skill, predicted parent coaches' fidelity in their first five sessions implementing ABC. These associations remained after controlling for the effects of education and experience, two characteristics often examined as predictors of implementation.

We believe the mini-AAI predicted fidelity because it measured a stable aspect of internal experience that is important to the ABC intervention in a *specific* way. That is, the mini-AAI was designed to measure providers' valuing of attachment experiences, which may be critical for implementing an attachment-based parenting intervention. Additionally, unlike many attribute measures used in prior work, the original AAI is a coder-rated measure, and is rated based on discourse analysis rather than response valence, making it difficult for respondents to fake an autonomous responding style (Hesse, 2008); we sought to capture these aspects of the interview in our adaptation. The vignettes were designed to assess providers' ability to understand and recognize ABC-targeted behaviors, and to use in the moment comments to address these behaviors, a critical aspect of ABC implementation.

The vignettes thus measured providers' ability to quickly learn a novel process, which predicted their implementation of a very similar process in the more complex setting of home-based intervention sessions. For research teams interested in designing screening vignettes for other evidence-based interventions, we recommend developing initial vignettes that model an intervention strategy (e.g., identifying, then challenging, a maladaptive cognition in cognitive-behavioral therapy) as well as novel vignettes that assess understanding of, and initial ability to apply, this strategy. The modeling aspect of the vignettes in the current study departs from those in the motivational interviewing domain (e.g., Baer et al., 2012; Miller et al., 1991; Rosengren et al., 2005), but may better assess teachable components of fidelity. Written, audio, or video format may be used, with written formats minimizing demands on executive functioning, and audio/video formats increasing both realism and demandingness.

When the mini-AAI and vignette assessments were included together in RWAs, both contributed to all three outcomes, but the relative importance of each differed by outcome. Vignette scores appeared relatively more important for the two outcomes associated with commenting frequency. This suggests that providers' ability to quickly learn the skill of in the moment commenting in the vignettes may be particularly important in predicting future ease of commenting. The mini-AAI was a relatively stronger predictor of percentage of on-target comments, a measure of comment quality. This suggests that providers' valuing of attachment may predict their ability to *accurately* describe ABC's target behaviors, consistent with prior work linking state of mind to the ability to respond sensitively to infants' needs (Main & Goldwyn, 1998). Taken together, comment frequency is more associated with the theoretically teachable aspect of the screening interview (i.e., the vignettes) than comment quality.

Given that fidelity was examined across only the first five ABC sessions, questions of malleability of providers' skill cannot be answered satisfactorily by the current study. The current findings could be interpreted as suggesting that comment frequency is more teachable than comment quality, that is, it may be easier to teach a provider to make many comments than to make high quality comments. Alternatively, this finding may reflect the typical developmental process in ABC training and consultation: first, making comments, and later, refining comments; specifically, until coaches are commenting relatively frequently, they can receive only limited feedback on improving the quality of their comments. Additionally, during ABC consultation, coaches improve both comment frequency and quality (Caron, 2017). Thus, we do not consider these results to suggest that coaches cannot learn to improve their comment quality, but rather that the mini-AAI predicts coaches' comment quality at a specific point in time: after training but early in the consultation process. Consistent with general consensus in the field (e.g., Edmunds, Beidas & Kendall, 2013), we believe that training is insufficient, and consultation is necessary, to change clinicians' implementation. Over the course of ABC consultation, both low- and high-scoring interviewees may reach comparable levels of fidelity, making it critical to replicate the current study over a longer period of time. Future research should also explore whether the screening measures predict the rate of change in fidelity over time, and the amount of training needed to attain ABC certification. Finally, the results of the RWA should

be interpreted with caution, as they showed that both screening measures predicted a proportion of each outcome.

Both screening measures appear useful in predicting parent coaches' future implementation of ABC. This information could be used in several ways. First, the screening measures could be used to identify providers who are likely to need more training and consultation to reach proficiency, as well as providers who may require less support. Predicting providers' training/consultation needs could allow consultation to be offered in doses adjusted to those needs. Additionally, by identifying providers who are likely to excel in the intervention for selection as site supervisors and trainers, the screening measure could also promote sustainability. Alternatively, the screening measure could inform selection of providers for ABC training. Implementation in the prevention science field has historically taken the approach of training broadly, but provider selection may provide one way to improve implementation outcomes. In all cases, the screening interview could inform agencies' and trainers' decision-making about allocation of financial and human resources. Using this type of screening measure may be burdensome, requiring extra time in the adoption phase of implementation, and potentially complicating hiring or selection decisions. However, the long-term impact on families due to increased treatment fidelity may be worth the added time and effort, and increased sustainability of implementation could save organizational time and resources in the long run.

A few limitations must be discussed. First, the screening interview and fidelity measure were scored by individuals in clinical roles. The screening interview was rated by workshop trainers, one of whom also provided clinical consultation to much of the sample. Knowledge of trainees' screening performance could have led the trainers/consultants to train or supervise differently. The fidelity measure was scored by consultants for use in individual consultation sessions; prior work has shown that consultants' ratings may be biased (e.g., Martino, Ball, Nich, Frankforter & Carroll, 2009). In the current study, concerns about bias due to the clinical roles of raters are tempered by strong reliability for both the screening interview and fidelity measure.

