The Family Check-Up with High-Risk Indigent Families: Outcomes of Positive Parenting and Problem Behavior from Ages 2 through 4 Years
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ABSTRACT

Seven hundred thirty-one families receiving services from a national food supplement and nutrition program were screened and then randomized to a brief family intervention. The families were distributed across three types of regions in the United States: metropolitan, suburban, and rural. When the children were ages 2 and 3 years, the families were offered a brief intervention strategy, the Family Check-Up, which included linked interventions tailored and adapted to the families' needs. Assessments were conducted at child ages 2, 3, and 4 years. Latent growth models revealed that for two standard measures of early childhood behavior problems, caregivers in the intervention condition reported decreased levels of behavior problems when compared with the control group. Systematic coding of videotaped home observations at child age 2 and 3 years revealed the reliable and valid measurement of a positive parenting construct that included proactive parenting, positive reinforcement, parent involvement, and engaged parent–child interaction time. Families in the intervention condition improved on all indices of positive parenting; in turn, improvements in positive parenting mediated improvements in children's early problem behavior. These findings suggest the effectiveness of brief family-centered interventions delivered in a public health setting to prevent the early emergence of mental health problems in young children.
(Dishion & Stormshak, 2007). Although the connection between early externalizing symptoms and later antisocial behavior can be first reliably identified at age 3, associations between parenting and adolescent antisocial behavior have been identified as early as child age 2 (Shaw & Gross, in press). Children differ in terms of genetically derived temperaments, and it is clear that the quality of parental response is especially instrumental for establishing long-term development outcomes among vulnerable children. Specifically, we know that among children assessed to be at genetic risk for problem behavior, punitive and harsh parenting practices greatly exacerbated that risk (Casp et al., 2002). Few randomized studies of interventions focus on the family environments of genetically vulnerable children. However, studies of young adults diagnosed with liability for schizophrenia reveal that an emphasis on positive family management reduces the negative affective tone of the family and reduces the incidence and mental health disability associated with the disorder (Fallon et al., 1985).

Thus, it is important to not simply emphasize what parents should not do (e.g., harsh punitive parenting), but to identify and promote positive parenting practices. In early childhood a combination of warm, positive affect and positive family management practices are critical to positive social and emotional development (Shaw et al., 2000). Specifically, attentive involvement with the young child establishes a foundation for understanding the child’s capabilities (Glik, Greaves, Kronenfeld, & Jackson, 1993; Supplee, Unikel, & Shaw, 2007), providing positive support for skill development, and using proactive behavior management (e.g., anticipating problematic situations such as long car rides or transitions from fun to routine activities) (Gardner, 1994; Gardner, Sonuga-Barke, & Sayal, 1999). Positive parenting practices set the tone for productive parent–child relationships in the future, reduced levels of coercive parent–child exchanges, and the willingness to implement parental monitoring practices critical in adolescence (Brown, Mounts, Lamborn, & Steinberg, 1993; Dishion & McMahon, 1998; Gardner, Ward, Burton, & Wilson, 2003).

Central to the emergence of early-childhood behavior problems are weak or disorganized disorganized management practices, which can result in parent negative affect and coercive parent–child interactions. Early-childhood escape conditioning or coercive processes characterized by parents’ unwitting reinforcement of noncompliance with attention, lead to escalations in problem behavior that may eventually spill over to disrupt academic engagement and relationships with peers and teachers (Campbell, Pierce, Moore, Markovitz, & Newby, 1996; Dishion; 1990; Ingoldsby, Shaw, & Garcia, 2001; Shaw, Owens, Vondra, Keenan, & Winslow, 1996). Accordingly, problem behavior in middle childhood as identified by teachers or parents is prognostic of continuity to adolescence, including more-serious antisocial activity (e.g., arrest), substance use, and sexual activity begun between the ages of 11 and 15 (Loeber & Dishion, 1983; Patterson, Reid, & Dishion, 1992; Shaw & Gross, in press). In addition to exacerbating child problem behavior, coercive parent–child interactions and a history of child antisocial behavior often undermine the parent–child relationship (Patterson & Dishion, 1988), making efforts to intervene at later developmental stages more challenging because parents may have “given up” their efforts to influence and socialize their child (Dishion, Nelson & Bullock, 2004; Dishion & Patterson, 1992).

A key early intervention strategy, therefore, is to strengthen the parent–child relationship in early childhood by engaging the parent in positive strategies for managing common toddler problem behaviors (Gardner et al., 1999; 2003; Sanders, 1999). We would expect positive interactions to have a preventive effect on early conduct problems. Consistent with this notion, Pettit and Bates (1989) found increased parent–child play and social contact in the first and second years of a child’s life to be associated with fewer conduct problems at age 4. Similarly, Gardner et al. (1999) found that when parents of toddlers timed their positive interaction strategies to anticipate troublesome situations, the risk of toddler behavior problems was diminished 2 years later. Successfully engaging parents in positive parenting practices may help increase the frequency of seemingly mundane parent–child interactions such as conversation and play, which are formative to language development and self-regulation (Baldwin, 1995; Baldwin, Bill, Desjardins, Irwin, & Markman, 1996; Hart & Risely, 1995).

