

# Early Parental Positive Behavior Support and Childhood Adjustment: Addressing Enduring Questions with New Methods

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## Abstract

*A large literature provides strong empirical support for the influence of parenting on child outcomes. The current study addresses enduring research questions testing the importance of early parenting behavior to children's adjustment. Specifically, we developed and tested a novel multi-method observational measure of parental positive behavior support at age 2. Next, we tested whether early parental positive behavior support was related to child adjustment at school age, within a multi-agent and multi-method measurement approach and design. Observational and parent-reported data from mother–child dyads (N = 731; 49 percent female) were collected from a high-risk sample at age 2. Follow-up data were collected via teacher report and child assessment at age 7.5. The results supported combining three different observational methods to assess positive behavior support at age 2 within a latent factor. Further, parents' observed positive behavior support at age 2 predicted multiple types of teacher-reported and child-assessed problem behavior and competencies at 7.5 years old. Results supported the validity and predictive capability of a multi-method observational measure of parenting and the importance of a continued focus on the early years within preventive interventions.*

*Keywords:* parenting; cognitive development; social competence; observational methods

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## **Introduction**

A significant body of literature over many decades has examined the influence of parenting on children's development (e.g., Baumrind, 1975; Bruner, 1977; Patterson, 1982). This literature is diverse in terms of the theoretical framework in which parenting is conceptualized. The role of parenting in early childhood appears to be of particular importance, especially in terms of predicting children's adjustment. The current study revisited the question of whether very early parenting independently contributes to children's outcomes at a key developmental phase in middle childhood and across multiple domains. Firstly, we tested the validity of a multi-method observational measure of positive behavior support in early childhood. The construct of positive behavior support emerged from the educational literature and refers to parents' proactive establishing of structure to encourage positive child behavior, provision of warmth and sensitivity to children's emotional experience, and contingent rewarding of positive child behavior (Crone, Horner, & Hawken, 2003; Dunlap & Fox, 2009). Secondly, we tested whether parental positive behavior support at age 2 predicted teacher-reported and child-assessed indices of child adjustment at age 7.5, above and beyond earlier child behavior and covariates. Thirdly, we examined whether associations between positive behavior support and measures of child adjustment were moderated by child- and family-level factors, including gender, race, income, and parent education.

### *Parenting—Conceptualization and Measurement*

A substantial literature has examined parenting practices, which feature a plethora of dimensions, and links to subsequent child adjustment. 'Positive parenting' is used as an umbrella term to refer to a range of parental behaviors, including warmth and sensitivity, proactive structuring of the environment, limit setting, and contingency-based reinforcement. Conceptualizations of positive parenting arose from Baumrind's (1975) constructs of authoritative, authoritarian, and permissive parenting. Two dimensions of authoritative parenting, specifically warmth and structure, have been incorporated into many parent-focused interventions. Authoritative parents create a supportive and structured environment for their child, while simultaneously being warm and affectionate (Dishion et al., 2008; Patterson, 1982). Randomized trials of parenting-focused interventions and mediation analyses within randomized trials, where increases in positive parenting are associated with reductions in child conduct problems, attest to the potential causal influence of these parenting strategies for child outcomes (Dishion et al., 2008; Gardner, Burton, & Klimes, 2006).

However, there is an ongoing need for effective interventions that strengthen parents' capacity to provide enriching and positive environments, which both protect and stimulate early cognitive and socioemotional development, and maximize children's life chances across multiple domains of adjustment. Prospective, longitudinal studies are needed to support this process. In particular, studies are needed that test associations between precisely operationalized dimensions of positive parenting and child outcomes. In developing a measure of positive behavior support, we aimed to address this gap in the literature. Further, two key methodological limitations have undermined the validity of measures adopted by previous studies. Firstly, many previous studies are limited by the use of parental self-report data to assess parenting. Various methodological concerns surround these techniques (Gardner, 2000), which center on threats to validity associated with self-report, including social desirability, but also on specific difficulties related

to assessing parenting. For example, parents may have difficulties interpreting the meaning of items relating to parenting constructs (e.g., time-out) or in making judgments about behaviors over long time periods (e.g., positive engagement over a month, or a year) (Morsbach & Prinz, 2006). When parents report on child outcomes and parenting, a further (although related) limitation arises whereby shared method variance may result in an inflation of any reported associations. Finally, whereas *single-informant* observation of parenting is a strong alternative, or complement, to parent reports of parenting, such methods are also not immune from threats to validity, including observer reactivity or inadequate behavior sampling (Gardner, 2000).

Thus, the first aim of the current study was to develop and test a multi-method and multi-informant observed measure of positive behavior support, building on the large existing literature that has examined assessment of parenting. In particular, we aimed to address gaps in the literature by developing a precisely operationalized measure and combining observations from independent assessors using three different observational approaches, which is a novel aspect of the current study and appears a useful avenue to improve measurement. In terms of operationalization, the term 'positive behavior support' was developed within the educational literature as an application of positive behavior interventions to achieve behavior change within schools (Sugai et al., 2000). In educational settings, positive behavior support refers to a continuum of services whereby students receive consistent rules, encouragement, and clear expectations (Reinke, Herman, & Tucker, 2006). In applying this construct to early home environments, positive behavior support refers to parents' proactive establishing of activities to encourage positive child behavior, their provision of warmth and sensitivity to children's emotional experience, and their contingent rewarding of positive child behavior (Crone et al., 2003; Dunlap & Fox, 2009). In the current study, we operationalized positive behavior support using a novel measure that combined ratings from three observational methods, including micro-social analysis and macro-social ratings of videotaped parent-child interactions during structured tasks in the home, and global ratings of unstructured parent-child interactions by a different assessor following a 'live' home visit of 2-3 hr.

