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Collateral Benefits of the Family Check-Up on Early Childhood School Readiness: Indirect Effects of Parents' Positive Behavior Support

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Abstract

We examined the longitudinal effects of the Family Check-Up (FCU) on parents' positive behavior support and children's school readiness competencies in early childhood. It was hypothesized that the FCU would promote language skills and inhibitory control in children at risk for behavior problems as an indirect outcome associated with targeted improvements in parents' positive behavior support. High-risk families in the Women, Infants, and Children (WIC) Nutrition Program participated in a multisite preventive intervention study ($N = 731$) with three yearly assessments beginning at child age 2 years. Positive behavior support was measured using four indicators derived from at-home observations of parent–child interaction during semistructured tasks. Longitudinal structural equation models revealed that parents in families randomly assigned to the FCU showed improvements in positive behavior support from child age 2 to 3, which in turn promoted children's inhibitory control and language development from age 3 to 4, accounting for child gender, ethnicity, and parental education. Findings suggest that a brief, ecological preventive intervention supporting positive parenting practices can indirectly foster key facets of school readiness in children at risk.

Key Words: Family Intervention, Prevention, Positive Parenting, School Readiness, At-risk Populations

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Family intervention programs for children at risk for early conduct problems are typically designed to decrease problematic parenting practices such as coercion (Dishion, Patterson, & Kavanagh, 1992; Martinez & Forgatch, 2001; Patterson, Reid, Jones, & Conger, 1975) and increase positive parenting practices such as parental involvement (Forgatch & Toobert, 1979; Webster-Stratton & Taylor, 2001). This focus on parenting skills is thought to lay the groundwork not only for the reduction of children's conduct problems, but also for the promotion of children's normative social, emotional, and cognitive competencies during a crucial developmental period (Hess & Holloway, 1984; Shaw, Bell, & Gilliom, 2000). Parental involvement and support, for example, have been linked to children's decreased conduct problems (Gardner, Sonuga-Barke, & Sayal, 1999; Gardner, Ward, Burton, & Wilson, 2003) and improved cognitive and academic achievement (Estrada, Arsenio, Hess, & Holloway, 1987; Supplee, Shaw, Hailstones, & Hartman, 2004). Correspondingly, parenting intervention programs that aim to improve these parenting practices have been shown to be effective for reducing children's behavior problems in early childhood (Barlow & Stewart-Brown, 2000; Brestan & Eyberg, 1998; Webster-Stratton & Taylor, 2001; Yoshikawa, 1995). However, we know less about how the promotion of positive parenting in early family intervention with children at risk for conduct problems influences children's normative competencies, such as school readiness (Brooks-Gunn & Markman, 2005).

School readiness is a crucial concern for young children from high-risk families because difficulties with learning at the transition into formal schooling can set children up for a cycle of

failure (Brooks-Gunn & Duncan, 1997; Stipek & Ryan, 1997). Prevention and intervention services often target low-income families who may be contending with a host of interrelated risk factors, including parent stress, insufficient parental education, single-parent status, parent mental health problems and substance abuse, low child birth weight, racial and ethnic discrimination, unsafe neighborhoods, and lack of access to community support services (McLoyd, 1998; Reid & Eddy, 1997; Wasserman & Miller, 1998; Webster-Stratton & Hammond, 1998). These types of environmental stressors put children at early risk for academic and cognitive delays (Campbell & Ramey, 1994; Duncan, Brooks-Gunn, & Klebanov, 1994; Lonigan & Whitehurst, 1998), reduced socioemotional competencies (Blair, 2002; Fantuzzo, Bulotsky-Shearer, Fusco, & McWayne, 2005; Raver & Knitzer, 2002), and early-starting conduct problems (Conduct Problems Prevention Research Group, 1992; Dodge, Pettit, & Bates, 1994; Shaw, Owens, Giovannelli, & Winslow, 2001). Although the reduction of early-starting conduct problems is an important family treatment goal for facilitating children's adaptation to school (Webster-Stratton, Reid, & Hammond, 2001), it may be equally important to focus on parenting practices in high-risk families that promote aspects of school readiness beginning from an early age.

Positive parenting can refer to many different parenting behaviors (e.g., warmth, praise, positive reinforcement, monitoring). In the present study, our examination of parenting practices was informed by work in educational psychology that refers to *positive behavior support* as a nonaversive set of strategies designed to promote growth and competence in students in the school context (e.g., Crone & Horner, 2003; Lewis & Sugai, 1999). These strategies include providing clear expectations for positive behavior, structuring environments that elicit positive child behavior, providing positive reinforcement for children, and interactively engaging with

children to provide a context for learning and development. In early childhood, we would expect that parents who provide high levels of these behaviors would provide a relationship context for the development of language skills and self-regulation, both critical aspects of school readiness. Accordingly, this study examined whether preventive intervention effects on parents' positive behavior support that have been found to reduce children's behavior problems prior to the school transition (Dishion, Shaw, Connell, Gardner, Weaver, & Wilson, in press; Shaw, Dishion, Supplee, Gardner, & Arnds, 2006) could also foster school readiness competencies for young children at risk.

Positive Behavior Support as a Mechanism of Change

Implicit in this research question was a secondary goal: the testing of parents' positive behavior support as an indirect mechanism of change in the effects of early, preventive family intervention on child outcomes. The efficacy of parenting interventions for children at risk for behavior problems has been well researched and established (Taylor & Biglan, 1998), with many programs resulting in improved positive parenting practices and/or reduced behavior problems in children (Brotman et al., 2003; Fisher, Gunnar, Chamberlain, & Reid, 2000; Hutchings et al., 2007; Patterson, DeGarmo, & Forgatch, 2004; Shaw et al., 2006; Taylor, Schmidt, Pepler, & Hodgins, 1998; Turner & Sanders, 2006; van Zeijl et al., 2006; Webster-Stratton et al., 2001). Many such programs are founded on social learning and coercion theories (e.g., Forgatch & DeGarmo, 1999) or attachment theories (e.g., Juffer, Bakermans-Kranenburg, & Van IJzendoorn, 2005) that propose that aspects of early child development are influenced through dynamics embedded in the parent–child relationship (Bowlby, 1969; Patterson et al., 1975). However, despite theorizing that parenting plays a key role in intervention programs for children, relatively few empirical intervention studies have explicitly tested the impact of preventive

intervention on child outcomes through its effects on parenting practices (see Brooks-Gunn, Berlin, & Fuligni, 2000, and Rutter, 2005, for discussion).

Positive, effective, and proactive parenting practices have been shown to mediate the relationship between early family intervention programs and children's behavior problems. Gardner and colleagues (Gardner, Burton, & Klimes, 2006) found that improvements in positive parenting partially mediated the effect of the Incredible Years intervention program (Webster-Stratton & Reid, 2003) on negative behaviors in clinically referred children (age 2–9 years), changes that were maintained at an 18-month follow-up. Work by Forgatch and colleagues (DeGarmo, Patterson, & Forgatch, 2004; Forgatch & DeGarmo, 1999; Martinez & Forgatch, 2001) showed that single mothers' effective parenting (defined as involvement, skill encouragement, problem-solving, and monitoring) of boys in Grades 1 to 3 was a mediating mechanism of the effects of a group-based Parent Management Training intervention on boys' noncompliance, externalizing behavior, and maladjustment. This mediational effect followed a transactional pattern over time across a 30-month period: Treatment group improvements in positive parenting peaked between 6 and 12 months after intervention and mediated reductions in children's externalizing and internalizing behaviors, which in turn mediated changes in maternal depression (DeGarmo et al., 2004). We adopted a similar developmental framework in the present longitudinal study, but with respect to children's school readiness skills rather than behavior problems. This involved testing whether random assignment to the intervention group resulted in improvements in parents' positive behavior support at the one-year follow-up assessment, and whether this improvement, in turn, was associated with children's subsequent school readiness skills at the two-year follow-up.