The mechanisms by which positive parenting practices will reduce child problem behavior include building cooperative parent–child relationships, diverting the child from trouble, reducing the functional utility of coercion, and promoting the child’s development of positive coping skills. We hypothesize that a major advantage of improving family management in early childhood is that it frees the caregiver to focus on the development of positive, self-regulatory abilities in the child. Within this developmental framework, one might see the early emergence of positive behavior management practices and increased parental attention and parent–child verbal interaction time as proximal targets in the prevention of early onset behavior and affective difficulties in young children.

**Family Interventions**

If a small subset of children has the highest rate of
problem behavior and psychopathology within a community and these risk factors can be reliably identified in early childhood, intervention programs logically would prioritize these children’s families. If effective, the prevention efforts would improve parent–child interactions and reduce risk among the most vulnerable youth, on a variety of adjustment indices. The Family Check-Up (FCU) intervention specifically targets family management practices in early childhood to reduce and prevent later problem behavior and focuses on parenting factors and variables found to compromise parenting quality (e.g., temperament, parental well being) that have also been shown to be directly related to trajectories of persistent problem behavior. The term family management describes a collective set of parenting skills known to be highly related to child success (Bullock & Forgatch, 2005; Forgatch, Bullock, & Patterson, 2004; Patterson, 1982; Patterson et al., 1992).

That family-centered strategies are effective for reducing problem behavior is strongly supported in the treatment and prevention science literatures across developmental periods (e.g., Brody et al., 2004; Conduct Problem Research Prevention Group, 2002; Dishion & Patterson, 1992; Eddy & Chamberlain, 2000; Forgatch & DeGarmo, 1999; Henggeler et al., 1998, Kazdin, 2003; Liddle, 1999; Sanders, 1999; Spoth, Redmond, & Shin, 1998), including early childhood (Brinkmeyer & Eyberg, 2003; Olds et al., 1997; Olds, 2002; Webster-Stratton, 1990). Family-centered interventions have undergone a critical shift in the past 20 years, moving from a treatment model that is delivered to clients in clinic settings to a prevention model involving proactive recruitment of parents to engage in interventions in home and community settings such as schools, daycare, and community support services (Gardner, Burton, & Klimes, 2006; Hutchings et al., 2007; Shaw, Dishion, Supplee, Gardner, & Arnds, 2006).

It is not difficult to argue that the earlier one intervenes with a family, the easier it is to make significant developmental changes and reduce the likelihood of early-starting conduct problems and later drug-use risk. There are three reasons for the early intervention hypothesis. First, early interventions target the child behavior before more-serious forms of antisocial behavior develop. Noncompliant and oppositional behavior is easier to remediate than are lying, stealing, and proactive aggression. One reason for targeting behavior early is that the child’s ecology expands with development, moving from home into school and neighborhood settings that are less predictable and that involve relationships with teachers (Pianta, Steinberg, & Rollins, 1995) and same-age and older peers (Dishion, Duncan, Eddy, Fagot, & Fetrow, 1994; Ingoldsby & Shaw, 2002). Eventually, peers transform reactive aggression into proactive aggression and support other forms of negative behavior (Poulin & Boivin, 2000). By adolescence, peers become a powerful context within which delinquency, drug use, and sexual experimentation are embedded (Capaldi, Crosby, & Stoolmiller, 1996; Dishion & Owen, 2002; French & Dishion, 2003; Patterson, Dishion, & Yoeger, 2000). Thus, family interventions initiated in early childhood are more likely to meet the objective of preventing a variety of early behavior problems. The second advantage of early intervention is that parents are probably younger and have undergone fewer development transitions themselves, including having multiple children and multiple partner transitions, and likely engage in fewer high-risk behaviors that compromise their own health. In particular, divorce and remarriage have disruptive effects on the parent–child relationship and child adjustment, and although these transitions can be opportune times to intervene (e.g., Martinez & Forgatch, 2001), it certainly would be better to prevent their occurrence in the first place. Early interventions by Olds and colleagues not only reduced the number of caregiver relationship transitions, but also the number of ensuing children (Olds et al., 1997; Olds, Hill, Robinson, Song, & Little, 2000).

Third, the sense of optimism a caregiver has regarding the possibility of parent–child relationship change is much higher in their offspring’s early childhood. As noted earlier, parents’ motivation to change may be significantly reduced after years of predominantly acrimonious interchanges with a child, compared with when they are parents of toddler-age offspring. We found that parents of older children were more likely to drop out of behavioral family therapy treatment (Dishion & Patterson, 1992). In the FCU model, only 25% of the parents of adolescents engaged in the intervention (Connell, Dishion et al., in press), whereas over 75% of families in early childhood trials engaged in the FCU (Shaw, Dishion et al., 2006).