### *Child Adjustment*

Our second study aim focused on whether our measure of positive behavior support was uniquely related to child adjustment in middle to late childhood. We focused on four domains of functioning at 7.5 years old, as evidence suggests that children's adaptation in school between 7 and 9 years old represents a critical index for later functioning. Firstly, we assessed children's externalizing behavior (disruptive/aggressive behavior), which has been shown to predict a host of adverse outcomes later in life, including school difficulties, substance abuse, and delinquency (Loeber & Dishion, 1983). Secondly, we assessed academic achievement via standardized tests. Academic achievement in middle childhood has been shown to predict educational attainment, unemployment, and crime into adulthood (Fergusson, Horwood, & Ridder, 2005). Thirdly, we examined effortful control, the ability to inhibit a dominant response, identify errors, and engage in planning. Effortful control has been linked to a variety of socioemotional, behavioral, and cognitive outcomes (Rothbart, Ahadi, & Evans, 2000). Finally, we examined child social competence and relationships. The ability to develop and maintain positive social relationships with peers and teachers during middle childhood is thought to lay the

foundations for psychological adjustment, well-being, and social connectedness across the life span (Hartup & Stevens, 1997).

However, prior to school entry, individual differences in children's behavioral, socioemotional, and cognitive adjustment are present (Waldfoegel & Washbrook, 2008). In particular, the period of 0–3 years appears to be a particularly critical stage of development from neurobiological (Nelson, Thomas, & de Haan, 2006) and behavioral (Shaw & Bell, 1993) perspectives, which may have a lasting impact on outcomes in middle to late childhood. For example, during the toddler years, there is dramatic growth and plasticity in brain development as well as selective persistence or pruning of synaptic connections (Nelson et al., 2006). In addition, the toddler years, and in particular the 'terrible twos', represent an important transition as children begin to master a range of developmental tasks, including empathy and gender identity. This period is also defined by a child's increasing physical mobility and exploratory and autonomous behavior without the requisite cognitive understanding to appreciate the consequences of behavior (Shaw & Bell, 1993). From ages 2–3 years old, children therefore still require explicit directions, monitoring, and support from an engaged parent to focus their attention and keep them safe (Bruner, 1977).

An examination of parenting during this age period thus appears to be a useful avenue of investigation to understand how differences in children's school-age cognitive and socioemotional skills emerge and the extent to which parenting is related to outcomes. In support of this notion, an extensive body of research over many decades has focused on whether early parenting practices, assessed during the toddler years, are related to different facets of children's behavior. For example, strong evidence supports the idea that early positive parenting practices, including warmth and sensitivity, are related to later socioemotional and cognitive child outcomes in early and middle childhood (e.g., Campbell, Ramey, Pungello, Sparling, & Miller-Johnson, 2002; NICHD Early Child Care Research Network, 2004). Further, a stimulating and structured environment and proactive parenting practices have been shown to predict children's subsequent social, emotional, and academic competencies (e.g., Patterson, Reid, & Dishion, 1992).

Our second study aim was to build on this existing literature and examine an enduring research question, which has implications for basic science, intervention development, and policy. Specifically, we tested whether our newly developed measure of observed parental positive behavior support predicted indices of child adjustment within a large longitudinal sample of high-risk toddlers, followed up over 5.5 years. Positive behavior support was observed at age 2, which represents a critical neurobiological and behavioral developmental age. Child adjustment was assessed at a second important developmental phase, early on in formal schooling at 7.5 years old, and indexed by measures of externalizing behavior, social competence, academic achievement, and effortful control. Assessments incorporated both teacher-reported and child test data to minimize shared method variance. We tested the hypothesis that positive behavior support, which encapsulates aspects of both warmth/sensitivity as well as parental proactivity/structuring, would have a generalized positive effect on children's broader adjustment at school age across multiple domains.

### *Child, Family, and Contextual Risk Factors*

Finally, beyond the influence of parenting, it is vital to consider the complex interplay of factors, which shape and determine a parent's ability to foster effective caregiving

skills (Belsky, 1984). In particular, psychological resources of parents (e.g., parental education) and broader sources of stress (e.g., poverty) need to be considered alongside any direct effects of parenting (see Belsky, 1984; Shaw & Shelleby, 2014). Further, a large literature has examined the effects of family poverty on children's social and instrumental functioning. This is a particularly salient issue given that one in four children in the USA is growing up in poverty (US Census Bureau, 2012). Indeed, poverty has been linked to children's later cognitive (Duncan & Brooks-Gunn, 1997) and socioemotional development (Bradley & Corwyn, 2002). Any examination of how very early parenting is related to child development thus needs to take into account the complex context in which this behavior occurs. Our third study aim focused on addressing this notion.

Firstly, within models examining the effect of observed positive behavior support on child adjustment, we controlled for the effects of relevant contextual risk factors, including family income, parent education, child gender, and child race on child outcomes. Thus, we tested the *direct* effect of child- and family-level risk factors on child adjustment. Secondly, we examined whether the effects of positive behavior support were contingent on child- or family-level risk factors. Specifically, we examined whether associations between positive behavior support and child externalizing behavior, effortful control, social competence, or academic skill different were *moderated* by child race, gender, or ethnicity, parent education, or family income. Finally, as the sample was drawn from an ongoing randomized controlled trial of a brief parenting intervention (Dishion et al., 2008), we also examined whether associations between positive behavior support and child adjustment differed for families who subsequently received the intervention.