School Readiness and Parents' Positive Behavior Support

We examined language skills and self-regulation as two important and related indicators of school readiness. Child development and policy researchers have emphasized the need to assess indicators of children's socioemotional and cognitive functioning to obtain a comprehensive picture of school readiness (Denham, 2006; Horton & Bowman, 2002; Raver & Zigler, 1997; Thompson & Raikes, 2007). Independently, language skills (Beitchman, Wilson, Brownlie, Walters, & Lancee, 1996; Brandone, Salkind, Golinkoff, & Hirsh-Pasek, 2006; Hart & Risley, 1995) and self-regulation (Graziano, Reavis, Keane, & Calkins, 2007; Raver, Blackburn, Bancroft, & Torp, 1999; Rimm-Kaufman & Kagan, 2005) have been shown to be key contributors to children's successful adaptation to school. Recent research has highlighted their interrelatedness also, such that low inhibition and low levels of language skill interact to predict higher levels of teacher–student conflict (Rudasill, Rimm-Kaufman, Justice, & Pence, 2006). Further, language ability (Kaiser, Cai, Hancock, & Foster, 2002; Stansbury & Zimmermann, 1999) and self-regulation (Calkins & Fox, 2002; Eisenberg et al., 1996) may be compromised in children with conduct problems and in children at risk due to socioeconomic disadvantage (Stipek & Ryan, 1997).

We have reason to expect that parents' positive behavior support plays a role in children's self-regulation and language during early childhood, and thus could serve as a mechanism of change with respect to their development. The relationship between early parenting and the development of children's self-regulation is well established (Calkins & Hill, 2007; Cicchetti & Toth, 1997; Kochanska, Coy, & Murray, 2001; Thompson, 1991). Research has found that parents' positive verbal initiations with the child (Olson, Bates, & Bayles, 1990), modeling of appropriate regulatory strategies (Putnam, Spritz, & Stifter, 2002), and active instruction and engagement (Supplee et al., 2004) are linked to children's higher self-regulation

in early childhood. With respect to language, consistent parental responsiveness (Landry, Smith, Swank, Assel, & Vellet, 2001), parent–child dyadic synchrony (Skuban, Shaw, Gardner, Supplee, & Nichols, 2006), high levels of warmth and support (Estrada et al., 1987; Ryan, Martin, & Brooks-Gunn, 2006), and the provision of choices to the child during an attention task (Landry, Smith, Swank, & Miller-Loncar, 2000) have been linked with young children's improved cognitive and language skills. Finally, research that explicitly links linguistic and social aspects of school readiness has shown that both are positively associated with parental involvement (Farver, Xu, Eppe, & Lonigan, 2006).

Early Family Intervention and School Readiness

Home-based parenting interventions for high-risk families have tended to fall into two general categories: home-visiting programs aimed at promoting various aspects of positive parenting in low-income parents (e.g., discipline, monitoring, and nurturance), and parent training programs aimed toward improving parenting practices to reduce children's behavior problems (Brooks-Gunn et al., 2000; Yoshikawa, 1995). It is yet unclear whether these early home-based parenting interventions can promote skills related to school readiness such as inhibitory control and language development (Barnett, 1995; Gomby, Larner, Stevenson, Lewit & Behrman, 1995). Brooks-Gunn and Markman (2005) have argued that "few home-visiting programs have altered children's school readiness" (p. 153) and that "little evidence exists, for or against, regarding effects on language" (p. 152). In contrast, we do know that programs outside the home that target children's cognitive and linguistic development, such as family literacy programs and school-based interventions, are more apt to show maintenance of effects when they include a parenting component (Brooks-Gunn & Markman, 2005). If community and school-based programs can capitalize on parental involvement to promote children's school readiness,

we would hope to find that parental involvement in the context of home-based interventions would have the same impact in early childhood.

On the other hand, a potential problem with this argument is that levels of parental involvement in home-based interventions can be hampered by low parental motivation (Spoth, Redmond, Hockaday, & Shin, 1996). In families that are likely to be targeted for treatment, stressors associated with material hardship such as holding multiple jobs and contending with a chaotic home environment can stand in the way of participation (Caldwell et al., 2005). Given that many intervention models rest upon the notion that altering parenting behavior is a key mechanism of change, how do we motivate parents to participate to ensure that they receive the opportunity to change?

The Family Check-Up (FCU) was inspired by work on motivational interviewing (Miller & Rollnick, 2002) and was specifically designed to address parents' motivation to change. Three unique strategies underlie the FCU. First, intervention is based on an ecological assessment of the child and the family. An ecological approach to family intervention and treatment (Dishion & Stormshak, 2007) is important in capturing a comprehensive picture of the various proximal and distal factors that could impose constraints as well as offer windows of intervention in the family system. Second, a feedback session is structured around parents' goals and strengths (derived from the assessment) in order to elicit client–therapist interactions that are most likely to influence change. Third, the FCU is brief (three sessions), and any additional intervention is adapted and tailored to the family by providing a flexible menu of change strategies to choose from in order to achieve their goals. Thus, the FCU is a brief, motivational intervention that supports parents' existing strengths as well as their engagement in additional parent training services when needed.

An important feature of this ecological intervention model, in contrast to more traditional clinical models, is its public health focus. In other words, the FCU provides a link between home-based preventive intervention services and the host of treatment programs available to parents in other community and service settings. Further, in an effort to promote health maintenance, the FCU involves periodic contact with families (at a minimum yearly), thus supporting adaptive changes over the course of key developmental transitions for the child and family. Model-driven, ecological intervention strategies that explicitly target parenting practices have been shown to lead to long-term positive outcomes in children and adolescents (Dishion & Patterson, 1999; Forgatch, 1991).

It is important to note that the FCU has shown effects on families typically at risk for low participation on the basis of their risk profile for children's conduct problems (e.g., high maternal depressive symptoms; Shaw et al., 2006). In addition, research has shown that the FCU not only prevents deterioration in parenting behaviors in at-risk families, but actually increases levels of positive parenting during a child's early years (Gardner et al., 2007; Shaw et al., 2006). Further, these increases in positive parenting mediate the impact of treatment on children's behavior problems (Dishion et al., in press). In work with adolescents, the implementation of the FCU in a public middle school was found to reduce drug use from age 11 to 14 and to reduce arrests, antisocial behavior, and drug use through high school (Connell, Dishion, Yasui, & Kavanagh, 2007). The family-centered intervention strategy, in this sense, has shown relatively long-term effects in terms of reducing child and adolescent problem behaviors.

This study was designed to extend these findings to determine if the FCU could produce collateral developmental benefits in children's school readiness for low-income families and their toddlers at risk for conduct problems. Given that the FCU was not specifically designed to

promote children's school readiness, we did not hypothesize causal or mediational effects of the intervention on school readiness, but rather indirect effects through targeted improvements in positive parenting. Thus, we hypothesized that random assignment to the FCU beginning when children were 2 years old would foster parents' increased positive behavior support by the age 3 assessment, and that parents' positive behavior support at age 3, in turn, would promote children's school readiness factors of language skill and inhibitory control at age 4, accounting for sociodemographic characteristics and stability in parent and child factors over time.

Method

Participants

Participants were 731 families recruited between 2002 and 2003 from WIC programs in the metropolitan areas of Pittsburgh, Pennsylvania and Eugene, Oregon, and within and outside the city of Charlottesville, Virginia. Families were approached at WIC sites and invited to participate if they had a son or daughter aged 2 years 0 months to 2 years 11 months, following a screen to ensure that they met the study criteria by having socioeconomic, family, or child risk factors for future behavior problems. Risk criteria for recruitment were defined as one standard deviation or more above normative averages on several screening measures in the following three domains: (a) child behavior problems (e.g., conduct problems, high-conflict relationships with adults), (b) family problems (e.g., maternal depression, daily parenting challenges, substance use problems, teen parent status), and (c) sociodemographic risk (e.g., low education achievement and low family income as defined by the WIC criterion). Risk classification was required in two or more of the three risk categories for inclusion in the sample. Of the 1666 parents who were approached at WIC sites and had children in the appropriate age range, 879 families met the eligibility requirements (52% in Pittsburgh, 57% in Eugene, 49% in

Charlottesville), and 731 of these families (83.2%) agreed to participate (88% in Pittsburgh, 84% in Eugene, 76% in Charlottesville). Therefore, of the final 731 families who made up the study sample, 272 (37%) were in Pittsburgh, 271 (37%) in Eugene, and 188 (26%) in Charlottesville. More participants were recruited in Pittsburgh and Eugene because of the larger population of eligible families in these regions relative to Charlottesville.