The empirical evidence for the effectiveness of family-centered interventions in early childhood is impressive. The pioneering work of Webster-Stratton and colleagues is exemplary. By using videotaped examples and systematic, behavioral therapy–based parenting skills that build a productive parent–child relationship and improve family management, significant improvements have been observed and replicated (e.g., Webster-Stratton & Taylor, 2001). In the family management model, the interventions are offered in a group format, and caregivers’ discussions about the videotaped examples are a compelling source of change.

**The EcoFIT Treatment Model**

Despite these promising findings, current forms of
empirically supported family interventions arguably require more efficient and brief interventions that can be rolled out into service delivery systems that have contact with large numbers of children and families. The ecological approach to family intervention and treatment (EcoFIT) was originally designed to address those challenges relevant to young adolescents (Dishion & Kavanagh, 2003). The intervention is “ecological” in that it is designed to improve children’s adjustment across settings (home, school, neighborhood) by motivating positive parenting practices and involvement in those settings. A key feature of the intervention is that it is assessment driven and tailored to the needs of youth and families as revealed by family observations, assessments in extrafamilial contexts (e.g., schools), and reports from important individuals in the child’s life (e.g., parents, teachers, youth when of age), and that typically, intervention is brief.

The application of the EcoFIT model to early adolescence has produced promising results. Using an intention to treat design and individual-level random assignment of 6th grade students to either middle school as usual or middle school with FCUs, we found that by the first year of high school those in the latter condition either reduced their drug use or were prevented from beginning substance use (Dishion, Kavanagh, Schneiger, Nelson, & Kaufman, 2003). Moreover, among the highest risk youth we found that reduction in marijuana use was mediated by improvements in observed parental monitoring (Dishion, Nelson, & Kavanagh, 2003). Recently, Connell, Dishion, Yasui, & Kavanagh (in press) used a mixture modeling strategy to incorporate engagement into the analysis of intervention effectiveness and found that the highest risk families engaged more consistently in the FCU than did lower risk families, and involvement with the intervention was associated with reduced risk of antisocial behavior, marijuana use, and police reports of arrests.

In pilot work leading to this study, we applied the FCU intervention to high-risk families of toddlers involved in the Women, Infants, and Children program (WIC), a national program for family nutrition supplement and support. We randomly assigned 120 families of toddlers to either WIC as usual or WIC with one FCU at child age 2 and found that the intervention reduced subsequent problem behavior and improved parent involvement at child ages 3 and 4, respectively (Shaw et al., 2006). Moreover, videotaped home observation sessions showed that random assignment to the FCU had resulted in improvements in caregivers’ use of proactive parenting practices and reduced child negative behavior (Gardner, Shaw, Dishion, Burton, & Supplee, 2007, in press). These findings generally fit with those of two dissertation projects that used the FCU with families with toddlers and revealed improved parenting and reduced child problem behavior (Jones, 2004; O’Leary, 2000).

The WIC study of the FCU was limited in terms of sample size, intervention services offered to the families, and use of only male children from an urban community. Our current study, referred to as the Early Steps Multisite Study, remedies these limitations. First, the sample includes 731 at-risk families; half were randomly assigned to the FCU/EcoFIT intervention and the remainder to WIC as usual. Second, the families were recruited from three geographically and culturally diverse regions, including metropolitan Pittsburgh, Pennsylvania, suburban Eugene, Oregon, and rural Charlottesville, Virginia. The sample also reflects cultural diversity, including African American, European American, and Latino families. Third, we used the entire EcoFIT model in that families were provided additional services following the FCU, consistent with an adaptive, tailored approach to intervention. We examined outcomes on parent reports of child problem behavior and direct observations of positive parenting practices, including positive reinforcement, proactive parenting, parent involvement, and joint-attention verbal interaction. In this study, we hypothesize that families at high risk involved in WIC and randomized to the EcoFIT would:

1) Report reductions in problem behavior from child age 2 through age 4 years, compared with control families;
2) Show increases in caregiver involvement and direct observations of positive parenting practices at child age 2 and 3, compared with control participants;
3) Show that reductions in problem behavior would be mediated by improvements in positive parenting practices, as measured by home visitor ratings and direct observations of parent-child interaction.

**Method**

**Participants**

Participants included 731 mother–child dyads recruited between 2002 and 2003 from WIC programs in the metropolitan areas of Pittsburgh, Pennsylvania, and Eugene, Oregon, and within and outside the town of Charlottesville, Virginia. Families were contacted at WIC sites and invited to participate if they had a son or daughter between age 2 years 0 months and 2 years 11 months, following a screen to ensure that they met the study criteria by having socioeconomic, family, and/or child risk factors for future behavior problems. Risk criteria for recruitment were defined at or above one standard deviation above normative averages on
several screening measures in the following three domains: (a) child behavior (conduct problems, high-conflict relationships with adults), (b) family problems (maternal depression, daily parenting challenges, substance use problems, teen parent status), and (c) socio-demographic risk (low education achievement and low family income using WIC criterion). Two or more of the three risk factors were required for inclusion in the sample.