## **Method**

### *Participants*

Participants included 731 children and families recruited between 2002 and 2003 from US-wide Women, Infants, and Children Nutrition Programs (WIC) in the metropolitan areas of Pittsburgh, PA, and Eugene, OR, and in and outside the more rural town of Charlottesville, VA. Families were contacted at WIC sites and invited to participate if they had a son or daughter between age 2 years 0 month and 2 years 11 months, following a screen to ensure that they met the study criteria by having socioeconomic, family, and/or child risk factors for future behavior problems (Dishion et al., 2008). Risk criteria for recruitment were defined at 1 *SD* or higher above normative averages on various screening measures in three domains: (1) child behavior (e.g., conduct problems), (2) family problems (e.g., maternal depression), and (3) sociodemographic risk (e.g., low education). To qualify, families had to meet criteria for at least one scale within that domain. Two or more of the three risk domains were required for inclusion in the sample.

Of the 1666 families who had children in the appropriate age range and who were contacted at WIC sites across the three study sites, 879 met eligibility requirements and 731 (83.2 percent) agreed to participate. The children in the sample had a mean age of 29.9 months ( $SD = 3.2$ ) at the time of age 2 assessments (approximately 2.5 years old). Across sites, primary caregivers self-identified as belonging to the following ethnic groups: 28 percent African-American, 50 percent European-American, 13 percent biracial, and 9 percent other groups. During the screening period, more than 66 percent of enrolled families had an annual income of less than \$20 000, and the average

number of family members per household was 4.5 ( $SD = 1.63$ ). Forty-one percent of the sample had a high school diploma or general education diploma, and a further 32 percent had 1–2 years of post-high school training. Following the baseline age 2 assessment, half the sample was randomly assigned to receive a brief family intervention (see Dishion et al., 2008); intervention status was subsequently used as a covariate in analyses.

Of the 731 families who initially participated, 560 (77 percent) were available at age 7.5. At 7.5, selective attrition analyses revealed that families with significantly lower parental education were more likely to have dropped out,  $F(1, 730) = 11.08, p < .01$ . However, there were no other significant differences in attrition by site, intervention status, children's race, or gender. At age 7.5, teacher data were available for 313 children, primarily due to difficulties in obtaining cooperation of two school systems, which reduced retention in those sites. Of the 560 families retained at age 7.5, 56 percent had teacher ratings available. Similar analyses to those reported above revealed no significant differences between families with vs. without teacher data in demographic factors. Selective attrition analyses also revealed no significant differences in attrition by study variables that were the focus of the current study, including scores on the three measures of positive parental behavior support and baseline child measures ( $p$  values  $> .26$ ). As data were determined to be missing at random (Schafer & Graham, 2002), all participants were included in analyses. Teacher findings were also corroborated by incorporating the testing of children directly (for academic achievement), data for which were available for 94 percent of the sample assessed at age 7.5.

### *Study Procedures*

All assessments were conducted in the home annually from age 2 with mothers, and if present, an alternative caregiver (e.g., father or grandmother). Assessments began with children engaging in free play with age-appropriate toys, while mothers completed questionnaires. After free play, mother and child participated in a variety of tasks, including clean up and delay of gratification tasks. All tasks were videotaped, and clean-up, teaching, and meal preparation tasks were used for observational coding of two of the three observational measures of parenting. Following the home visit, assessors completed a questionnaire relating to aspects of the home environment, the parent–child relationship, and parent behavior.

### *Demographics Questionnaire*

A demographics questionnaire was administered to mothers during age 2 visits (Dishion et al., 2008; Table 1). The measure included questions about parental education and family income. Parent education ranged from parents reporting no formal schooling to completion of a graduate degree. The variable was dummy coded as 'less than high school completion' = 0 and 'high school and beyond' = 1. Gross annual family income ranged from less than \$4999 to more than \$90 000. Income was dummy coded as families having annual income of  $\leq \$14,999 = 0$  with a comparison group of  $\geq \$15 000 = 1$ . Child gender was coded as female = 0; male = 1. Child's race was dummy coded as 'Caucasian/other' = 0 with 'Black African-American/biracial' being the comparison group = 1. Ethnicity was dummy coded as 'non-Hispanic' = 0 with 'Hispanic' being the comparison group = 1. Finally, as data were collected from three sites, two dummy-coded variables were created to represent site location, with families located in Oregon treated as the comparison group.

**Table 1. Descriptive Statistics of Study Variables**

		<i>n</i>	% of sample	
Intervention status	Control group = 0	364	49.8	
	Intervention group = 1	367	50.2	
Parent education	Less than high school = 0	172	23.5	
	High school or more = 1	559	76.5	
Family income	\$14 999 or less = 0	348	47.6	
	\$15 000 or more = 1	383	52.4	
Child gender	Female = 0	362	49.5	
	Male = 1	369	50.5	
Child race	Caucasian/other = 0	432	59.1	
	Black, African-American/biracial = 1	299	40.9	
Child ethnicity	Non-Hispanic = 0	631	86.3	
	Hispanic/Latino = 1	98	13.4	

		<i>n</i>	<i>M</i>	<i>SD</i>
<b>Observed positive behavior support (age 2)</b>	COIMP	725	6.00	1.04
	HOME	730	29.34	5.36
	RACS	726	.33	.14
<b>Child measures (age 2)</b>	Disruptive behavior (P)	730	20.70	7.30
	Relationship conflict (P)	730	28.33	7.43
	Inhibitory control (P)	720	3.97	.80
	Pre-academic skills (P)	728	60.24	25.19
<b>Child outcomes (age 7.5)</b>	Disruptive behavior (T)	313	7.76	10.14
	Effortful control (T)	286	.01	2.66
	Social competence (T)	309	-.01	2.42
	Academic skills (C)	505	100.69	13.31

*Note:* C = child assessed; COIMP = coder impressions; HOME = home inventory; P = parent reported; T = teacher reported; RACS = relationship affect coding system.