Children in the sample (49% female) had a mean age of 29.9 months (*SD* = 3.2) at the time of the age 2 assessment. Across sites, the children were reported to belong to the following racial groups: 27.9% African American (AA), 50.1% European American (EA), 13.1% Bi-racial, and 8.9% other races (e.g., Asian American, Native American, Native Hawaiian). In terms of ethnicity, 13.4% of the sample reported being Hispanic American (HA). During the period of screening from 2002 to 2003, more than two thirds of those families enrolled in the project had an annual income of less than $20,000, and the average number of family members per household was 4.5 (*SD* = 1.63). At the time of the first assessment, 36.3% of participating parents were married, 31.6% were single, 19.8% were living together, 7.7% were separated, 4% were divorced, and .7% were widowed. Forty-one percent of the population had a high school diploma or GED equivalency, and an additional 32% had one to two years of post–high school training.

Retention. Of the 731 families who initially participated, 659 (90.2%) participated at the one-year follow-up when children were between 3 years 0 months and 3 years 11 months old and 619 (84.7%) participated at the two-year follow-up when children were between 4 years 0 months and 4 years 11 months old. Selective attrition analyses revealed that families with significantly lower levels of parental education were more likely to drop out of the study at the age 3 assessment, $F(1, 730) = 5.24$, $p < .05$, and the age 4 assessment, $F(1, 730) = 7.68$, $p < .01$.

Otherwise, there were no significant differences in attrition by project site, child race, ethnicity, gender, child inhibitory control (parent report), or child language ability. Furthermore, no significant differences were found in the number of participants who were not retained in the control versus intervention groups at the age 3, $\chi^2(1, 731) = .435$, $p > .05$, and age 4 assessments, $\chi^2(1, 731) = .722$, $p > .05$.

Measures

Demographics questionnaire. A demographics questionnaire was administered to the mothers during the age 2, 3, and 4 visits. This measure included a question about parental education, which was assessed on a scale of 1 (*no formal schooling*) to 9 (*graduate degree*).

Positive behavior support. To assess parenting behavior, interaction between the child and his or her primary caregiver was observed in the home. At age 2 years, 97% of primary caregivers were mothers, 2% were fathers, and 1% were "other" (typically a grandmother). Of the families who participated in all three assessments, the primary caregiver changed for at least one of the assessments in 3.8% of the families (for example, from the biological mother to the biological father). The following four observational measures of parenting in the home were used to build a latent construct of positive behavior support:

1) Parent involvement: Infant/Toddler Home Observation for Measurement of the Environment (HOME) Inventory. The Involvement item of the HOME Inventory (Caldwell & Bradley, 1984) was used to capture parent involvement. The HOME was completed by an experimenter at the end of the in-home assessment visit in reference to the primary caregiver. The Involvement item included three criteria which were either observed or not observed, resulting in a score of 0 (*none present*) to 3 (*all present*): "Parent keeps child in visual range, looks often," "Parent talks to child while doing household work," and "Parent structures child's

play periods."

2) Positive reinforcement: The Relationship Process Code. A team of 24 undergraduate students (roughly 5–10 at any given time) coded videotaped family interaction tasks in the home by using the Relationship Process Code (RPC; Jabson, Dishion, Gardner, & Burton, 2004). Noldus Observer 5.0 (Noldus Information Technology, 2003) was used to process the observation data for coding purposes. The RPC is a third-generation code derived from the Family Process Code (Dishion, Gardner, Patterson, Reid, & Thibodeaux, 1983) used extensively in previous research. Coders were trained to a kappa criterion of .70, and coder drift was addressed through regular, random reliability checks on 20% of the final dataset (10% per each of the two waves of data). Disagreements were resolved by consensus. The overall average percent agreement across all coders and RPC codes was 87.02% (Noldus inter-observer kappa = .86). Coding was performed across all eight family interaction tasks combined (see the Procedure section for a description of the individual tasks).

The positive reinforcement score was derived as the proportional duration of time in seconds the parent spent prompting and reinforcing young children's positive behavior. The final variable consisted of a summary of the following RPC codes: a) positive verbal, indicated by verbal support, endearment, or empathy (e.g., "Good job!" "I like your drawing," "I love you"); b) positive physical (e.g., hugging, kissing, patting on the back affectionately, giving high fives); c) verbal suggestions and strategic prompts of positive or constructive activities for the child (e.g., "Why don't you take a look at that new truck?"), including nonverbal strategies (e.g., mother carries child and sits her amongst researcher's toys); and d) positive structure, indicated by direct encouragement or guidance of the child's task-related behavior such as providing explicit choices in a request for behavior change (e.g., "Do you want to put the cars away first or

the dinosaurs first?") or using imaginative or playful teaching strategies (e.g., singing a clean-up song).

3) Engaged interaction: The RPC. A second score from the RPC reflected the parent's neutral but engaged interaction with the child. This code captured conversation that maintained interaction and engagement by means of questions, answers, and explanations about routine (non–task related) matters, conversation about the past or present, verbal acknowledgment of another's statement, agreements or disagreements with another's statement, good-natured jokes and teasing, and teaching unrelated to the task. Engaged interaction also included physical contact that was helpful, neutral, and nonintrusive, such as holding a child back to ensure his/her safety or holding a child's arm to assist him/her with an activity. The final engaged interaction score was the proportional duration of time in seconds that the parent spent in engaged, neutral conversation or physical interaction across all the family interaction tasks combined.

4) Proactive parenting: The Coder Impressions Inventory. Proactive parenting was assessed using the Coder Impressions Inventory (Dishion, Hogansen, Winter, & Jabson, 2004), adapted from the Oregon Social Learning Center Impression Inventory. After microcoding of each videotaped family interaction was completed, coders gave an overall rating on a scale of 1 (*not at all*) to 9 (*very much*) of the parent's tendency to anticipate potential problems and to provide prompts or structured changes to prevent young children from becoming upset or involved in problem behavior. The following six items were used: parent gives child choices for behavior change whenever possible; parent communicates to the child in calm, simple, and clear terms; parent gives understandable, age-appropriate reasons for behavior change; parent adjusts/defines the situation to ensure the child's interest, success, and comfort; parent redirects the child to more appropriate behavior if the child is off task or misbehaves; parent uses verbal

structuring to make the task manageable (Cronbach's alpha age 2 = .835, age 3 = .873).

Language skills: Fluharty 2 Preschool Speech and Language Screening Test. The Fluharty 2 (Fluharty, 2000) is a brief, comprehensive test administered by means of a child interview that applies to children age 2 to 6 years. There are four subtests: a) Repeating Sentences (10 items), which measures the ability to recall and reproduce a variety of sentence patterns (e.g., "The car, which was red, was parked outside"); b) Following Directives and Answering Questions (15 items), which measures the ability to abstract the meaning of an utterance to follow an instruction or respond to a question appropriately (e.g., "Show me a block that isn't blue"); c) Describing Actions (8 items), which measures the ability to select a verb from the lexicon (e.g., "pouring") and incorporate it into an appropriate sentence structure pattern; d) Sequencing Events (4 items), which measures the ability to formulate properly sequenced sentences about a designated topic to convey information (e.g., "What is your favorite game? Tell me how to play it"). Each item is scored as either correct or incorrect.

The scores for each of the four subtests were standardized, and then the first two subtests were summed and converted to a standardized receptive language quotient (i.e., a standard score with a mean of 100 and standard deviation of 15). The latter two subtests were summed and converted to a standardized expressive language quotient. In turn, these two quotients were summed to create the general language quotient score that was used to represent language skills for the purposes of this study. The same measure was used at both the age 3 (Cronbach's alpha = .899) and age 4 (Cronbach's alpha = .919) assessments (data at age 2 were not available).

Inhibitory Control: Children's Behavior Questionnaire. The 13-item Inhibitory Control subscale of the Children's Behavior Questionnaire (CBQ; Rothbart, Ahadi, Hershey, & Fisher, 2001) was used to assess children's behavioral self-regulation. This subscale includes items such

as “has difficulty waiting in line for something,” and “can easily stop an activity when s/he is told ‘no.’” Item answers ranged from 1 (*extremely untrue of child*) to 7 (*extremely true of child*). Mothers completed this questionnaire in reference to their child at age 2 (Cronbach’s alpha = .661), age 3 (Cronbach’s alpha = .687) and age 4 (Cronbach’s alpha = .738).