Recruitment. As shown in Figure 1 and in Table 1, of the 1666 families who had children in the appropriate age range and who were contacted at WIC sites across the three study sites, 879 met the eligibility requirements (52% in Pittsburgh, 57% in Eugene, 49% in Charlottesville) and 731 (83.2%) agreed to participate (88% in Pittsburgh, 84% in Eugene, 76% in Charlottesville). The children in the sample had a mean age of 29.9 months ($SD = 3.2$) at the time of the age 2 assessment.

Of the 731 families (49% female), 272 (37%) were recruited in Pittsburgh, 271 (37%) in Eugene site, and 188 (26%) in Charlottesville. Across sites, primary caregivers self-identified as belonging to the following ethnic groups: 28% African American, 50% European American, 13.0% biracial, and 9% other groups (e.g., American Indian, Native Hawaiian). Thirteen percent of the sample reported being Hispanic American. During the 2002 to 2003 screening period, 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$). 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%) were available at the one-year follow-up and 619 (85%) participated at the two-year follow-up when children were between 4 and 4 years 11 months old. At ages 3 and 4, selective attrition analyses revealed no significant differences in project site, children’s race, ethnicity, or gender, levels of maternal depression, or children’s externalizing behaviors (parent reports). Furthermore, no differences were found in the number of participants who were not retained in the control versus the intervention groups at both ages 3 ($n = 40$ and $n = 32$, respectively) and 4 ($n = 58$ and $n = 53$), respectively.

Measures

Demographics questionnaire. A demographics questionnaire was administered to the mothers during the child age 2, 3, and 4 visits. This measure included questions about family structure, parental education and income, parental criminal history, and areas of familial stress.
Maternal depression. We used a brief but valid indicator of adult depression referred to as the Center for Epidemiological Studies on Depression Scale (CES-D; Radloff, 1977). The CES-D is a well-established and widely used 20-item measure of depressive symptomatology that was administered to mothers at the child age 2 and 3 home assessments. Participants report how frequently they have experienced the listed depressive symptoms during the past week on a scale ranging from 0 (less than a day) to 3 (5–7 days). Items are summed to create an overall depressive symptoms score. For the current sample, internal consistencies were .76 and .75 at the age 2 and 3 assessments, respectively.

Early childhood problem behavior. The Child Behavior Checklist for Ages 1.5–5 (CBCL; Achenbach & Rescorla, 2000) is a 99-item questionnaire that assesses behavioral problems in young children. Mothers completed the CBCL at the child ages 2, 3, and 4 home assessments. The CBCL includes one broad-band factor that assesses externalizing symptoms, Externalizing, which was used as the primary outcome measure in our study. Internal consistencies for Externalizing were .86, .89, and .86 at ages 2, 3, and 4, respectively, in the current study.

At child age 2, 3, and 4 assessments, we administered the Eyberg Child Behavior Inventory, a widely used 36-item measure of early childhood problem behavior (Robinson, Eyber, & Ross, 1980). The Eyberg includes two factors that focus on the perceived intensity of a behavior and degree to which the behavior is a problem for caregivers. Because the Intensity factor is similar in content and structure to the CBCL Externalizing factor, for our study we focused on the Problem factor, which asks caregivers to use a 7-point scale to report the extent to which the behavior is a problem for the parent. The inventory has been demonstrated to be highly correlated with independent observations of children’s behavior, to differentiate clinic-referred and nonclinic populations (Robinson et al., 1980), and show high test–retest reliability (.86) and internal consistency (.98) (Webster-Stratton, 1985). In our study, internal consistencies for the Problem factor were .84, .90, and .94 at ages 2, 3, and 4, respectively.

Procedures

Assessment protocol. Parents (i.e., mothers and, if available, alternative caregivers such as fathers or grandmothers) and children 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), which began with the child being approached by an adult stranger (i.e., undergraduate videographer), each primary caregiver and child participated in a cleanup task (5 minutes), followed by a delay of gratification task (5 minutes), four teaching tasks (3 minutes each, with the last task being completed by alternate caregiver and child), a second free play (4 minutes), a second cleanup task (4 minutes), the presentation of two inhibition-inducing toys (2 minutes each), and a meal preparation and lunch task (20 minutes). The exact home visit and observation protocol was repeated at age 3 and 4 for both the control and intervention groups. Families received $100 for participating in the age 2 home visit. Families were reimbursed $120 at the age 3 assessment and $140 at the age 4 assessment.

The randomization sequence was computer generated by a staff member who was not involved with recruitment. Randomization was gender balanced to ensure an equal number of males and females in the control and intervention subsample. To ensure that the randomization was blinded, the examiner opened a sealed envelope, revealing the family’s group assignment only after the assessment was completed, and shared this information with the family. Examiners carrying out follow-up assessments were not informed of families’ randomly assigned condition.

Relevant to this study, we present maternal reports of child externalizing problems from age 2, 3, and 4 assessments and direct observations of parent–child interaction from the child age 2 and 3 assessments. Coding of family assessment videotapes was completed for ages 2 and 3 to test the hypothesis of a link between improvements in positive parenting in response to the intervention and change in young children’s problem behavior.