#### *Parenting: Positive Behavior Support*

A latent variable for parent's positive behavior support was created using items from three different observational strategies. The current study uses the age 2 construct, which was assessed at baseline, prior to randomization to the intervention or control group.

*Home Observation for Measurement of the Environment Inventory.* Firstly, home visitors completed the infant/toddler home observation for measurement of the environment (IT-HOME; Caldwell & Bradley, 1984). The Early Steps study includes IT-HOME responsiveness, acceptance, and involvement scales using examiner observation only. In addition, various examiner impressions, developed for the Early Steps study, were added. These additional impressions included ratings of the home environment and parent social skills. Thirteen items from the modified IT-HOME were

related to the positive behavior support construct. Items were chosen if they reflected (1) proactive parenting/effective management of child's behavior or structuring of the child's environment (six items; 'parent structures child's play' and 'parent seemed in control of the child'), or (2) parental warmth, positive reinforcement through praise, or displays of affection (seven items; 'parent caresses or kisses child at least once'). The 13 items were summed to create a directly observed positive behavior support subscale from ratings on the modified IT-HOME, which demonstrated satisfactory reliability (age 2,  $\alpha = .73$ ; age 3,  $\alpha = .76$ ).

*Relationship Affect Coding System Coding.* Secondly, a team of undergraduates, blind to child and family data, coded videotaped family tasks using the relationship affect coding system (RACS; Peterson, Winter, Jabson, & Dishion, 2008), a micro-social coding system that captures the topography and affect within relationship behaviors. Specifically, RACS coding reflects three dimensions of parent and child behavior simultaneously: verbal and physical behaviors, as well as affect. Verbal codes include two types of events: general conversation (positive, negative, or neutral) and attempts at changing the behavior of another (directives, negative directive, and positive structure). Physical behaviors involve a physical interaction (positive, negative, or neutral contact). Affect codes reflect the affect displayed by the parent and child in an interaction (anger/disgust, validation, distress, positive affect, and ignore). The cues used for affect code selection are based on facial expression, vocal tone, and non-verbal cues, such as body posture.

The RACS coding was recorded using Noldus Observer XT, Version 11.0 (Noldus Information Technology, 2012), which allows for continuous and simultaneous coding of parent-child interactions for the three dimensions (verbal, physical, or affect). We created six behavior clusters to summarize possible data streams for both parent and child during interactions: positive, neutral, directives, negative, no talk, and ignore (see Figure 1). Decision rules determined which behavior stream prevailed if two different streams were present simultaneously. For example, a caregiver could say something negative to the child (negative verbal) and then laugh (positive affect). In such a case, the decision rules dictated that negative interactions would trump the positive (see the RACS coding manual; Peterson et al., 2008). The order of trumping was as follows: ignore, negative, positive, directive, no talk, and neutral.

Using these behavior clusters, we determined simultaneous states of parent and child to derive four dyadic states: positive engagement, neutral engagement, coercive engagement, and non-interactive. For the current study, the durations of positive and neutral engagement between parent and child were used to create a summary score that reflected positive behavior support (4 out of 36 possible cells; Figure 1). For example, a parent could provide positive verbalizations that indicated support, endearment, or empathy (e.g., 'I love you') or positive physical behavior (e.g., hugs and kiss). Neutral interactions were also included within the positive behavior support construct. Neutral interactions include structuring of the environment, task, or child behavior in ways that are inherently non-emotional/neutral in nature but reflect involvement or conversation between parent and child (e.g., 'did you find your shoes?' or 'what should we have for dinner?'). Neutral physical contact was also included, such as holding a child back as to protect or to ensure safety, or holding a child's arm as to assist in a task or activity. Across these regions (Figure 1), the total duration that each dyad was observed in the positive and neutral engagement regions was calculated and divided by the overall session time to calculate a *duration proportion* score. Reliability coefficients for the



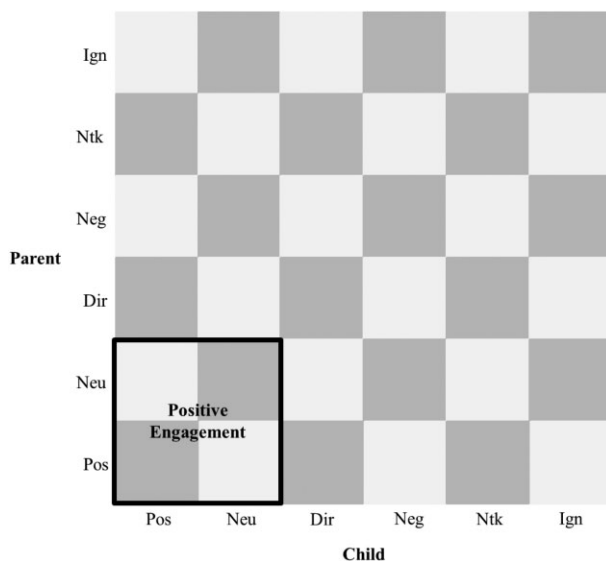


Figure 1. Summary Score of Positive Engagement Derived From Relationship Affect Coding System (RACS) Coding.

Note: Pos = positive engagement; Neu = neutral engagement; Dir = directive; Neg = negative engagement; Ntk = no talk; Ign = ignore.

RACS coding were in the 'good' to 'excellent' range with an overall kappa score of .93 and agreement of 93 percent for the 15 percent of videotapes that were coded twice.