Procedure

Assessment protocol. Parents (i.e., mothers and, if available, alternative caregivers such as fathers or grandmothers) who agreed to participate in the study were scheduled for a 2.5-hour home visit. Each assessment began by introducing children to an assortment of age-appropriate toys and having them play for 15 minutes while the mothers completed questionnaires. After the free play (15 minutes) that began with the child being approached by an adult stranger (i.e., undergraduate videographer), each primary caregiver and child participated in a clean-up task (5 minutes) followed by a delay of gratification task (5 minutes), four teaching tasks (3 minutes each, with the last task completed by the alternate caregiver and child), a second free play (4 minutes), a second clean-up task (4 minutes), the presentation of two inhibition-inducing toys (2 minutes each), and a meal preparation and lunch task (20 minutes). The average cumulative length of the parent–child interaction tasks was one hour (60.71 minutes) at age 3 and slightly more than one hour (72.13 minutes) at age 4. This same home visit assessment protocol was repeated at ages 3 and 4 for both the control and intervention groups.

Families received $100 for participating in the age 2 assessment, $120 for participating in the age 3 assessment, and $140 for the age 4 assessment. The randomization sequence was computer generated by a member of the staff who was not involved with recruitment. Randomization was balanced by gender to ensure an equal number of males and females in the control and intervention subsamples. To ensure that the examiner was blind to treatment

condition, the examiner opened a sealed envelope to reveal the family's group assignment only after the assessment was completed, and then shared this information with the family. Examiners carrying out follow-up assessments were not informed of the family's randomly assigned condition.

Intervention protocol: The Family Check-Up (FCU). Families randomly assigned to the intervention condition were then scheduled to meet with a parent consultant for two or more sessions, depending on the family's preference. The FCU is a brief, three-session intervention based on motivational interviewing and modeled after the Drinker's Check-Up (Miller & Rollnick, 2002). Typically, the three meetings include an initial contact session, an assessment session, and a feedback session (Dishion & Kavanagh, 2003). However, to optimize the internal validity of the study (i.e., prevent differential drop-out for intervention and control conditions), the assessments were completed before random assignment results were known to either the research staff or the family. Thus, for the purposes of research only, the sequence of contacts was an assessment (baseline), randomization, an initial interview, a feedback session, and potential follow-up sessions. For completing the FCU at the end of the feedback session, families were given a $25 gift certificate that could be used at local supermarkets or video stores.

Thus, the initial meeting was an assessment conducted with research staff, as described earlier, during which the family engaged in a variety of in-home videotaped tasks of parent–child interaction and caregivers completed several questionnaires about their own, their child's, and their family's functioning. During this home assessment, staff also completed ratings of parent involvement and supervision. The second session was a "get-to-know-you" (GTKY) meeting during which the parent consultant explored parent concerns, focusing on family issues that were currently the most critical to the child's well being. The third meeting involved a feedback

session during which the parent consultant used motivational interviewing strategies to summarize the results of the assessment. An essential objective of the feedback session is to explore the parent's willingness to change problematic parenting practices, to support existing parenting strengths, and to identify services appropriate to the family's needs. At the feedback, the parent was offered the choice to engage in follow-up sessions that were focused on parenting practices, other family management issues (e.g., coparenting), and contextual issues (e.g., child care resources, marital adjustment, housing, and vocational training). Although parent consultants recommended appropriate community services according to the particular needs of the family, follow-up sessions most often consisted of ongoing in-person or phone sessions with the parent consultant.

Parent consultants who completed the FCU and follow-up parenting sessions were a combination of Ph.D. and master's-level service workers, all with previous experience in carrying out family-based interventions. At the study's outset they had modest experience in using the FCU. Parent consultants were initially trained for 2.5–3 months in a combination of strategies that included didactic instruction, role playing, and ongoing videotaped supervision of intervention activity. Before working with study families, parent consultants were initially certified by lead parent consultants at each site, who in turn were certified by the second author. Certification was established by reviewing videotapes of feedback and follow-up intervention sessions to evaluate whether parent consultants were competent in all critical components of the intervention as previously described. This process was repeated yearly to reduce drift from the intervention model, following the methods of Forgatch et al. (2005), who found that direct observations of therapist fidelity to parent management training predicted change in parenting practices and child behavior. In addition, cross-site case conferences were convened weekly

using videoconferencing to further enhance fidelity. Finally, annual parent consultant meetings were held to update training, discuss possible changes in the intervention model, and address special intervention issues reflected by the needs of families across sites.

Of the families assigned to the intervention condition, 77.9% participated in the FCU GTKY and feedback sessions at child age 2 and 65.4% at child age 3. At the baseline assessment, there were no significant differences between families in the intervention condition who engaged in the FCU (78%) and families who did not (22%) on sociodemographic covariates of interest (child age, gender, ethnicity, geographical location, baseline level of child distress, parental education, and family income). For families in the intervention condition, the average number of sessions per family was 3.32 (SD = 2.84) at child age 2 and 2.83 (SD = 2.70) at age 3, with the GTKY and feedback included as two of those sessions. Within the intervention condition, the number of treatment sessions was negatively correlated with children's inhibitory control at age 2 (r = -.11, p < .05). We used an intention-to-treat design for all study analyses, including the 22.1% of families assigned to the intervention group who chose not to take part in the FCU.

Results

Descriptive Analyses

Descriptive statistics for all variables are shown in Table 1, including the raw scores for the four separate indicators of parents' positive behavior support (parental involvement, positive reinforcement, engaged interaction, and proactive parenting). With regard to the two microcoded indicators, parents spent an average of 8% of the task time (SD = 7%) in positive reinforcement and an average of 18% of the task time (SD = 9%) in engaged interaction with their children. These proportional durations were consistent across parent–child interactions at ages 2 and 3.

Children's language skills were 1.3 standard deviations below the normative average at age 3 and .77 standard deviations below the normative average at age 4.

Correlations for all variables are shown in Table 2. For the purposes of these analyses, racial and ethnic categories were simplified into an ethnic minority versus nonminority distinction. Notably, no significant associations were found between treatment group and child gender or ethnicity, parental education, or indicators of positive behavior support at age 2, suggesting that randomization was successful. Child gender was significantly related to inhibitory control in that girls showed modestly higher inhibitory control than did boys at ages 3 and 4. Ethnic minority children showed modestly lower language skills at ages 3 and 4. Also, parents of ethnic minority children demonstrated lower levels of positive behavior support than did parents of nonminority children, with the exception of observed positive reinforcement at age 2. For the most part, parental education, positive behavior support, and the child outcomes of inhibitory control and language skills showed anticipated positive intercorrelations ranging in magnitude from small to moderate.

Direct Effects on School Readiness

In preliminary analyses, we explored whether random assignment to the FCU would result in improvements in children's self-regulation as indexed by the CBQ Inhibitory Control scale and language development as measured on the Fluharty 2 Test. We conducted a repeated measures analysis of variance on the Inhibitory Control scale and found a marginal trend ($p <$ .07) in favor of the intervention over the control group in increasing self-regulation from age 2 to age 4. The effects for language development were in the same direction but were not statistically reliable.

Positive Behavior Support Construct

The positive behavior support latent construct included four observed parenting factors at each time point: a) home visitor ratings of parent involvement, b) direct coding of parents' positive reinforcement, c) direct coding of parents' engaged interaction, and d) coder impressions of proactive parenting. The measurement model of positive behavior support is presented in Figure 1. Factor loadings were constrained to be equal across time, and correlations within measure were also allowed across time. The model was a good fit to the data, χ^2 (df = 22) = 51.50, p = .00; CFI = .96; RMSEA = .04; SRMR = .04. Parents' positive behavior support was highly stable over time, β = .88. Factor loadings were moderate, with proactive parenting loading the highest of the four parenting indicators. All paths in the model were significant at the $p < .05$ level with the exception of the cross-time correlation between parent involvement at age 2 and at age 3.

Indirect Effects Model

We hypothesized that families receiving the FCU would show improvements in positive behavior support from child age 2 to age 3, and these in turn would be related to increases in children's language skills and inhibitory control from age 3 to 4. We were also interested in the interrelatedness of language and inhibitory control over time from a school readiness perspective. Thus, to test these hypotheses, we performed longitudinal structural equation modeling in Mplus (Muthén & Muthén, 2004), incorporating children's language and inhibitory control at ages 3 and 4 into one model. We used full information maximum likelihood estimation (Muthén & Muthén, 2004), a method that accommodates missing data by estimating each parameter using all available data for that specific parameter. The theoretical model with covariates is presented in Figure 2.