Coding of videotaped parent–child interactions. A team of undergraduates coded the videotaped family interaction tasks using the Relationship Process Code (RPC; Jabson, Dishion, Gardner, & Burton, 2004) (average team RPC percent agreement = .87, kappa = .86). The RPC is a third-generation code derived from the Family Process Code (Dishion, Gardner, Patterson, Reid, & Thibodeaux, 1983) used extensively in previous research. After coding each family interaction, coders completed a coder impressions inventory regarding proactive and positive parenting practices, for the purpose of this research study. All family interaction tasks were evaluated in the scoring of positive parenting practices. In addition, the home visitors’ ratings of parent involvement with the young child were used as another indicator of the positive parenting construct.

In detail, the following items were entered into the positive parenting scores:

1) Parent Involvement. This measure is based on the home visitor’s rating of the parents’ involvement using
the following items from the Home Observation for Measurement of the Environment inventory (Bradley, Corwyn, McAdoo, & Garcia Coll, 2001): “Parent keeps child in visual range, looks at often”; “Parent talks to child while doing household work”; “Parent structures child’s play periods.”

2) Positive Behavior Support. This measure is based on videotape coding (durations) of caregivers prompting and reinforcing young children’s positive behavior as captured in the following RPC codes: positive reinforcement (verbal and physical), prompts and suggestions of positive activities, and positive structure (e.g., providing choices in a request for behavior change).

3) Engaged Parent–Child Interaction Time. This score reflects the average length of parent–child sequences involving talking or physical interactions such as turn taking or playing a game. Thus, the average duration of episodes that included consecutive parent–child exchanges involving RPC codes such as Talk and Neutral Physical Contact were used to define these episodes.

4) Proactive Parenting. Videotape coders rated each parent on his or her tendency to anticipate potential problems and to provide prompts or other structural changes to avoid young children becoming upset and/or involved in problem behavior on the following six items: 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 (alpha = .835).

**Intervention protocol: The 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 experimental and control conditions), the assessments were completed before random assignment results were known to either the research staff or the family. Thus, for the purpose of research studies only, the sequence of contacts comprised an assessment (baseline), randomization, an initial interview, a feedback session, and possibly follow-up sessions. Families were given a gift certificate for $25 for completing the FCU at the end of the feedback session, which 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 with and supervision of their child. The second session was an initial interview with the parent consultant, during which the 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 summarized the results of the assessment using motivational interviewing strategies. An essential objective of the feedback session is to explore the parents’ willingness to change problematic parenting practices, to support existing parenting strengths, and to identify services appropriate to the family needs. The parent was also offered follow-up sessions that focused on parenting practices, other family management concerns (e.g., coparenting), and contextual issues (e.g., child care resources, marital adjustment, housing, 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 of whom had previous experience in carrying out family-based interventions but at the study’s outset, had no experience in using the FCU. The consultants were initially trained for 2.5–3 months using a combination of strategies, including didactic instruction and role playing, followed by ongoing videotaped supervision of intervention activity. Before working with study families, parent consultants were initially certified by lead parent consultants at each site who had been certified by the intervention developer (Dishion). Certification was established by reviewing videotapes of feedback and follow-up intervention sessions to evaluate whether the parent consultants were competent in all critical components of the intervention as described later in this article. This process, which is repeated yearly to reduce drift from the intervention model, adheres to the methods of Forgatch, Patterson, & DeGarmo, (2005), in which it was revealed 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 pos-
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 initial interview and feedback sessions at child age 2 and 65.4% at child age 3 (see Table 1 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 child age 3, including the initial interview and feedback as two of those sessions. We also tested whether the number of sessions parents had with parent consultants was related to CBCL Externalizing or Eyberg Problem factor scores at child ages 3 or 4, examining correlations between number of sessions at age 2 in reference to maternal reports of problem behavior at age 3, and number of sessions at age 3 in relation to reports of problem behaviors at age 4. In previous research using the FCU with toddlers, no associations between treatment sessions and later problem behavior were found (Shaw et al., 2006). In the current analyses, initial correlations revealed a pattern of modest positive associations between number of sessions and later problem behavior. At age 3, correlations with both child outcomes were nonsignificant trends (both $r = .10$, $p < .10$). In relation to the number of sessions at age 3, correlations with age 4 child behavior also were positive, albeit modest, $r = .086$ (ns) for CBCL Externalizing, and $r = .093$ ($p < .10$) for Eyberg Problem. However, when initial levels of child problem behavior were accounted for using partial correlations, none of the four correlations remained statistically reliable (i.e., all with $p$ levels > .10. For all analyses below, we use an intention to treat design, including in all analyses the 22.1% of families assigned to the intervention group who did not participate in the FCU.

### Results

Descriptive statistics for all variables are shown in Table 2. For ease of interpretation, we present t-scores on the Eyberg and CBCL measure, although raw scores were used for models to avoid potential age and gender corrections. The percentage of the respondents in the clinical range on these measures at each age is also presented in Table 2. In terms of validating children’s problem behavior status, for both the CBCL Externalizing and Eyberg Problem factors, mean scores were approximately one standard deviation above normative scores at age 2. Using the borderline clinical cutoff of the 90th percentile for the CBCL, 48.6% of children were reported to have clinically elevated scores on the Externalizing factor at age 2. This percentage was reduced over time to 24% at age 4.

