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 effects of the Family Check-Up (FCU) on parents’ positive behavior support and growth in children’s inhibitory control and language development 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 improvements in parents’ positive behavior support. High-risk families in the Women, Infants, and Children (WIC) Nutrition Program participated in a multisite intervention study (N = 731) with three yearly assessments beginning at child age 2 years. Parents’ 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, controlling for child gender, ethnicity, and parental education. Findings suggest that a brief, ecological family intervention supporting positive parenting practices can promote key facets of school readiness in children at risk. Key Words: Family Intervention, Prevention, Positive Parenting, School Readiness, Self-regulation

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, parental mental health problems and substance abuse, low birth weight, racial and ethnic discrimination, unsafe neighborhoods, and lack of access to community support services (McLoyd, 1998; Reid & Eddy,

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 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, under review; Shaw, Dishion, Supplee, Gardner, & Arnds, 2006) could also foster school readiness competencies for young children at risk.

Positive Behavior Support as a Change Mechanism

Implicit in this research question was a secondary goal: the testing of parents’ positive behavior support as a mechanism of change in the effects of early 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 (Brotman et al., 2003; Fisher, Gunnar, Chamberlain, & Reid, 2000; Patterson, DeGarmo, & Forgatch, 2004; Shaw et al., 2006; Webster-Stratton et al., 2001) and children’s behavior problems (Fisher et al., 2000; Hutchings et al., 2007; 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 childhood development are influenced through dynamics embedded in the parent–child relationship (Bowlby, 1969; Patterson et al., 1975). However, despite theorizing that parenting plays a causal role, relatively few empirical intervention studies have explicitly tested positive parenting as a causal or mediating mechanism in the examination of treatment effects on child outcomes (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 our longitudinal study by testing how improvement in parents’ positive behavior support in the year following assignment to intervention acted as an indirect mechanism with respect to children’s subsequent school readiness outcomes one year later.

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 skills during early childhood, and thus could serve as a mechanism of change with respect to the development of these skills. 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 developed precisely to provide a link between prevention services and the host of treatment programs available to parents in the form of parent training. A key difference in prevention versus treatment programs is the public health focus and the effort to reach into the community to provide services that support parenting. In our early work in this area it became clear that when families did not seek treatment, they needed an intervention that was both strengths based and motivational. Thus, we designed the FCU as a brief, motivational intervention that would support parents’ existing strengths as well as their engagement in parent training services when needed. The intervention model integrates motivational interviewing (Miller & Rollnick, 2002)
and model-driven, ecological intervention strategies that explicitly target parenting practices known to lead to long-term positive and negative outcomes in children and adolescents (Dishion & Patterson, 1999; Forgatch, 1991). The intervention framework (EcoFIT) is an ecological approach to family intervention and treatment (Dishion & Stormshak, 2007).

Three unique strategies underlie the EcoFIT model in general and the FCU in particular. First, the interventions are adapted and tailored based on an ecological assessment of the child and family. Second, a feedback session is structured to elicit client–therapist interactions that influence change. Third, clients are provided a flexible menu of change strategies to choose from to achieve their goals. The selected menu of services is adapted to caregivers’ motivational contexts and their parenting strengths as revealed by the assessment.

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., in press; Shaw et al., 2006). Further, these increases in positive parenting mediate the impact of treatment on children’s behavior problems (Dishion et al., under review). In recent work with adolescents, the FCU delivered 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, in press). 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. We hypothesized that random assignment to the FCU beginning when children were 2 years old would foster parents’ increased positive behavior support by the subsequent 3-year assessment, which in turn would promote children’s school readiness factors of language skill and inhibitory control at 4 years old, controlling for sociodemographic factors and stability in children’s language and inhibitory control 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 age 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 (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), 13.0% biracial, and 8.9% other races (e.g. American Indian, 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 7.1% 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. For a more detailed breakdown of recruitment and participation demographic data by site, please see Dishion et al. (under review).
Retention. Of the 731 families who initially participated, 659 (90.2%) were available at the one-year follow-up 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. At ages 3 and 4, selective attrition analyses revealed no significant differences by project site, child race, ethnicity, gender, child inhibitory control (parent reports), 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 (n = 40 and n = 32, respectively) and age 4 assessments (n = 58 and n = 53, respectively).

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. Mothers were the primary caregivers in 710 of the 731 families in the sample, whereas in 14 families the father was the primary caregiver and in 7 families another relative acted as primary caregiver (typically a grandmother). 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 subscale of the HOME (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 subscale 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 propery 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 observation 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-ses ion 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).