To account for potential differences in positive behavior support, language skills, or

inhibitory control by sociodemographic factors, we included three covariates: child gender, child ethnic minority status, and parental education. Prior research has shown that beginning in early childhood, girls typically demonstrate higher levels of emotion regulation (Cole, Zahn-Waxler, & Smith, 1994) and inhibitory or effortful control than do boys (see Else-Quest, Hyde, Goldsmith, & Van Hulle, 2006, for a review). Ethnic and racial gaps in school readiness have been demonstrated in the literature (Duncan & Magnuson, 2005), but are typically reduced by 25–50% when controlling for parenting behaviors (Brooks-Gunn & Markman, 2005). In addition, relations amongst various parenting behaviors (e.g., between parental warmth and intrusiveness) have been found to differentially impact child outcomes depending on race, ethnicity, and acculturation (Ispa et al., 2004).

Low socioeconomic status and persistent economic disadvantage are thought to contribute to children's increased emotional and behavioral difficulties (McLoyd, 1998) and to parental stress that may reduce parents' capacities for sensitive and involved parenting (Garner, Jones, & Miner, 1994; McLoyd, 1990). Socioeconomic status is often measured using both parental education and income, and thus we examined each in relation to the variables of interest. Partial correlations revealed that when controlling for parental education, family income was unrelated to all variables in the model except for coder impressions of proactive parenting at child age 3, $r = .14$, $p < .01$. Conversely, when controlling for parental income, parental education was still related to all of the variables in the model ($p < .01$) except for home visitor ratings of parental involvement at child age 2. The lack of effect of income may have resulted from a restricted range of income in our sample, because more than two thirds of the sample had an annual income of less than $20,000. Therefore, parental education was retained as a covariate in the model whereas family income was not.

An initial model was computed on the primary predictors and outcomes of interest, which was a good fit to the data, χ^2 (df = 54) = 125.72, p = .00; CFI = .95; RMSEA = .04; SRMR = .04. The model was then recomputed to see whether model fit was improved by adding child gender (male = 0, female = 1), child ethnic minority status (European American = 0, ethnic minority = 1), and parental education as covariates. The model fit was comparable, χ^2 (df = 82) = 158.19, p = .00; CFI = .95; RMSEA = .04; SRMR = .04, and so the model with covariates was retained and is presented in Figure 3. Considering the large sample size, we performed an additional chi-square to degrees of freedom ratio test that confirmed a reasonable model fit, χ^2/df = 1.57. Overall, the model accounted for 52% of the variance in children's language skills and 30% of the variance in children's inhibitory control at age 4. For descriptive purposes, Table 3 shows change statistics separately by intervention condition for the latent parental positive behavior support variable, children's language skills, and children's inhibitory control.

We hypothesized that the FCU would show indirect effects on children's language skill and inhibitory control through parents' positive behavior support. Therefore, we first examined the effect of intervention on parents' positive behavior support at age 3, which was significant (estimate = .12, SE = .04, β = .14). Thus, families randomly assigned to the FCU intervention showed statistically higher levels of positive behavior support than did controls one year later, despite accounting for high stability in this set of observed parenting practices from child age 2 to age 3.

Considering that there was an intervention effect on parents' positive behavior support, we next examined whether this effect, in turn, promoted change in children's language skill over time. Language at age 4 was regressed on age 3 language, age 3 positive behavior support, and treatment status, while positive behavior support at age 3 was regressed on age 2 positive

behavior support and treatment status. Thus, the model tested whether intervention was related to change in positive behavior support from age 2 to 3, and whether this change in positive behavior support predicted change in child language from age 3 to 4, controlling for the direct effect of treatment. The relationship between positive behavior support at age 3 and child language at age 4 was significant (estimate = 5.56, *SE* = 1.32, β = .19), despite moderately high stability in children's language scores over time (estimate = .78, *SE* = .04, β = .64). The direct effect of treatment on child language at age 4 was not significant (estimate = −.03, *SE* = .81, β = .00). A statistical test of the significance of the indirect effect from intervention to the change in positive behavior support to the change in child language was examined, with standard errors for indirect effects calculated using the delta method described by MacKinnon and colleagues (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002; MacKinnon, Lockwood, & Williams, 2004). These analyses confirmed an indirect effect of treatment on child language at age 4 through positive behavior support at age 3, although it was modest (estimate = .648 *SE* = .25, β = .03). Thus, controlling for stability in positive behavior support and in children's language, treatment led to an increase in children's language skills over time indirectly through positive behavior support.

We then examined the indirect effect of the intervention on children's inhibitory control through its effect on parents' positive behavior support. Child inhibitory control at age 4 was regressed on age 3 inhibitory control, age 3 positive behavior support, and intervention status, and positive behavior support at age 3 was regressed on age 2 positive behavior support and intervention status. Thus, the model tested whether intervention was related to change in positive behavior support from child age 2 to 3, and whether this change predicted change in child inhibitory control from age 3 to 4, controlling for the direct effect of intervention. The

relationship between positive behavior support at age 3 and child inhibitory control at age 4 was significant (estimate = .25, *SE* = .09, β = .14), despite moderately high stability in children's inhibitory control scores over time (estimate = .50, *SE* = .04, β = .48). The direct effect of intervention on child inhibitory control at age 4 was not significant (estimate = .02, *SE* = .06, β = .02). A statistical test of the significance of the indirect effect from intervention to the change in positive behavior support to the change in child inhibitory control confirmed that there was an indirect effect of intervention on child inhibitory control at age 4 through positive behavior support at age 3 (estimate = .03, *SE* = .01, β = .02), although again this effect was small in magnitude. Thus, controlling for stability in positive behavior support and in children's inhibitory control, intervention led to an increase in children's inhibitory control over time indirectly through positive behavior support.

Post hoc analyses revealed another significant indirect effect in the model with regard to the cross-lagged relationships between the school readiness factors of inhibitory control and language skills at ages 3 and 4. Interestingly, parents' positive behavior support at child age 2 was indirectly related to children's language at age 4 through its effect on child inhibitory control at age 3 (estimate = .85, *SE* = .39, β = .03). However, the reverse direction of effects from language at age 3 to inhibitory control at age 4 was not found. In fact, child language skills at age 3 were not significantly related to inhibitory control at age 4, nor were the concurrent relationships between the two outcomes significant at age 3 or age 4 despite being modestly positively correlated in preliminary analyses.

The analytic model controlled for the covariates of child gender, child ethnic minority status, and parental education. Ethnic minority status was related negatively to parents' positive behavior support at age 2 (estimate = −.22, *SE* = .04, β = −.28), and showed a modest positive

relationship with children's inhibitory control at age 3 (estimate = .15, *SE* = .06, β = .10). To explore this finding further, we conducted post hoc invariance testing in Mplus to determine whether the measurement model of parenting and the intervention effect on parenting held across ethnic minority and non-ethnic minority groups. For the measurement model of parenting, hierarchically nested chi square tests and resulting chi square differences tests (using scaling correction factors to account for non-normally distributed outcomes; Satorra & Bentler, 2001) revealed no worsening of model fit when factor loadings, covariances among indicators, and parenting stability over time were constrained across groups. Model fit did worsen when the variance for the latent parenting construct at age 2, χ^2 diff = 9.39, *df* diff = 4, *p* = .05, and the residual variances for the indicators, χ^2 diff = 10.16, *df* diff = 4, *p* = .04, were constrained to be equal across groups. However, even with all model parameters constrained, reasonable model fit was still retained, χ^2 (*df* = 61) = 93.12, *p* = .005, CFI = .95, RMSEA = .04. Invariance testing revealed a lack of significant difference in intervention effects on parenting between ethnic minority and non-ethnic minority groups, χ^2 diff = 2.97, *df* diff = 1, *p* = .08, and a lack of group difference in covariances between parenting and child outcomes, χ^2 diff = 1.17, *df* diff = 3, *p* = .75.

Finally, to understand the overall direct intervention effect on parenting, an effect size was calculated between the intervention and control groups, indicating a small effect of the intervention on levels of parents' positive behavior support at age 3 (*d* = .24; Cohen, 1992) in the context of the full theoretical model. Considering that this study used an intention-to-treat design and that not all intervention families chose to engage in the FCU, we also conducted post hoc "as treated" analyses to ensure that the direct effect of the intervention on parenting held when families in the control condition were compared to only those families in the intervention

condition who engaged (78% of the intervention group at age 2). Multivariate regression analyses confirmed that families who engaged in the intervention at age 2 showed significantly higher levels of the indicators of positive behavior support than control families at age 3, Wilks' lambda = .981, $F(4, 497) = 2.44$, $p < .05$, controlling for child gender, ethnicity, and parental education.