Correlations for problem behavior variables from
age 2 to 4 are shown in Table 3, and correlations for positive parenting variables from age 2 to 3 are shown in Table 4. It is important to note that no significant associations were found between treatment group and child gender or ethnicity, levels of maternal depressive symptoms, or any type of child problem behavior at age 2, suggesting that randomization was successful. Modest to moderate associations were consistently found among the observed indicators of positive parenting. In addition, modest but significant negative associations were found between ethnicity and dimensions of positive parenting, with African American mothers observed to show lower levels than European American mothers.

The central analyses tested the following hypotheses: 1) that random assignment to a family-centered intervention would result in reductions in the frequency of externalizing problems and those problems being perceived as problematic by mothers, 2) that intervention would also result in improvement in parenting practices, and 3) that reduction in the frequency of externalizing symptoms and those symptoms that were a problem for mothers would be mediated by improvements in parenting. All analyses were conducted using Mplus 4.1 and used full information maximum likelihood estimation (Muthén & Muthén, 2004), which provides a method for accommodating missing data by estimating each parameter using all available data for the estimation of that specific parameter.

**Hypothesis 1: Problem Behavior in Early Childhood**

Hypothesis 1 was tested with two latent growth models that examined the effect of intervention on the rate of change from child age 2 to age 4 in mother-reported problem behaviors from the Eyberg Child Behavior Inventory and externalizing problems from the CBCL. Raw scores were used from each scale to avoid corrections for age and gender related to the use of norm-based scores on these measures. We used an intention to treat design to represent random assignment to the intervention as a dichotomous variable (0 = control, 1 = intervention).

The model for the Problem Behavior scale from the Eyberg inventory provided excellent fit to the data ($\chi^2 [df = 3] = .52, p = .91; CFI = 1.00; RMSEA = .00; SRMR = .001$). The model yielded significant intercept (estimate = 14.22, $SE = .24$) and slope values (estimate = -.49, $SE = .24$), as well as significant residual variance in the intercept (estimate = 23.70, $SE = 3.33$) and slope parameters (estimate = 12.75, $SE = 1.93$). The effect of intervention on the rate of change in problem behavior was significant (estimate = -.71, $SE = .32$; $\beta = −.10$). Figure 2 provides the summary of the findings for the Eyberg Problem Behavior score. As can be seen in the figure, the effect of the intervention was significant, with the rate of change in problem behavior decreasing more rapidly in the intervention group compared to the control group.

**Figure 2.** Change from age 2 through 4 years on the Eyberg measure of child problem behavior (ITT).
seen, for the randomly assigned control group, there was more growth in problem behavior in the control group compared with the intervention group.

The model for the externalizing scale from the CBCL also provided excellent fit to the data ($\chi^2$ [df = 3] = 6.01, $p = .11$; CFI = .99; RMSEA = .04; SRMR = .02). The model yielded significant intercept (estimate = 20.63, SE = .11) and slope values (estimate = −2.00, SE = .22), as well as significant residual variance in the intercept (estimate = 41.57, SE = 3.82) and slope parameters (estimate = 11.24, SE = 1.79). The effect of intervention on the rate of change in problem behavior was significant (estimate = −.82, SE = .29; β = −.12), with more growth in problem behavior in the control group.

Two additional series of models examined possible gender and ethnicity differences in the effect of intervention on the rate of change in problem behavior. First, to examine possible gender differences in the effect of intervention, we examined the fit of a two-group model, comparing results for males and females. The difference in the chi-square value across a model with all paths constrained to be equal across genders and a model allowing the intervention effect to vary by gender was found to be nonsignificant for both the Eyberg Problem Behavior ($Δ\chi^2$ = 1.60, $Δdf$ = 1, ns) and the Externalizing Behavior Problem scales ($Δ\chi^2$ = 2.21, $Δdf$ = 1, ns), indicating that the intervention effect did not vary by gender.

Possible ethnicity differences in the effect of intervention were also examined by comparing the fit of models constraining all paths to be equal for European American and ethnic minority families with models allowing the intervention effect to vary across ethnicity groups. The difference in the chi-square value across a model with all paths constrained to be equal across ethnicity groups and a model allowing the intervention effect to vary by ethnicity was found to be nonsignificant for both the Eyberg Problem Behavior ($Δ\chi^2$ = 0.85 $Δdf$ = 1, ns) and the Externalizing Behavior Problem scales ($Δ\chi^2$ = 2.52, $Δdf$ = 1, ns), indicating that the intervention effect did not vary by ethnicity. In light of the nonsignificant differences in the effects of intervention across either gender or ethnic groups, no further differences in effects across groups were explored.