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 Dr. Dishion. 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 treatment condition, 77.9% participated in the GTKY and feedback sessions at child age 2, 65.4% at age 3, and 65.3% at age 4 (see Dishion et al., under review, for site-specific data). Of those families who met with a parent consultant, 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. The number of treatment sessions at age 2 was unrelated to children’s language and inhibitory control outcome variables at ages 3 and 4. 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, with the four indicators of parents’ positive behavior support (parental involvement, positive reinforcement, engaged interaction, and proactive parenting) listed separately. In observed parent–child interactions, parents spent an average of 8% of the

<table>
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<th>Table 1: Descriptive Statistics</th>
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<th>SD</th>
<th>Range</th>
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<tr>
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<td>10.29</td>
<td>67–115</td>
<td>350</td>
</tr>
<tr>
<td>Language skills, age 4</td>
<td>88.46</td>
<td>12.87</td>
<td>62–115</td>
<td>352</td>
</tr>
<tr>
<td>Inhibitory control, age 2</td>
<td>3.94</td>
<td>0.77</td>
<td>1.40–6.15</td>
<td>655</td>
</tr>
<tr>
<td>Inhibitory control, age 3</td>
<td>4.20</td>
<td>0.76</td>
<td>1.46–6.62</td>
<td>645</td>
</tr>
<tr>
<td>Inhibitory control, age 4</td>
<td>4.44</td>
<td>0.79</td>
<td>1.17–6.38</td>
<td>614</td>
</tr>
</tbody>
</table>
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 proportions 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 expected positive intercorrelations ranging in magnitude from modest to moderate.

**Direct Effects on School Readiness**

We initially examined whether random assignment to the FCU would result in improvements in children’s self-regulation as indexed by the Rothbart Inhibitory Control scale and language development as measured on the Fuhrtary Language 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, $\chi^2 (df = 22) = 51.50, p = .00; CFI = .96; RMSEA = .04; SRMR = .04$. Parents’ positive behavior support was highly stable over time, $\beta = .88$. 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 parent involvement measure, which did not show stability across time.

**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 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 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 and 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, $\chi^2 (df = 54) = 125.72, p = .00; \text{CFI} = .95; \text{RMSEA} = .04; \text{SRMR} = .04$. 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, $\chi^2 (df = 82) = 158.19, p = .00; \text{CFI} = .95; \text{RMSEA} = .04; \text{SRMR} = .04$, 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, $\chi^2/df = 1.57$. 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.

According to our interest in the indirect effects of the FCU on children’s language skill and inhibitory control through parents’ positive behavior support, the effect of treatment on parents’ positive behavior support at age 3 accounting for stability in this factor over time was significant (estimate = .12, $SE = .04$, $\beta = .14$). Thus, families randomly assigned to the FCU intervention showed statistically higher levels of positive behavior support than did controls one year later, despite high stability in this set of observed parenting conditions. The direct effect of treatment 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, $SE = 1.32$, $\beta = .19$), although it was modest. 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 modest 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 children’s 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 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). Post hoc analyses of variance were performed using dummy codes for the EA, AA, and HA racial/ethnic classifications so that in each case, a specific racial/ethnic group was compared with all other groups combined. AA parents demonstrated significantly lower levels of positive parenting at child age 2 with respect to three of the four observed indicators (parent involvement, t(718) = 2.92, p < .01, engaged interaction time, t(562) = 4.63, p < .001, and proactive parenting, t(577) = 3.97, p < .001). There were no significant differences in observed positive reinforcement. Post hoc analyses revealed no significant differences in children’s inhibitory control by race/ethnicity.

**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). The present study confirmed the potential for parents’ positive behavior support to act as a change mechanism in intervention effects on child outcomes, and demonstrated that the FCU improved school readiness in young, low-income children at risk for early-starting conduct problems through its effects on parents’ increased positive behavior support. Notably, we have demonstrated 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 both improve children’s normative school readiness competencies and reduce their maladaptive problem behaviors ( Dishion et al., in press; Gardner et al., under review; Shaw et al., 2006) during a formative developmental period.

**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? We found prior evidence that improvements in parents’ use of positive behavior support resulted in reductions in problem behavior from child age 2 to age 4 ( Dishion et al., under review; Gardner et al., in press; Shaw et al., 2006), and we know that 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 has 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 an 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. 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, effectively 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, post hoc analyses revealed a modest, negative relationship between AA ethnic minority status and parents’ positive behavior support. However, previous researchers have found evidence for race- and ethnicity-based differences in observed parenting behaviors and concluded that the use of a general parenting model across ethnic groups introduces error (Phinney & Landin, 1998; Raver et al., 2007). Brody, Murr, Kim, and Brown (2002) observed that AA parenting, in particular, appears harsh although AA children may perceive such parenting behavior as positive. Brody and Flor (1998) have suggested that AA parents often use no-nonsense parenting strategies that include harsh reprimands and physical punishment along with positive affect. Moreover, other research (Ackerman, Kogos, Youngstrom, Schoff, & Izard, 1999; Bluestone & Tamis-LeMonda, 1999; Wallace & Muroff, 2002) and our own work (Wilson et al., under review) has shown that African Americans report greater exposure to environmental and individual risk factors than do other ethnic groups, yet they share equal or lower levels of respective vulnerability to risk or morbidity. 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 that we are currently assessing in other work (Wilson, et al., under review).
Future Directions for the Family Check-Up
Given the marginally significant 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 two 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 behaviors that would promote their children’s language development and inhibitory control. Although efforts were made in this intervention to promote positive parenting in general, future versions of the FCU could be further refined to specifically target parenting behaviors that would promote children’s language development and self-regulation. For example, we know from the pioneering work of Hart and Risley (1995) that simply increasing the young child’s interactive use of words would 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.

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, in designing our intervention, we did not focus more directly on parents’ support of language development and self-regulation, but focused more on lower base rate phenomena associated with young children’s early behavior problems. Second, largely as a function of our primary focus, 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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