*Coder Impressions Subscale.* Thirdly, following micro-social coding, coders completed a macro-social rating scale on the same videotaped interactions, using the coder impressions (COIMP) inventory (Dishion, Hogansen, Winter, & Jabson, 2004). As with the HOME, 11 macro-social items were drawn from the COIMP inventory to assess positive behavior support: (1) proactive parenting/effective management of child's behavior/structuring of the child's environment (seven items; 'parent defines the situation so as to assure the child's interest, success and comfort'), or (2) parental warmth, positive parental reinforcement of behavior through praise, or displays of affection (four items; 'parent hugs, kisses, cuddles and tickles the child' and 'parent shows affection for the child'). The 11 items were summed to form a composite COIMP positive behavior support subscale, showing good reliability (age 2,  $\alpha = .85$ ; age 3,  $\alpha = .84$ ).

#### *Child Externalizing Behavior*

At age 7.5 years old, teachers completed the teacher report form (TRF) of the child behavior checklist (CBCL), externalizing factor (Achenbach, 1991). At age 2, parents completed the CBCL externalizing factor (Achenbach & Rescorla, 2001) for ages 1.5–5 years old. The CBCL is a 99-item questionnaire to assess behavioral problems, and specifically aggression and rule-breaking behavior. The externalizing factor showed high internal consistency in the current sample for the CBCL at age 2 ( $\alpha = .86$ ) and TRF at age 7.5 ( $\alpha = .94$ ).

### *Effortful Control*

At age 7.5, teachers completed the effortful control factor from the short form of the early adolescent temperament questionnaire-revised (Ellis & Rothbart, 2002). Effortful control refers to a child's capacity to voluntarily regulate behavior and attention. The scale comprises three dimensions: activation control (eight items), attention (seven items), and inhibitory control (11 items). Each item was rated on a 5-point scale (ranging from 1 = almost always untrue to 5 = almost always true). In the current sample, internal consistency of the teacher-reported effortful control scale (i.e., across all three dimensions) at age 7.5 was high ( $\alpha = .94$ ). At age 2, parents completed the 13-item inhibitory control subscale of the children's behavior questionnaire (Rothbart, Ahadi, Hershey, & Fisher, 2001), a parent-report measure of temperament (e.g., 'child lowers voice when asked to do so' and 'child has a hard time following instructions'). Parents rated each item on a 7-point Likert scale ranging from 'extremely untrue' to 'extremely true'. The parent-reported inhibitory control subscale at age 2 showed acceptable reliability ( $\alpha = .66$ ).

### *Social Competence*

A composite variable assessing children's positive social interactions in school at age 7.5 termed 'social competence' was created using items from three different measures. Firstly, teachers completed the social skills rating system (Gresham & Elliott, 1990). From this measure, we used the 10-item cooperation subscale to assess children's displays of cooperation within social situations (e.g., 'child compromises in conflict situations to reach agreement' and 'child accepts peers' ideas'). The 10 items showed high internal consistency ( $\alpha = .86$ ). Secondly, teachers completed the peer associates and social acceptance (PASA) measure (Dishion, Kim, Stormshak, & O'Neill, 2014). From this, a single item was used to assess children's sociometric status ('what percentage of peers like and accept student?'), which was rated on a 5-point scale (1 = very few to 5 = almost all). In addition, three further items of the PASA assessed prosociality of children's peers. Children's sociometric status and cooperation scores were strongly correlated ( $r = .61, p < .001$ ) and prosociality of peers was moderately correlated with sociometric status and cooperation ( $r = .50, p < .001; r = .57, p < .001$ ). We standardized and summed items from across the subscales to form a composite 'social competence' score. At age 2, parents completed the conflict subscale of the adult-child relationship scale (ACRS; modified from the student-teacher relationship scale; Pianta, 2001), which assesses parental perceptions of conflict in the relationship with their child. In particular, although we did not have a measure of social competence at this age, we included this parent-reported measure as an index of child early social or relationship difficulties that might set the stage for poor future social interactions with peers. The ACRS consists of 10 items, rated on a 5-point Likert scale (e.g., 'the child and I always seem to be struggling with each other'). Scores for the 10 items were summed with good internal consistency ( $\alpha = .75$ ).

### *Academic/Pre-Academic Skills*

Three subtests from the Woodcock-Johnson III tests of achievement (WJ-III; McGrew & Woodcock, 2001) were administered to children at age 7.5. The letter-word identification subtest measures children's abilities to identify letters and words. The

calculation subtest requires children to write single numbers and perform mathematical procedures. The spelling subtest measures children's pre-writing skills (e.g., drawing lines and tracing letters) and writing and spelling orally presented words. The WJ-III was normed on a sample of 8818 children from over 100 geographically diverse communities in the USA (McGrew & Woodcock, 2001) with a standard score based on a mean of 100 and *SD* of 15. In the current study, we used children's total score across subtests. Pre-academic skills at age 2 were assessed via parent report on the MacArthur communicative development inventory (Fenson et al., 1993), which provides an index of children's vocabulary and language level, even when parental literacy is low.

## Results

### *Aim 1: Validity of the Multi-Method Observed Measure of Positive Behavior Support*

The first aim of the current study was to develop and test a multi-method composite variable of positive behavior support derived from three different observational measures: macro-ratings of social interactions, global ratings of parent-child interactions in the home, and event-related, micro-social ratings of parent behavior. We examined the validity of the multi-method observed measure of positive behavior support by computing inter-subscale correlations, evaluating model fit statistics, and assessing cross-subscale reliability (Cronbach's alpha). Model fit was considered adequate if the root mean square error of approximation (RMSEA) and the comparative fit index (CFI) values met established guidelines for good fit (RMSEA < .06 and CFI > .95) (Hu & Bentler, 1999). Inter-subscale, cross-method bivariate correlations at age 2 ranged from  $r = .28-.34$  ( $p < .001$ ; see Table 2). These correlations suggested that the three observational methods were assessing similar aspects of parenting. Secondly, confirmatory factor analysis indicated that the three subscales formed a latent factor at ages 2, with moderate loadings onto a general positive behavior support factor (range  $\beta = .50-.60$ ,  $p < .001$ ) and acceptable model fit [ $\chi^2(3) = 188.34$ ,  $p < .001$ ; CFI = 1.00; RMSEA = .00]. Finally, Cronbach's alpha indicated moderate internal consistency across the multi-method subscales ( $\alpha = .57$ ).