**Hypothesis 2: Observations of Positive Parenting Practices**

To test Hypothesis 2, we examined the measurement model for the positive parenting construct, which included the following indicators: (a) home visitor ratings of parent involvement, (b) direct observations of positive behavior support (positive reinforcement, positive prompting, and structuring), (c) direct observation of the engaged parent–child interaction time (parent–child interaction time), and (d) coder impressions of proactive parenting. We examined simultaneously the convergent validity of these indicators of parenting and the stability and the intervention effect, as shown in Figure 3. Factor loadings were constrained to be equal across ages 2 and 3. Figure 3 shows that the four indicators formed a coherent construct and were highly stable from age 2 to 3 (beta = .81). Despite the high stability, random assignment to the intervention resulted in statistically reliable improvements in observed positive parenting. The model shown in Figure 3 provides a good fit to the data ($χ^2$ [df = 26] = 32.48, $p = .18$; CFI = .99; RMSEA = .02; SRMR = .04).

**Hypothesis 3: Positive Parenting and Child Problem Behavior**

![Figure 3. Positive parenting: Stability and intervention effect.](image-url)
For Hypothesis 3, mediator analyses examined the indirect effect of intervention on the rate of change in problem behaviors through the effect of intervention on maternal symptoms at child age 3. The basic mediation model is shown in Figure 4. For ease of interpretation, these results are shown in Figures 5 and 6. In both models, the slope of problem behaviors was regressed on age 3 positive parenting and intervention status, while positive parenting at child age 3 was regressed on intervention status, the initial level of child problem behaviors, and positive parenting at child age 2. Thus, this model tests whether intervention is related to the change in positive parenting from child age 2 to 3, and whether this change in positive parenting, in turn, predicts the rate of change in child behavior problems from age 2 to 4, controlling for the direct effect of intervention. A statistical test of the significance of the indirect effect from intervention to the change in maternal symptoms to the rate of change in problem behavior 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).

As shown in Figure 5, the model for externalizing problem behavior from the CBCL provided reasonable fit to the data by most indices of model fit ($\chi^2 [df = 66] = 88.85, p = .04; CFI = .98; RMSEA = .02; SRMR = .04$), and the nonsignificant chi-square may be related to the large sample size. In this model, the direct effect of intervention on the problem behavior slope was not significant with maternal symptoms included in the model. Treatment significantly predicted improvements in positive parenting from child age 2 to 3. More positive parenting predicted less growth in problem behavior. The indirect effect from intervention to more positive parenting to decreased growth in problem behavior was statistically significant, although small in magnitude, indicating a significant partial mediation effect of positive parenting.

As shown in Figure 6, the model for problem behavior from the Eyberg Child Behavior Inventory provided reasonable fit to the data by most indices of model fit ($\chi^2 [df = 66] = 89.45, p = .03; CFI = .98; RMSEA = .02; SRMR = .04$), and the nonsignificant chi-square may be related to the large sample size. The direct effect of intervention on the problem behavior slope was not significant with positive parenting in the equation. The family-centered intervention significantly predicted improvements in positive parenting from child age 2 to 3. More positive parenting

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**Figure 4.** Basic mediation model: Test indirect path from treatment to child age 3 years positive parenting to slope in problem behavior.

**Figure 5.** Mediation model: Externalizing.
predicted less growth in problem behavior in early childhood. The indirect effect from intervention to more positive parenting to less growth in problem behavior was statistically reliable.

Discussion
These data support the hypothesis that a brief, adaptive, and tailored approach to supporting positive parenting practices can prevent the growth of problem behavior in young children at a critical two-year period in development (ages 2, 3, and 4). Moreover, reduction in growth of early childhood problem behavior was associated with improvement in positive parenting practices from child age 2 to 3. Although the effect size is small at this time, the possible public health significance of this finding is clear: A relatively small effect size applied to a large population can result in rather large benefits to the overall mental health community, by reducing the number of early-onset and persistent offenses and early-onset drug abuse (Biglan & Taylor, 2000). The cost of these problem behaviors, considered together, is enormous (Miller, 2004).

It is worth noting that the risk of early-onset antisocial behavior in this sample is considerable. In earlier research we found that early-onset externalizing problems could be predicted by a combination of maternal depression and active, fearless temperament when children were age 2 (Shaw et al., 2006). We in fact screened the population in this study to include mothers and children with multiple risk factors, including maternal depression and child temperament and behavior problems. Therefore, our ability to effectively engage families, briefly intervene to promote positive parenting, and reduce growth in problem behavior has three major implications.

First, the EcoFIT model is general and the FCU in particular are promising strategies that can be used as an inexpensive intervention in service settings that involve a large number of families at high risk. The WIC venue is especially suitable because its primary goal is to promote the health of young children age 0 to 5. Low-income families in need of nutritional and financial support could also be offered cost effective parenting services that, for many, could have substantial benefits in the long-term reduction of risk. Although it is certainly true that many of the families would benefit from or require more support than the FCU can provide, the use of assessments to target and focus treatment services significantly reduces the cost of the services and improves the engagement of families at high risk (Dishion & Stormshak, 2007). Communities concerned about promoting the behavioral health of children and ensuring school readiness could use WIC as a venue for empirically supported prevention practices.