Our sample was further limited by a restricted range in screening scores, partly because early support for the screening interview's predictive utility (Meade, Blackwell, Roben & Dozier, 2013) led to its utilization in helping agencies make selection decisions. Further selection bias was introduced because all screened providers were interested in learning ABC, and were put forth as possible trainees by their agencies. However, the problem of restricted range would likely only reduce our ability to find associations between variables, making it notable that the interview predicted fidelity in spite of the range. A further limitation is that provider-level data were nested in multiple ways, including within fidelity-focused consultant, within clinical consultant, within agency, and within training cohort, and analyses did not account for nesting.

In summary, we found that two screening measures, a brief assessment of valuing of attachment/openness and vignettes assessing initial aptitude for a key intervention component, predicted providers' initial fidelity to ABC. Identifying providers who will implement an intervention with fidelity could promote efficient use of training resources,

and could improve the quality of intervention provided to families. Others may also find it useful to screen trainees, and this paper provides an example and theoretical basis for the design of screening procedures.

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Figure 1.
Participant flow chart.

Table 1
Means, Standard Deviations, and Bivariate Correlations between Screening Variables and Fidelity Scores

	Mean (SD)	Education	Experience	Mini-AAI	Vignettes	Percent On-Target Comments	Percent Missed Opportunities	On-Target Comment Frequency
Education	1.8 (0.5)	--						
Experience	11.3 (6.4)	.04	--					
Mini-AAI	3.9 (0.9)	.20	.11	--				
Vignettes	3.9 (0.9)	.17	.15	.37*	--			
Percent On-Target Comments	73.6 (19.1)	.26	-.12	.48**	.39*	--		
Percent Missed Opportunities	65.7 (15.5)	-.20	-.07	-.35*	-.38*	-.41**	--	
On-Target Comments/Minute	1.0 (0.6)	.20	.16	.27	.31 [†]	.53**	-.76**	--
Number of Components	1.2 (0.3)	.10	-.17	.07	.17	.05	-.15	.16

Note. Education ranged from 0 to 3 (0 = lower than B.A.; 1 = B.A.; 2 = M.A.; 3 = Ph.D.). Experience was measured by reported years of experience in the field. Missing data reduced *N* for correlations with vignettes to 41, and with education and experience to 34–35.

[†] $p = .05$

* $p < .05$

** $p < .01$

Table 2

Regression Analyses: Mini-AAI and Vignette Assessment Scores Predicting Fidelity Outcomes, Controlling for Experience and Education

Predictor	B	Std. Error	Beta	p-value
Percent On-Target Comments				
Education	5.70	5.11	.18	.27
Experience	−0.47	0.43	−.17	.28
Mini-AAI	7.81 *	2.95	.42	.013
Education	5.84	4.88	.18	.24
Experience	−0.55	0.41	−.20	.20
Vignettes	11.37 **	3.40	.51	.002
Percent Missed Opportunities				
Education	−3.50	4.59	−.13	.45
Experience	−0.06	0.38	−.03	.88
Mini-AAI	−5.85 *	2.65	−.37	.035
Education	−4.31	4.38	−.16	.33
Experience	−0.05	0.37	−.02	.90
Vignettes	−7.47 *	3.05	−.41	.02
On-Target Comment Frequency (Comments per Minute)				
Education	0.15	0.19	.14	.42
Experience	0.01	0.02	.73	.47
Mini-AAI	0.15	0.11	.25	.17
Education	0.14	0.17	.13	.41
Experience	0.01	0.01	.09	.55
Vignettes	0.34 **	0.12	.47	.006

Note. Education ranged from 0 to 3 (0 = lower than B.A.; 1 = B.A.; 2 = M.A.; 3 = Ph.D.). Experience was measured by reported years of experience in the field. *N* for these analyses is reduced to 34–35 due to missing data.

* $p < .05$

** $p < .01$

Table 3

Relative Weights Analysis: Proportion of Variance Accounted for by Mini-AAI Scores, Vignette Scores, Experience, and Education

Predictor	Relative Weight	R ²
Percent On-Target Comments		.342
Education	11.9%	
Experience	8.1%	
Mini-AAI	49.4%	
Vignettes	30.7%	
Percent Missed Opportunities		.204
Education	12.1%	
Experience	0.9%	
Mini-AAI	37.7%	
Vignettes	49.3%	
On-Target Comment Frequency (Comments per Minute)		.149
Education	16.7%	
Experience	11.0%	
Mini-AAI	29.5%	
Vignettes	42.7%	

Note. Education ranged from 0 to 3 (0 = lower than B.A.; 1 = B.A.; 2 = M.A.; 3 = Ph.D.). Experience was measured by reported years of experience in the field. *N* for these analyses is reduced to 34 due to missing data.