### *Aim 2: Association Between Age 2 Observed Parental Positive Behavior Support and Age 7.5 Child Adjustment*

To examine our second study aim, we computed descriptive statistics and inter-correlations of study variables. Next, we examined prediction of age 7.5 outcome variables (teacher-reported externalizing behavior; teacher-reported effortful control; teacher-reported social competence; child-assessed academic achievement) by observed positive behavior support within a structural equation modeling (SEM) regression framework. For each age 7.5 outcome variable, we controlled for the parent-reported version of the dependent variable at age 2 (externalizing behavior; inhibitory control; relationship conflict; and pre-academic skills/vocabulary) and relevant covariates. The model included within-time correlation of residual covariances among constructs at both age 2 and age 7.5. A full information maximum likelihood (FIML) approach was used to estimate all models in Mplus 5.21 (Muthén & Muthén, 2010). FIML accommodates missing data and provides less biased estimates than listwise or pairwise deletion (Schafer & Graham, 2002).

*Zero-order Associations.* Descriptive statistics for study variables are shown in Table 1 and bivariate correlations between variables in Table 2. Zero-order correlations

**Table 2. Bivariate Correlations Between Study Variables**

	Age 2 observed positive behavior support				Age 2 child variables				Age 7.5 child variables			
	COIMP (O)	RACS (O)	HOME (O)	Externalizing (P)	Inhibitory control (P)	Relationship conflict (P)	Pre-academic skills (P)	Externalizing (T)	Effortful control (T)	Social comp (T)		
Age 2												
RACS (O)	.28***											
HOME (O)	.34***	.30***										
Externalizing (P)	-.13**	-.06	-.19***									
Inhibitory control (P)	.07†	.05	.11**	-.50***								
Relationship Conflict (P)	-.13**	-.10**	-.13***	.48***	-.23***							
Pre-academic skills (P)	.07†	.31***	.08*	-.01	.22***	-.05						
Externalizing (T)	-.10†	-.14*	-.17**	<b>.21***</b>	-.15**	.12*	-.10†					
Effortful control (T)	.16**	.13*	.08	-.16**	<b>.21***</b>	-.13*	.16**	-.66***				
Social Competence (T)	.10†	.11*	.16***	-.17**	.13*	<b>-.10†</b>	.13*	-.70***	.76***			
Academic skills (C)	.07	.19***	.18***	-.09*	.09*	.02	<b>.25***</b>	-.21***	.27***	.31***		

Note: C = child assessed; COIMP = coder impressions; HOME = home inventory; O = observed; P = parent reported; T = teacher reported; RACS = relationship affect coding system. Bold indicates stability in constructs. Results presented are based on full information maximum likelihood (FIML) in Mplus. There were comparable zero-order associations using listwise deletion.  
 \*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$ , †  $p < .10$ .

between age 2 observed positive behavior support and age 7.5 child outcome variables were significant, albeit modest in magnitude (range,  $r = .16-.19$ ,  $p < .01$ ). Child measures showed modest stability across time, with correlations ranging from  $.10-.25$  ( $p < .10$ ) between parent reports of variables at age 2 and teacher-reported or child-assessed versions at age 7.5, which is perhaps to be expected based on the length between assessments (5.5 years) and the use of multiple informants across settings.

*Multiple Regression.* The unique association between observed positive behavior support and the outcome variable was examined using multiple regression within an SEM framework (Figure 2). In line with our second hypothesis and thus supporting the predictive validity of the construct, we found that the latent factor of observed parental positive behavior support at age 2 was significantly related to child outcomes at 7.5 over and above stability in child behavior and the effects of covariates. Higher parental positive behavior support was related to higher effortful control ( $\beta = .24$ ,  $p < .05$ ), social competence ( $\beta = .30$ ,  $p < .01$ ), and academic skills ( $\beta = .34$ ,  $p < .001$ ), and lower externalizing behavior ( $\beta = -.23$ ,  $p < .05$ ).

Within multiple regression models, we also found that various covariates were related to the four child adjustment variables. Firstly, male gender was associated with higher teacher-reported externalizing behavior, and lower effortful control and social competence. Secondly, African-American/biracial children were reported by teachers as showing higher externalizing behavior and lower effortful control at age 7.5. Finally, as previously reported for this sample (Dishion et al., 2014), children in the intervention group had lower teacher-reported externalizing behavior at age 7.5, which we highlight to increase transparency about multiple publishing from this dataset.