Discussion

Researchers have called for the study of a) mechanisms of change in family interventions, specifically through parenting (Brooks-Gunn et al., 2000), and b) home-based family intervention effects on school readiness, especially for children at risk due to economic hardship (Brooks-Gunn & Markman, 2005). This study substantiates the potential for parents' positive behavior support to act as a change mechanism in preventive intervention programs for young children. Findings demonstrated that the FCU was indirectly related to improvements in school readiness in young, low-income children at risk for early conduct problems through its effects on parents' increased positive behavior support. Although these effects were indirect rather than causal, it is notable that a brief, home-based, public health intervention such as the FCU, one that can be provided to families in the context of service systems widely available to indigent families in the United States, can contribute to both improvements in children's normative school readiness competencies and reductions in maladaptive problem behaviors (Dishion et al., in press; Gardner et al., 2007; Shaw et al., 2006) during a formative developmental period. This effect was even more notable in light of the high levels of stability observed in parenting and child school readiness factors over time.

Parents' Positive Behavior Support

Collectively, these findings and related studies support two major conclusions. The first

conclusion is that a set of positive parenting practices referred to as *positive behavior support* can be readily observed and changed in the context of a brief intervention strategy. The parenting practices we targeted within the rubric of positive behavior support included parental involvement, positive reinforcement, interactive engagement, and the proactive structuring of the child's environment, measured at both macro and micro levels. Note that the stability of parents' positive behavior support was quite high (greater than .8); however, parents randomly assigned to the FCU showed improvement in these critical parenting practices in response to an average of three sessions of intervention activity per year.

How do we know that these increases in parents' positive behavior support were not simply a reaction to a well-behaved and well-regulated child? Prior evidence shows that improvements in parents' use of positive behavior support results in reductions in problem behavior from child age 2 to age 4 (Dishion et al., in press), and the intervention targeted only parenting practices, with no direct intervention activity involving the child. So this outcome leads us to a second important conclusion: that increases in parents' positive behavior support have important, albeit relatively modest in terms of effect size, collateral benefits for children. Children's language skills and inhibitory control were related to parents' baseline levels of positive behavior support, but still demonstrated statistically significant improvements over time associated with increases in parents' positive behavior support. Successfully engaging parents in positive parenting practices, even over a relatively small number of meetings, may help increase the frequency of seemingly mundane parent–child interactions such as conversation and play, which are formative to the development of language and self-regulation (Baldwin, 1995; Baldwin, Markman, Bill, Desjardins, & Irwin, 1996; Hart & Risley, 1995). This finding supports programs based on the notion that parental involvement plays a key role in interventions to

promote school readiness (e.g., Reed et al., 2006). It also suggests the need for future research on how home- and school-based interventions might be integrated to promote children's school readiness through the role of parents' positive behavior support. For example, improving parents' positive behavior support when children are young may serve children's abilities to benefit from educational interventions once they enter the school system.

School Readiness

School readiness is a crucial issue for children at risk, but there has been little evidence to date that early, home-based interventions affect children's school readiness (Brooks-Gunn & Markman, 2005). Moreover, most research on school-related outcomes for socioeconomically disadvantaged children has been in reference to later childhood (Ryan, Fauth, Brooks-Gunn, 2006). The present study begins to address this gap in the literature and opens the door for future research. Theorists point to the need for a more comprehensive measure of school readiness, including language and cognitive skills, behavioral and emotional self-regulation, and socioemotional competence (Shonkoff & Phillips, 2000). Empirical studies are beginning to incorporate these outcomes collectively (see Raver, Gershoff, & Aber, 2007, for an example), and our assessment of school readiness would be improved by additional relevant measures. For example, self-regulation was assessed as behavioral inhibition according to maternal report, but the construct of self-regulation also encompasses emotion regulation, which has been linked to children's success in school (Graziano et al., 2007).

Clearly, we have more to learn about how positive parenting and children's various school readiness skills interact over time during the early childhood years. Our study uncovered another indirect pathway such that parents' positive behavior support at child age 2 promoted children's self-regulation at age 3, which contributed positively to their language skills at age 4.

It is unclear why self-regulation might promote later language skills, but not the reverse, in children at risk. Better regulation may provide children with more opportunities to acquire new linguistic skills and attend to language, particularly in the context of the completion of a structured language interview such as the Fluharty. More comprehensive assessments of these outcomes and more assessment points could help us understand how dynamic interaction processes unfold over time with regard to positive aspects of parent−child interactions and adaptive outcomes such as children's school readiness. The understanding of such processes, essentially the counterpart to the coercive family processes so well delineated in the developmental psychopathology literature, is an essential next step in directing us toward windows of intervention with the highest likelihood of promoting positive change for families and children at risk.

Finally, we have more to learn about relations among children's school readiness, parenting practices, and race and ethnicity for families at risk. In the present study, we used a simple ethnic minority versus non-ethnic minority distinction, partly due to the fact that non-equivalent and small cell sizes for a number of ethnic groups prohibited a complete analysis and interpretation of differences by specific ethnic group. However, previous researchers have found evidence for race- and ethnicity-based differences in observed parenting behaviors and have concluded that the use of a general parenting model across ethnic groups introduces error (Phinney & Landin, 1998; Raver et al., 2007). For example, Brody and Flor (1998) have suggested that African American parents often use no-nonsense parenting strategies that include harsh reprimands and physical punishment along with positive affect. Moreover, research has shown that certain ethnic groups report greater exposure to environmental and individual risk factors than others, yet demonstrate equal or lower levels of vulnerability to risk or morbidity

(Ackerman, Kogos, Youngstrom, Schoff, & Izard, 1999; Bluestone & Tamis-LeMonda, 1999; Wallace & Muroff, 2002; Wilson et al., under review). Hence, this study underscores the importance of addressing ethnic differences in positive parenting practices by exploring positive behavior support in relation to other aspects of parenting (e.g., Ispa et al., 2004) and by understanding the impact of environmental risk on parenting (e.g., Wilson et al., under review).

Future Directions for the Family Check-Up

The effect size of the FCU on change in positive parenting practices was small (d = .24), and the indirect intervention effects on child school readiness were modest (e.g., β = .03). However, these effects remain statistically meaningful in the context of an autoregressive structural equation model accounting for high stability in parenting and child factors over time (leaving little leftover residualized variance with which to estimate intervention effects). Further, they are practically meaningful for a sociodemographically diverse, multisite prevention study employing a brief, randomized, and intent-to-treat design. Other prevention programs targeting change in observed positive parenting practices with high-risk populations have shown larger, though still moderate, effects. For example, DeGarmo et al. (2004) found an effect size of .35 on effective parenting practices at a 12-month follow-up, which dissipated to .20 at 30 months. Brotman et al. (2003) found a medium prevention effect (eta squared = .075) for change in low-income parents' observed, microcoded positive behaviors with young children. However, such programs are more intensive (e.g., the latter was one year), and few to date have investigated effects on school readiness. Thus, in finding that a brief, tailored intervention implemented in an existing service setting shows even small benefits for child competencies it was not specifically designed to alter, this study offers significant promise for how further refinements of the FCU and comparable prevention programs can promote positive parenting practices and children's

developmental health in potentially cost-effective ways for families at risk.

Given the modest, indirect effects of the FCU on children's inhibitory control and language skill, one cannot help but speculate if the FCU could be revised to be more sensitive to these aspects of child development in early childhood. Parent consultants working with families randomly assigned to the intervention noted anecdotally that many of the caregivers seemed depressed and disengaged from their young child, which could make it challenging for these parents to engage in proactive behaviors that would promote their children's language development and inhibitory control. Recent work has shown that the Family Check-Up reduces children's problem behaviors through reductions in maternal depression (Shaw, Dishion, Connell, Gardner, & Wilson, under review), and higher levels of maternal depression have been linked to children's difficulty with school readiness competencies (NICHD ECCN, 1999). Thus, although efforts were made in this intervention to promote positive parenting in general, future versions of the FCU could be refined to specifically target parenting behaviors known to influence children's school readiness competencies, as well as target maternal depression (see Shaw et al., under review, for discussion). For example, we know from the pioneering work of Hart and Risley (1995) that simply increasing the young child's interactive use of words could be of benefit. Similarly, establishing daily family routines in which the child is an integral member could serve the secondary function of promoting self-regulation abilities that would form the infrastructure for successful adaptation to the school environment.