Second, this study provides an important addition to a sparse literature on intervention mechanisms (Weersing & Weisz, 2002), by showing that even a brief, individually tailored intervention that typically involves limited opportunity for skills training effectively mediates change in positive parenting style and skill. Other studies finding this effect have used considerably longer interventions that involved more extensive behavioral skills training (Martinez & Forgatch, 2001; Gardner et al., 2006; Gardner, Hutchings, & Bywater, 2007).

Third, the sample studied was diverse with respect to both gender and ethnicity. As previously stated, a unique advantage of the adaptive, tailored EcoFIT family intervention is that it is flexibly delivered and responsive to a wide variety of families and children. Indeed, we found no significant differences among our study’s ethnic groups in terms of engagement or effectiveness of the intervention. Nevertheless, given our experience with diverse families, it is important to consider further improvements in the intervention model’s capacity to meet the needs of a wide variety of...
of families. For example, many minority families in the United States deal with challenges such as acculturation stress, discrimination, or simply maintaining cultural strengths and coherence in the face of a dominant, majority community. We are currently developing a broader assessment menu that will enable assessment of the strengths and needs of families of various ethnicities that is relevant to factors such as racial socialization and cultural resilience (Yasui & Dishion, in press). Presently, however, it is reassuring that the flexibility of the EcoFIT approach and the FCU delivered by a culturally sensitive therapist is helpful to majority and minority families.

This study’s findings corroborate results from the broader literature on the effectiveness of preventive interventions aimed at reducing child conduct problems in early childhood among families at high risk (Baydar, Reid, & Webster-Stratton, 2003; Olds, 2002). The findings also provide additional support for the effectiveness of the FCU in general (Gonnell et al., in press; Dishion, Nelson, & Kavanagh, 2003) and its application to high-risk families during the toddler period. In an earlier study with a smaller sample of toddler-age boys from an urban community, we found that one session of the FCU reduced subsequent child externalizing problems and increased positive parenting and parental involvement (Gardner et al., in press; Shaw et al., 2006). The results of our current study suggest that a repeated FCU session engenders more consistent improvements in child behavior and parenting outcomes with a larger and more ethnically diverse sample of boys and girls followed from ages 2 to 4.

Limitations
Our study has methodological limitations that merit consideration. First, although we presented evidence to suggest that the FCU is associated with improvements in child problem behavior and positive parenting, effect sizes, albeit meaningful from a public health perspective, were relatively modest (ds ranged from .18 to .19. There are two reasons for the small effect sizes. First, although families in the study were at high risk, many of them were actually doing well when evaluated with standardized measures of child problem behavior and direct observation. Therefore, a change was not expected or induced. Second, we suspect that for those families with more serious difficulties that do not change, two patterns of core issues are basic to the family disruption. One is the caregivers’ affective adjustment, usually depression as a function of having several young children under conditions of poverty. The other is a history of maternal trauma that underlies both the depression and the poverty conditions of the family. Psychosocial interventions such as EcoFIT will have limited impact in some contexts and conditions, and these conditions require attention at the broader level of the community and the nation. However, we believe the EcoFIT model can be helpful for some caregivers in affective distress (Shaw, Connell, Dishion, Wilson, & Gardner, under review), and we plan to further develop this component of the intervention model following principles derived from evidence-based practices that target depression, dissociation, and anxiety secondary to difficult circumstances and history.

A second limitation of the study is that at this age we have only one reporting agent to address the clinical significance of the child’s problem behavior. Because participation in the intervention group might have biased later maternal reports of child behavior, it would have been more optimal to have had a second informant of child behavior. Such data will be forthcoming from teachers in the coming years. How well a child adapts to the public school environment is a key test of the overall benefit of early intervention because this critical transition has significant long-term consequences for the child’s future and adjustment (Kellam & Van Horn, 1997). Continued follow-up of our study sample will shed light on the endurance of intervention gains seen in the home context and whether such effects are evident at school.

Clearly, many traditional models of mental health intervention are wanting with respect to our most vulnerable families and children. Consistent with insights shared by Kazdin (1987) and others (Dishion & Patterson, 1993; Patterson, Dishion, & Chamberlain, 1993), a health maintenance model is likely more appropriate than a “medical model.” That is, continued support helps vulnerable families and children continue to maintain healthy parenting practices and relationship patterns that promote children’s adjustment through adolescence and into young adulthood. Thus, we now cast EcoFIT as a health maintenance model designed for implementation in contexts that facilitate regular and repeated exposure and influence on children and families, and less for freestanding mental health clinics that do not have ties to institutions such as public schools (see Dishion & Stormshak, 2007).

Our current findings endorse previous evidence that long-term improvements in young children’s problem behavior can be achieved with a brief family-based intervention for toddlers. Our study also showed that improving positive parenting practices mediated positive child behavior change. Reduction in child problem behaviors was achieved using an existing, nationally available service delivery setting for low-income children who are at risk for early-starting pathways of externalizing problem behavior.
and whose families do not typically use mental health services, especially this early in their child’s development. Future follow-up of this study’s cohort should clarify questions regarding the intervention’s endurance, potential changes in effect sizes, and the benefits of the changes to the child’s adaptation to the school environment.

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