### *Aim 3: Moderation by Child- and Family-level Risk Factors*

As a more stringent test, we conducted multi-group analyses to examine whether associations between positive behavior support and child outcome variables differed by child- or family-level risk factors. Specifically, we examined models testing associations between positive behavior support and child adjustment in a multi-group SEM framework testing various potential binary moderators [intervention vs. control group; male vs. female; non-Hispanic vs. Hispanic ethnicity; African-American/biracial vs. Caucasian/other race; less than high school vs. high school and beyond; income of  $\leq \$14\,999$  (low) vs.  $\geq \$15\,000$  (high)]. We focused on a cut-point below  $\$15\,000$  to capture individual differences in poverty even within our low income sample. In particular, the cut reflects families who were over 25 percent below the poverty line for a family of four in the year the data were collected. In separate analyses for each potential moderator, we constrained associations between positive behavior support at age 2 and child adjustment variables at age 7.5 to be equal across groups. We compared these with models where parameters varied across groups and tested for significant differences in fit using the Satorra–Bentler scaled chi-square differences test for use with maximum likelihood estimation (MLR) with robust chi-squares and standard errors (Satorra & Bentler, 2001). We found no significant differences in fit for models examining moderation by intervention group ( $\Delta\chi^2(4) = 3.40$ ,  $p = .49$ ), child gender ( $\Delta\chi^2(4) = 1.40$ ,  $p = .84$ ), parent education ( $\Delta\chi^2(4) = 3.13$ ,  $p = .54$ ), or family income ( $\Delta\chi^2(4) = 2.55$ ,  $p = .64$ ). However, in models testing for moderation by child race, we found a significant difference between models ( $\Delta\chi^2(4) = 5.39$ ,  $p = .02$ ),

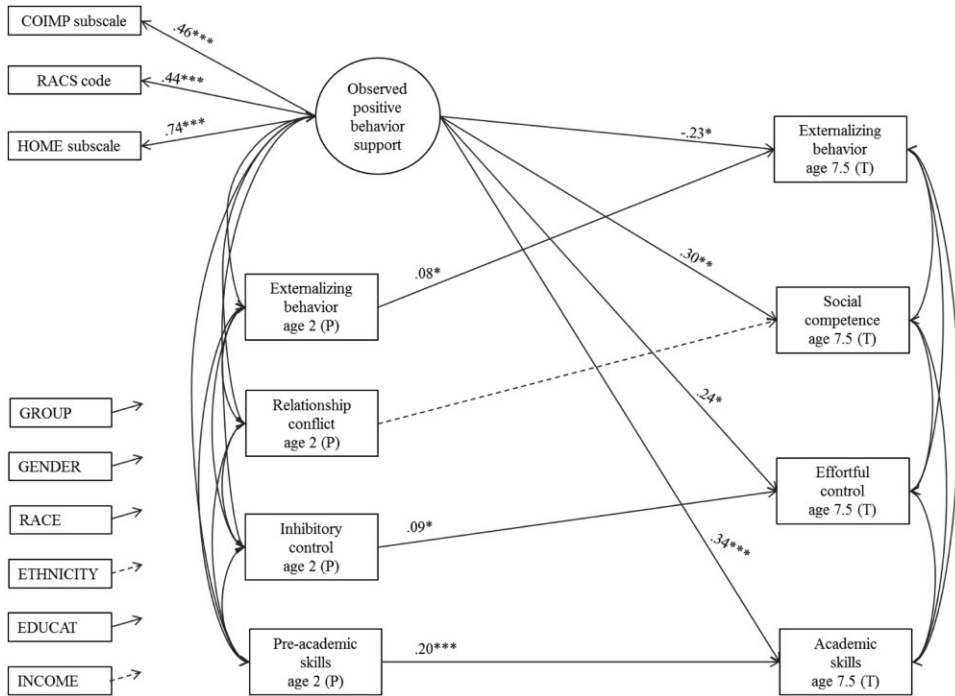


Figure 2. Regression Models Showing Prediction of Child Adjustment Variables at Age 7.5 by Observed Positive Behavior Support at Age 2, Controlling for Earlier Child Behavior and Covariates.

Note: \*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$ , + $p < .10$ . P = parent reported; C = child assessed; T = teacher reported. We controlled for effects of being in the intervention group, child gender, race and ethnicity, parent education, and family income. Data were collected from multiple locations so project site was included as a covariate. Male gender was related to higher externalizing behavior, lower effortful control, and lower social competence. African-American/biracial race was related to higher externalizing behavior and lower effortful control. Children in the intervention group had lower externalizing behavior. Within-time correlation of residual covariances among the age 2 and age 7.5 outcome measures were modeled. Results presented were based full information maximum likelihood (FIML) in Mplus. There were comparable effects using listwise deletion (externalizing,  $\beta = -.24^*$ ; social competence  $\beta = .38^{**}$ ; effortful control,  $\beta = .31^{**}$ ; academic skills,  $\beta = .32^{**}$ ).

suggesting that associations between positive behavior support and child adjustment variables were not equal across African-American/biracial vs. Caucasian/other families. Higher levels of observed positive behavior support appeared to be more strongly related to child outcomes among African-American/biracial families and specifically to higher effortful control (African-American/biracial,  $\beta = .31$ ,  $p = .06$  vs. Caucasian/other,  $\beta = .06$ ,  $p = .54$ ), more social competence (African-American/biracial,  $\beta = .29$ ,  $p = .07$  vs. Caucasian/other,  $\beta = .10$ ,  $p = .26$ ), and fewer externalizing problems (African-American/biracial,  $\beta = -.38$ ,  $p = .007$  vs. Caucasian/other,  $\beta = .002$ ,  $p = .98$ ). Higher observed positive behavior support was

significantly related to higher academic skills among both groups (African-American/biracial,  $\beta = .35, p < .001$  vs. Caucasian/other,  $\beta = .24, p = .006$ ).

## Discussion

The current study had three research goals relating to an examination of the importance of early parenting to children's development. Firstly, we developed a novel, multi-informant observational measure of positive behavior support at age 2. Secondly, we examined whether early observed positive parenting was related to multiple domains of children's school age adjustment. Thirdly, we examined whether concomitant child- and family-level risk factors were directly related to child adjustment variables or whether they moderated associations between parental positive behavior support and child outcomes. Key strengths of the current study included the valid, cross-method, and information-rich measurement approach to assessing parent behavior combining three observational methods of assessing parenting. The current study operationalized what appears to be a particularly important construct under the umbrella term of positive parenting, defined as positive behavior support (Crone et al., 2003; Dunlap & Fox, 2009).