Attrition is another important concern for preventive intervention models with an intent-to-treat design. The FCU was designed to increase parental motivation and engagement through explicit attention and tailoring to parents' own goals and strengths. However, we still experienced attrition, with families in the intervention condition engaging at a rate of 78% at age

2 and 65% at age 3. It is important to remember that although participating families were low-income and high-risk, they were not self-referred nor clinically referred. Thus, we would expect that some of these families would not need assistance with parenting practices, or would not engage in treatment for other reasons. Accordingly, our next task is to better understand what facilitated or prevented parents' engagement in treatment and make efforts to improve engagement rates. We have recently conducted focus groups with participating families and are currently studying determinants of engagement in greater depth.

In conclusion, all intervention trials have strengths and weaknesses and offer critical lessons. The strengths of this study include the large sample size, the economic and cultural diversity of the participating families, the preventive intervention model, the direct observation of parent–child interaction, and the longitudinal design. The weaknesses are evident in hindsight when we consider the study findings, given that the effect sizes are relatively modest. First, the intervention model does not focus specifically on parents' support of children's language development and self-regulation, but focuses more on lower base rate phenomena associated with young children's early behavior problems. Second, we did not more thoroughly measure children's self-regulation or language development by including observational tasks more directly linked to these critical child outcomes. Given what we have learned both collectively and as a function of this study, we support the testing of an early preventive intervention model that focuses more directly on the parenting mechanisms and child behaviors crucial for the child's movement into a trajectory of success, rather than solely the prevention of psychopathology.

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Table 1.

Descriptive Statistics

	M	*SD*	Range	*N*
Parental education	5.19	1.14	2–8	731
Parent involvement, age 2	2.21	0.89	0–3	730
Parent involvement, age 3	2.12	0.97	0–3	642
Positive reinforcement, age 2	0.08	0.07	0–0.48	610
Positive reinforcement, age 3	0.08	0.07	0–0.45	598
Engaged interaction, age 2	0.18	0.09	0–0.53	610
Engaged interaction, age 3	0.18	0.09	0–0.57	598
Proactive parenting, age 2	5.88	1.45	1.33–9	589
Proactive parenting, age 3	6.24	1.51	1.50–9	570
Language skills, age 3	80.51	10.29	67–115	538
Language skills, age 4	88.46	12.67	62–115	552
Inhibitory control, age 2	3.94	0.77	1.40–6.15	655
Inhibitory control, age 3	4.20	0.76	1.46–6.62	645
Inhibitory control, age 4	4.44	0.79	1.17–6.58	614

Table 2.

Bivariate Correlations

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. Treatment group	—															
2. Child gender	.00	—														
3. Child race/ethnicity	.00	.05	—													
4. Parental education	.01	−.03	−.13*	—												
5. Parent involvement, age 2	−.05	.06	−.13*	.12*	—											
6. Parent involvement, age 3	.02	.00	−.13*	.18*	.22*	—										
7. Pos reinforcement, age 2	.00	.00	−.06	.15*	.14*	.18*	—									
8. Pos reinforcement, age 3	.09*	.08	−.13*	.19*	.17*	.25*	.26*	—								
9. Engaged interaction, age 2	−.04	.04	−.20*	.20*	.23*	.23*	.08*	.20*	—							
10. Engaged interaction, age 3	.05	−.03	−.12*	.12*	.18*	.31*	.21*	.12*	.44*	—						
11. Proactive parenting, age 2	−.01	.05	−.14*	.22*	.24*	.24*	.28*	.20*	.29*	.22*	—					
12. Proactive parenting, age 3	.07	.00	−.21*	.22*	.22*	.29*	.17*	.25*	.29*	.29*	.45*	—				
13. Language skills, age 3	−.07	.07	−.10*	.22*	.07	.05	.08	.00	.32*	.06	.18*	.20*	—			
14. Language skills, age 4	.00	.08	−.13*	.25*	.13*	.10*	.13*	.09	.35*	.10*	.28*	.24*	.68*	—		
15. Inhibitory control, age 2	−.02	.13*	.08*	.02	.02	−.03	−.01	.01	.04	.03	.09*	.03	.17*	.15*	—	

16. Inhibitory control, age 3	.05	.15*	.01	.13*	.05	.13*	.15*	.17*	.16*	.10*	.18*	.11*	.15*	.24*	.51*	—
17. Inhibitory control, age 4	.06	.10*	.02	.07	.04	.15*	.15*	.19*	.16*	.13*	.19*	.18*	.14*	.23*	.42*	.52*

* $p < .05$

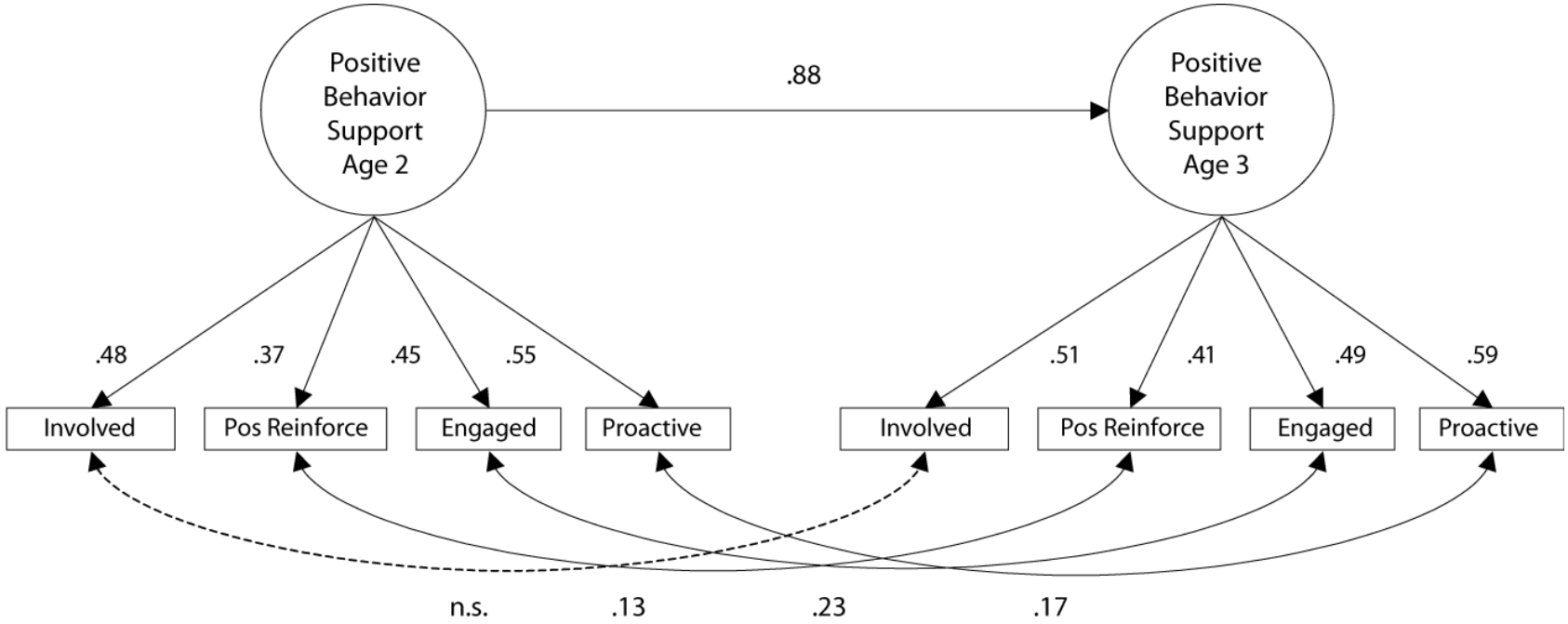
Table 3.