### *Validity of the Multi-Method Observed Measure of Positive Behavior Support*

To address our first aim, we developed and tested the validity of a measure of positive behavior support in very early childhood combining three different observational measures in a latent variable. Firstly, parental positive behavior support was observed following home assessor experiences of 2–3 hours with the family, enabling a holistic overview of the emotional climate of the home and how the parent managed the child's environment, reducing the likelihood of families reacting to the observer's presence. Secondly, positive behavior support was coded using global ratings of videotaped recordings of semi-structured play, teaching, and meal tasks. Thirdly, positive behavior support was assessed using micro-social ratings of positive parent–child engagement, across affective, physical, and verbal data streams, captured simultaneously. In relation to our first study hypothesis, there was empirical support for combining these three observational measurement approaches in a multi-method measure of parental early positive behavior support.

### *Parental Positive Behavior Support Predicting Child Adjustment*

To address our second study aim, we examined whether the latent observed positive behavior support construct at age 2 predicted children's adjustment 5.5 years later. We examined outcomes of externalizing behavior, social competence, effortful control, and academic skills. We focused on these four domains during middle childhood, a critical index for later functioning (e.g., Fergusson et al., 2005; Loeber & Dishion, 1983). Models included age 2 parent-reported versions of child variables and key child, family, and parent contextual risk factors. Higher levels of observed positive behavior support at age 2 were related to fewer teacher-reported externalizing problems, higher teacher-reported effortful control, more teacher-reported social competence, and higher child-assessed academic skills. As such, observed positive behavior support appears important to children's development across four domains of functioning, over and above stability in behavior and covariates.

### *Child and Family Risk Factors*

To address our second study aim, we included child- and family-level risk factors as covariates in the regression model testing the effect of observed positive behavior support on child outcomes. However, in a more stringent test, we re-examined models within a multi-group SEM framework. We tested whether associations between observed positive behavior support and child adjustment at 7.5 were moderated by child gender, race, or ethnicity, parent education, family income, or being in the intervention group. We found no evidence of moderation with the exception of race. For African-American/biracial children specifically, there was a significant effect of higher levels of parental positive behavior support on fewer externalizing behavior problems, higher social competence, and greater effortful control. Because we had not made any *a priori* hypotheses about potential moderating effects, we interpret this finding with caution. Nevertheless, the results highlight that a focus on enhancing positive behavior support may particularly be effective for parenting interventions among African-American/biracial families.

It is interesting to consider that observed positive behavior support had comparable effects on child adjustment across other potential moderators, including for males vs. female and for families with particularly low annual incomes, albeit within our relatively high-risk sample. The current study thus supports calls for policy-makers and governments to continue to find ways to support the early rearing environments provided by parents (Waldfogel & Washbrook, 2008), perhaps especially for children living in high-risk environments, such as the current sample. More specifically, the current study highlights the importance of a continued focus on effective positive parenting skills, including proactive structuring, warm and sensitive responding to children's emotional needs, and contingent use of praise. These aspects of positive parenting are components of many existing evidence-based parenting programs (e.g., Dishion et al., 2008; Webster-Stratton, 1998). As such, the current study provides further empirical support for key developmental targets of future and ongoing interventions designed to improve child outcomes.

### *Strengths and Limitations*

The current study addressed various methodological limitations of previous studies that have investigated early parenting via parent self-report or single informant observation only. Our use of a multi-method, multi-informant measure of positive behavior support, combining ratings from structured and non-structured tasks, using observations from both videotaped and 'live' interactions, and use of micro- and macro-rating scales are particular strengths. At the same time, the results of the current study should be viewed in the context of several limitations. Firstly, we focused on low-income children with multiple family and early child behavior risk factors. It is unclear whether the results would be generalizable to children from higher-income families with fewer risk factors. At the same time, around one in four children in the USA is growing up in poverty (US Census Bureau, 2012). As such, demonstrating an empirical link between positive behavior support and *positive* child outcomes at a critical developmental stage, over and above the effects of poverty, is an important finding. Secondly, there was attrition in our sample from ages 2 to 7.5. Teacher-reported outcome data were available for 313 of the original 731 families. We used an FIML to accommodate this missing data. Although attrition analyses revealed no significant differences in key



demographic factors for those families without teacher data, it is not clear whether the prediction of child outcomes by parenting would have differed in families lost to follow up. Thirdly, the alpha for the reliability of the three positive behavior support subscales was below the acceptable range, which should be considered alongside the findings.

### Conclusions

There are enduring questions about *how* and *when* to intervene with high risk families, in ways that will maximize children's life chances. The findings of the current study add to a large literature that has examined critical periods in children's development (Nelson et al., 2006; Shaw & Bell, 1993), children's school readiness and individual differences in cognitive and socioemotional functioning at school age (e.g., Fergusson et al., 2005), and the effects of the early social environment (Bradley & Corwyn, 2002; Campbell et al., 2002; NICHD Early Child Care Research Network, 2004). In particular, our results suggest that parent's early use of positive behavior support is important to multiple domains of children's adjustment relevant to success at school and later life chances. It is striking that this particular set of parenting behaviors was related to behavioral, socioemotional, and cognitive functioning, which is a testament both to the predictive validity of our measure and the potential for far-reaching and positive collateral effects of parental positive behavior support in early childhood on children's future adjustment. The current study thus provides evidence to support further development and testing of interventions that engage families during a critical age period from 2 to 3 years old. Notwithstanding the multiple risk factors facing many of the families in the current study, the importance of positive behavior support to children's development cannot be overlooked. Helping parents develop positive behavior support strategies as early on as possible in their child's life should remain a key universal preventive and targeted intervention focus.

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