Change Statistics by Intervention Condition

	Age 2 *M(SD)*	Age 3 *M(SD)*	Age 4 *M(SD)*	Δ*M*	Δ*SD*
Intervention Group					
Parents' PBS (latent)	.50(.39)	.60(.44)		+.10	+.05
Child Language Skills		79.65(9.50)	87.74(12.81)	+8.09	+3.31
Child Inhibitory Control		4.24(.75)	4.44(.77)	+.20	+.02
Control Group					
Parents' PBS (latent)	.55(.42)	.50(.42)		-.05	0
Child Language Skills		80.82(11.10)	88.09(12.53)	+7.27	+1.43
Child Inhibitory Control		4.16(.76)	4.36(.81)	+.20	+.05

Note: PBS = Positive Behavior Support

Figures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Positive Behavior Support Age 3
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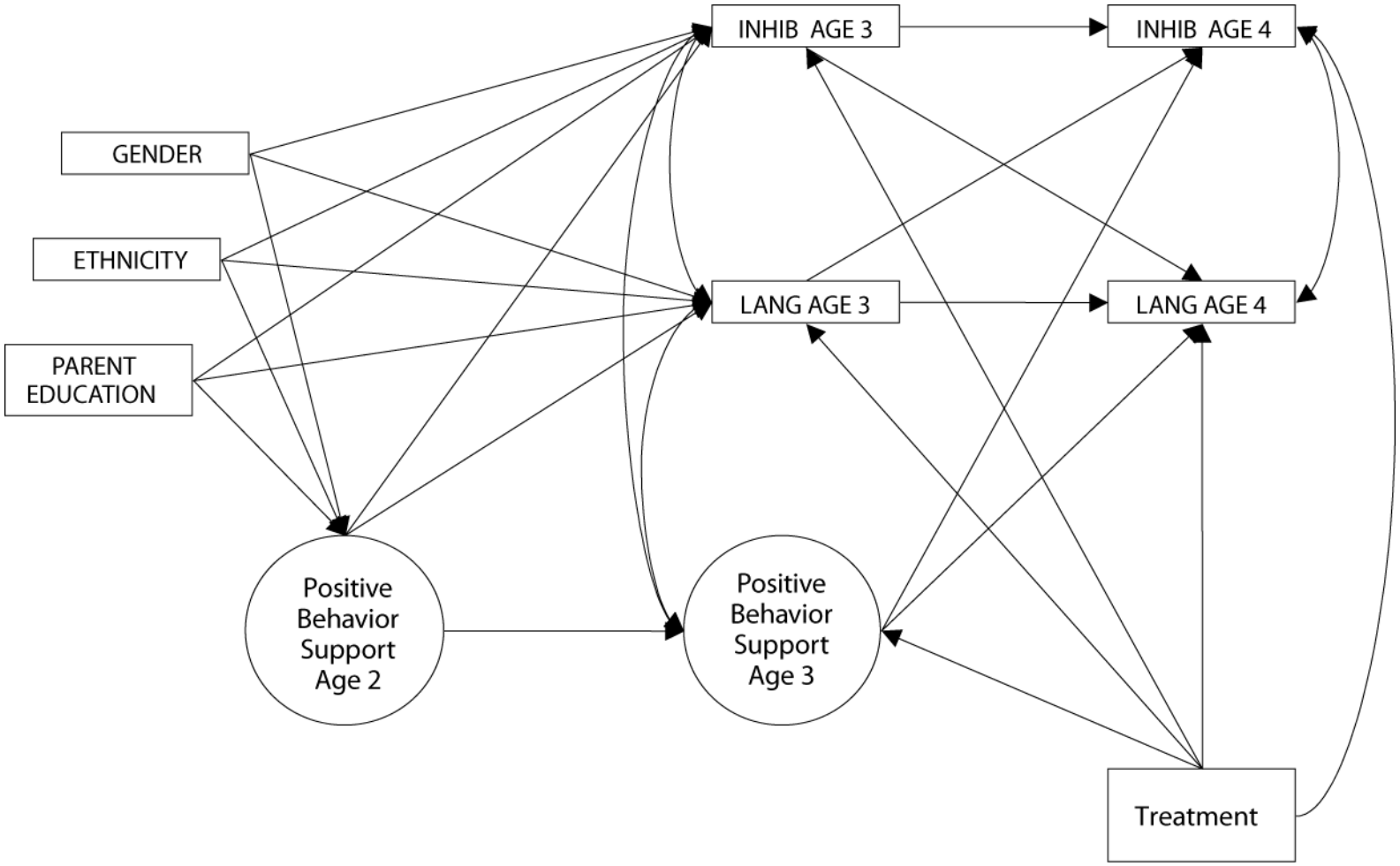
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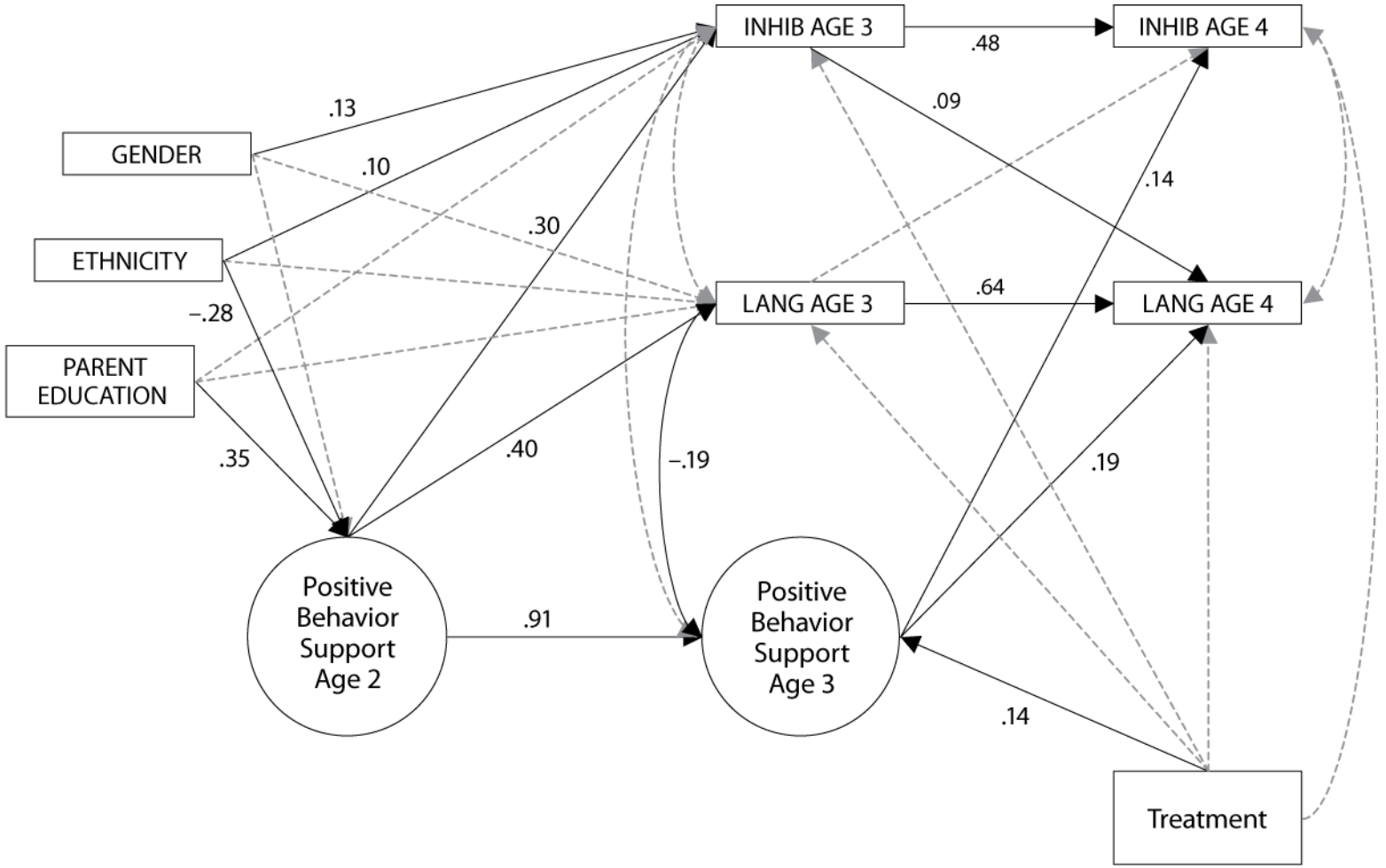
Positive Behavior Support Age 3
Treatment


INHIB AGE 3
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Positive Behavior Support Age 2
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Positive Behavior Support Age 3
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Treatment